Brand proliferation and inter-brand competition

The strategic role of transfer pricing

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Abstract
Purpose – This paper first attempts to analyze the issue of brand proliferation by a monopolist allowing transfer pricing as a channel to bridge headquarters and brand divisions, and then to view how the headquarters uses transfer pricing as a strategic device to encounter intra-brand competition, inter-brand competition and cross-border profit-shifting under an oligopolistic market.

Design/methodology/approach – This paper models cross-country interactions in a Cournot-Nash framework, and characterizes equilibrium that involves both transfer pricing and output decision. MNE’s behavior is based on a two-stage process in which the centralized headquarters’ prior action on setting transfer pricing is to backup the decentralized subsidiaries in their output decision-making.

Findings – It is demonstrated that MNEs have the incentive to manipulate their transfer prices in order to shift profit cross-border. Higher transfer pricing enables brand divisions to collude easier in the intra-brand competition model, and the level of transfer price hinges upon the strength of intra-brand competition and inter-brand competition. In addition, transfer pricing is affected by tax differences between two countries.

Originality/value – This paper provides the theoretical underpinning to see how headquarters may use transfer pricing as a strategic device to face intra- and inter-brand competition that is visibly evident in many diverse industries.

Keywords Transfer pricing, Brands, Brand management, International business, International trade

Paper type Research paper

1. Introduction
Considering the number of new product introductions and available product varieties, the practice of brand proliferation is visibly evident in many diverse industries. For example, new products are being continuously introduced in the breakfast cereals, beverage, shampoo, toothpaste, personal computer, automobile, clothing and tobacco industries. Given its prevalence in practice, understanding the implications of firm proliferation strategies undoubtedly has important managerial relevance. For instance, when one firm is already saturated in the “local market” with one brand, it could introduce a new brand as a way to continue growing. We have seen that all the larger companies including those multinational firms come out with new brands and plans to
grow the brand, in order to take advantage of the market to increase their market share, as long as there’s money and opportunity out there. In doing so, they indeed create intra-brand competition within the firm and inter-brand competition under oligopolistic markets; P&G and Unilever in the consumer goods market are well-known examples.

In the tobacco industry, US-based R.J. Reynolds Tobacco Company (RJRT) is the second-largest cigarette manufacturer in the US, with four of the nation’s ten best-selling cigarette brands: Winston, Camel, Salem and Doral. RJRT’s branded products is competing worldwide with UK-produced Pall Mall, Dunhill, 555 and Swiss-produced Davidoff. For the clothing industry, Spain-based Inditex is one of the world’s largest fashion distributors, with eight sales formats: Zara, Pull and Bear, Massimo Dutti, Bershka, Stradivarius, Oysho, Zara Home and Kiddy’s class-boasting 3,240 stores in 65 countries. It competes world-wide with multinational enterprises (MNEs), for example: Benetton, Calvin Klein, Dolce&Gabbana, etc., and extract profit cross-border.

In product proliferation literature, Raubitschek (1987) treats new brands as endogenous in order to deter entry in a model of product proliferation with multi-product firms. Gilbert and Matutes (1993) pointed out that brand proliferation is a credible entry-deterring strategy if the degree of brand-specific differentiation is not too large, and if products produced by different firms are perceived by consumers as being close substitutes, then a decision to proliferate products is also a decision to compete head-on with a rival firm. Accordingly, we might expect that brand differentiation decreases price competition and creates market share by brand proliferation.

Putsis (1997) provided an empirical study of the competitive pricing interaction between national brand and private label food products, focusing on the effect of brand proliferation. He grouped his findings into three categories:

1. Price, promotion and competitive effects.
2. Brand proliferation and entry deterrence.
3. Local market effects.

Bayus and Putsis (1999) used the personal computer as an example to demonstrate that proliferation strategy has a multi-dimensional explanation, and found that product proliferation decisions have both supply (price) and demand (market share) implications. Previous studies provided us with real-world scenarios and identified three primary effects of an international brand proliferation strategy for MNEs: intra-brand competition, inter-brand competition, and cross-border profit shifting.

Along with the rapid growth of MNEs, transfer pricing is used by decentralized transnational corporations as a strategic instrument to tackle the issues of brand proliferation. The strategic objectives of international transfer pricing fall into three areas: taxation-related objectives, internal management-oriented objectives, and international or operational objectives which were surveyed by Cravens (1997). The pricing of internal transactions undertaken by MNE’s headquarters is a tax issue that tax authorities are concerned about[1], but it is also a strategic concern of MNE in supporting its local subsidiaries on brand proliferation and output decision, as the MNE have the incentive to manipulate their transfer prices in order to shift profit cross-border[2]. Choi and Day (1998) examined the role of transfer pricing using a
model of a vertically integrated firm with divisions located in different tax jurisdictions. Baldenius et al. (2004) further explored transfer pricing of multinational firms when individual divisions face different income tax rates. Stewart (2001) delineated empirical evidence relating to the use of profit-switching transfer pricing in Ireland, focusing on trade and value-added data. He found that “an examination of trade flows of certain high-value-added sectors in Ireland is consistent with the hypothesis that transfer pricing is used to switch profits away from high tax areas by both underpricing imports and overpricing exports, for example, from the US, Canada, and various EEC countries to Ireland” (pp. 49).

Besides a purely tax-driven mechanism, transfer pricing is often used by the enterprise in achieving competitive advantage and other strategic objectives as well. Nielsen et al. (2003) treated it as a strategic instrument in an oligopolistic final goods market. Zhao (2000) constructed a model of a partially decentralized multinational firm in competition with a rival firm, and showed that transfer pricing can be used as a rent-shifting device by the MNE to compete with rival companies. Schjelderup and Sørgard (1997), and Göx (2000) analyzed the use of transfer pricing as a strategic device for divisionalized firms to face duopolistic price competition.

The major issue of brand proliferation is on the management of divisionalization. It has been argued that firms engaged in Cournot competition would find it individually profitable to create intra-firm competition via the establishment of horizontal divisions within the firm. The literature suggests that some constraints have to be imposed for divisionalization equilibrium existence, as to whether divisionalization equilibrium existence depends on the cost of divisionalization and the degree of product differentiation. Without considering production differentiation, Polasky (1992) showed that if splitting into divisions is costless and demand is linear, then divisionalization equilibrium does not exist, while Baye et al. (1996a, b) demonstrated that when it is costly to form competing divisions, a Nash equilibrium does exist. Ziss (1998) argued that if products are differentiated across firms but not across divisions, then divisionalization equilibrium exists even if the costs of creating divisions are zero.

Although divisionalization will create negative externalities between intra-brand divisions, the parent firm competing in oligopoly still has an incentive to form independent competing divisions and operate in an integer. Saggi and Vettas (2002) considered the strategic role of fees and royalties, but the role of international transfer prices as a rent-shifting device under intra- and inter-brand competition has not been previously analyzed. Looking into the existence of the divisionalization model, we will construct a brand differentiation model without imposing the cost of divisionalization for simplicity but assuming that the output is differentiated not only across firms but also across brand divisions of the same firm, and within such context intra-brand competition and inter-brand competition are examined.

In this paper, we attempt to offer formal answers to those above-mentioned scenarios and try to circumvent the shortcomings of the concerned literature, while emphasizing the strategic role of transfer pricing that is played by MNE in the context of brand proliferation. We first analyze the issue of brand proliferation by a monopolist allowing transfer pricing as a channel to bridge the headquarters and brand divisions, and then see how the headquarters uses transfer pricing as a strategic device to encounter intra-brand competition, inter-brand competition and cross-border profit shifting under an oligopolistic market. This method uses four components to further
elaborate the determinants of transfer pricing: marginal cost, tax differential effect, intra-brand competition effect and inter-brand competition effect.

We model cross-country interactions in a Cournot-Nash framework, and characterize equilibrium that involves both transfer pricing and output decision. MNE’s behavior is based on a two-stage process in which the centralized headquarters’ prior action on setting transfer pricing is to backup the decentralized subsidiaries in their output decision-making. It shows that MNE have the incentive to manipulate their transfer prices in order to shift profit cross-border. Higher transfer pricing makes brand divisions collude easier in the intra-brand competition model, and the level of transfer price hinges upon the strength of intra-brand competition and inter-brand competition, which works in the opposite direction. It also shows that optimal transfer pricing is affected by the difference in tax rates between two countries.

The remainder of the paper is organized as follows. Section 2 presents the basic brand proliferation model; section 3 focuses on the multinational intra- and inter-brand competition under oligopoly, and section 4 contains the conclusions.

2. Brand proliferation under monopoly
Consider an MNE consisting of multi-brand subsidiaries located in the host country. Let \( n \) represents the number of brand divisions provided by MNE in the host country. Each brand has its own brand manager and is charged with maximizing division profits and acts independently of the other brand division managers. The headquarters is located in the home country, and it provides final goods and uses strategic transfer pricing \( r \) to manage branches.

Assuming that \( Q \) represents the sum of output produced by these brand divisions and \( q_i \) represents the output produced by the \( i \)th brand division of MNE, then \( Q = \sum_{i=1}^{n} q_i \). Let \( Q_i = Q - q_i \) denotes the output of all brand divisions except those of brand \( i \) and \( p_i(q_i; Q_i) \) denotes the inverted demand function faced by brand division \( i \). We assume that output is differentiated across brand divisions and symmetrically differentiated as Bowley (1924) specified[3]:

\[
p_i = p_i(q_i + \delta Q_i), \quad i = 1, 2, \ldots, n
\]

with \( \delta \in [0, 1] \). We interpret parameter \( \delta \) as the degree of brand differentiation between final products. For \( \delta = 1 \) brand divisions supply homogeneous brands and they are perfect substitutes, while \( \delta = 0 \) brand divisions supply to independent market.

For an MNE, each brand division absorbs the transfer prices \( r \) as its marginal cost, and chooses the output. The setup described above implies that the brand manager of the \( i \)th brand division of MNE is induced to maximize divisional profits which are defined as:

\[
MAX(1 - t^f)\pi_i^f = (1 - t^f)[p(q_i + \delta Q_i)q_i - rq_i], \quad i = 1, 2, \ldots, n
\]

where \( t^f \) is the net tax rate imposed by the foreign government on the MNE’s brand divisions profits in the host country.
MNE’s after tax profits from brand divisions may be summarized as:

\[(1 - t^f)\Pi^f = (1 - t^f)\sum_{i=1}^{n} p_i^f\]  \hspace{1cm} (3)

where \(\Pi^f\) is MNE’s foreign profits before tax.

Now assume that the cost of brand divisionalization is zero and each produces output at a constant marginal cost \(c\) for simplification[4]. Let \(t^d\) represents the net tax rate for MNE’s domestic profit and \(\Pi^d\) represents MNE’s domestic profits before tax. The MNE’s domestic after-tax profits are given by:

\[(1 - t^d)\Pi^d = (1 - t^d)\sum_{i=1}^{n} (rqi - cq_i), i = 1, 2, \ldots, n\]  \hspace{1cm} (4)

The joint profit of the MNE is the sum that comes from domestic and brand divisions, and the net profit can be written as:

\[\text{MAX} \Pi(r) = (1 - t^d)\Pi^d + (1 - t^f)\Pi^f\]  \hspace{1cm} (5)

The brand division decides on the level of the final output, whereas the headquarters determines the transfer price. For the purpose to maximize the total profits from all divisions, we set up a two-stage game of complete information that involves simultaneous choice in each stage. In the first stage, the headquarters determines the transfer pricing that affects the reactions of the subsidiaries. In making this decision, the planners take into account the interactions among brands in the second stage. In the second stage, given the transfer price, independent brand managers choose appropriate final output in the host country. The quantity determined will in turn maximize MNE’s profit.

The model is now solved by using backward induction. Accordingly, the analysis begins by examining the brand division’s choice of output. Differentiating equation (2) with respect to \(q_i\) yields the following first order condition:

\[[p_i(\cdot) + q_i p_i'(\cdot) - r] = 0, i = 1, 2, \ldots, n\]  \hspace{1cm} (6)

If \(q\) denotes the symmetric equilibrium level of division output then:

\[q_i = q(r) = \frac{Q(\cdot)}{n} = q \text{ for all } i = 1, 2, \ldots, n\]  \hspace{1cm} (7)

In equilibrium \(q_i = q\), total differentiation of equation (6) yields:

\[q_r = \frac{dq}{dr} = \frac{1}{[2 + (n - 1)\delta + (1 + (n - 1)\delta)R]p'}\]  \hspace{1cm} (8)

where \(R = qp''/p'\) is a measure of the relative curvature of the demand curve in the final goods. We have to restrict the value of \(R\) when dealing with demand curves especially in the case of imperfect competition. As long as \(R\) is concave, linear or not too convex, the sign of equation (8) can be negative, which implies that an increase in the transfer price reduces the division’s level of the final output[5].

In the first stage, the MNE headquarters determines the transfer price by maximizing its total profits. Substituting equation (7) into equation (5), then
maximizing equation (5) with respect to $r$ and using condition (6) yields the following first-order condition

$$n\{(1 - t^d)[q + (r - c)q_r]\} + (1 - t^f)[-q + \delta(n - 1)qp'q_r] = 0$$

Equation (9) can therefore be rewritten as:

$$r = c + \left[\frac{t^d - t^f}{1 - t^d} \left(\frac{q}{q_r}\right)\right] + \left[-\frac{1 - t^f}{1 - t^d} \delta(n - 1)qp'\right]$$

which implies that the optimal transfer price will be determined by three components: the marginal cost, tax differential and intra-brand differential effect [in the sequence of the right hand side of the equation (10)].

Using vertical integration to internalize involves at least three issues among MNE’s divisions. First, the problem is due to the competition between two divisions that supply a final finished product from the same upstream MNE. Second, with brand differentiation consideration, there is a competition from incomplete brand substitution. Third, taxes differentiation between two countries creates an externality for tax evasion.

For decomposing the intra-brand competition from differentiated brand proliferation, we consider a decentralized monopolist framework in this section. If intra-competitions were presented for brand proliferation with differentiation, then using the transfer pricing to internalize them would bias the result towards vertical integration.

Firstly, there is the well-known problem of double marginalization between upstream and downstream divisions. For discussing traditional double marginalization problem, we exclude both the tax consideration and brand proliferation. The transfer pricing strategy is solved by setting the transfer price equal to the marginal cost of the products and MNE can reach the level of monopolizing profit. To illustrate this, we substitute $t^d = 0$, $t^f = 0$ and $n = 1$ (then $q = Q$) into equation (10), $r = c$. The centralized setting is equivalent to Hirshleifer’s (1956) solution of the problem of transfer pricing. Now, from equation (6), we can write the optimal reaction function for brands as:

$$p'(Q)Q + p(Q) - c = 0$$

It has the same effect with vertically integrated enterprises in that acting among branches will achieve an efficient allocation of resources within the organization. This is the so-called “double marginalization” problem (Spengler, 1950). In the absence of tax consideration, the headquarters can make a residual claimant per brand division by choosing $r = c$ to eliminate the distortion of vertical externality[6]. Given the decentralized nature of the typical enterprise, the transfer pricing becomes even more critical (Horngren, 1989).

Secondly, the problem of brand proliferation is due to the competition among two divisions that supply a final finished product from the same upstream MNE. For understanding the problem of intra-brand competition, we exclude the tax consideration but allow brand proliferation and brand differentiation. To see this, we substitute $t^d = 0$, $t^f = 0$ into equation (10), and obtain:
\[ r = c + [\delta(n - 1)q p'] = c + [\delta(n - 1)\rho \varepsilon^{-1}_d] \]  \hspace{1cm} (12)

where \( \varepsilon_d = -q p'/p \), the elasticity of demand function. Equation (12) implies \( r > c \) since the brand differentiation effect is positive (i.e. \( [\delta(n - 1)\rho \varepsilon^{-1}_d] > 0 \)). The results can be summarized as follows:

**P1.** Solving intra-division externalities, MNE has the incentive to charge higher transfer pricing in order to induce its branches to soften intra-brand quantity competition in the final product market.

This result in conjunction with equation (8), illustrates that the headquarters thus charges a higher transfer price for the subsidiary to lower output.

Departure from previous studies, we now discuss intra-brand competition in terms of two kinds of differentiation: the number of brand proliferation, and the degree of brand differentiation. How high the MNE will charge the transfer price over marginal cost is dependent upon the number of intra-brand proliferations and the degree of brand differentiation.

Differentiating equation (12) with respect to \( n \) and \( \delta \), respectively, yields:

\[ \frac{\partial r}{\partial n} > 0 \text{ and } \frac{\partial r}{\partial \delta} > 0 \]  \hspace{1cm} (13)

The above results can be summarized as follows:

**P2.** If the number of brand proliferation increases, the headquarters will charge a higher transfer price for the subsidiary to lower output. And when the degree of brand differentiation decreases, the headquarters will charge a higher transfer price to soften brand differentiated competition.

Similar to the consideration of strategic trade policy, the transfer price in the present model plays the role of export tariffs without a foreign rival. MNE’s headquarters can command their brand divisions to act as softer competitors on the final product market by charging a transfer price above the marginal cost. In the literature, the role of transfer pricing has always been used for the intermediate goods in oligopoly with rival firms, whereas in the present model, the final goods in monopoly MNE with brand proliferation are considered without such external competition.

Substituting equation (12) and \( t^d = t' = 0 \) into equation (6), we obtain optimal output reaction function:

\[ \hat{p}(\cdot) + q p'(\cdot) - c + \delta(n - 1)q p' = 0 \]  \hspace{1cm} (6')

In the homogeneous brand case, namely, \( \delta = 1 \), arranging the above expression yields \( [\hat{p}(Q) + Q p'(Q) - c] = 0 \), which is the same as equation (11), the traditional monopoly situation. On the other hand, transfer pricing cannot be used to eliminate brand differential externalities totally, when the degree of brand differentiation exists, namely, \( \delta < 1 \).

The above results can be summarized as follows:

**P3.** Without having brand differentiation but allowing intra-brand proliferation, MNE can use transfer pricing to eliminate the externality totally. But, transfer
pricing cannot be used to eliminate brand differential externalities totally when the degree of brand differentiation exists.

Finally, in the presence of tax differentials, transfer pricing can be either above or below the marginal cost, depending on the sign of \( (t^d - t^f) \) which is evident from equation (10).

We now exclude the degree of brand differentiation by setting \( \delta = 1 \). Substituting equations (10) and (8) into equation (6), we obtain:

\[
\begin{align*}
  p(\cdot) + q_0(\cdot) + \delta(n-1)q_0' - c - \frac{t^d - t^f}{1-t^d} \frac{(1 + n + nR)q_0'}{1-t^f}(n-1)q_0' + \frac{(1-t^d)}{(1-t^f)}(n-1)q_0' &= 0 \quad (6')
\end{align*}
\]

where \((1 + n + nR)\) cannot be zero[7]. Hence, if \( t^d = t^f \), the equation reduces to \([p(Q) + Qq_0'(Q) - c] = 0\), which is the same as equation (11). The above results can be summarized as follows:

**P4.** Taking tax into consideration, the optimal transfer pricing, \( r \), moves the MNE’s equilibrium to the monopoly solution if the taxation rates of the two countries are the same.

P4 illustrates the result that whether MNE’s transfer pricing strategy can lead the Cournot equilibrium to monopoly profits or not, is totally dependent on the tax differentiation between the host country and the home country. Intuitively, so long as MNE confronts the same tax rate between two countries, it does not have to take the “surplus management” for tax avoidance into account, and the tax device will then not make the firm deviate from the target objective.

Under the circumstances where MNEs pursue the goal of profit maximization, the profit tax rate differentiation is a key to determine the level of transfer pricing. In our analysis, the different tax rate was not taken as an instrument for tax competition by two countries; however, it has a function in regulating MNE’s strategic policy. In particular, when transfer price causes tax avoidance, those countries will take various “anti-tax paradise” policies and lead to the arms length principle, inhibits the strategic transfer pricing from operating normally. At the same time, appropriate adjustments of tax policy by government will assist the MNE’s strategy to work. Describing this relevant scenario as follows.

In the literature, most papers focus on how multinational firms adopt transfer pricing to avoid paying income taxes. Tax authorities ask transfer prices to be set according to the arm’s length standard (ALS)[8], as if the transactions had taken place between unrelated parties acting at arm’s length in competitive markets. Adopting this transfer-pricing rule, it is possible to come up with several comparable evaluation results that form a band of ALS. Therefore, the transfer price falls into the band regarded as dealing with the arm’s length standard, and need not be adjusted. On the contrary, the price should be adjusted.

Taking partial derivative of equation (10), we obtain \( \partial r/\partial t^d = 2(1 - t^f)q_0'/(1 - t^d)^2 < 0 \) and \( \partial r/\partial t^f = 2q_0'/t^d - t^d > 0 \). Tax policy of an active government could tune the transfer price back to the arm’s length standard (ALS). The results can be summarized as follows:
P5. Following the arm’s length standard, authorities may adjust the tax rate indirectly instead of claiming to adjust the transfer price directly when the price is out of the band.

From P5, the coordination role that government takes can be formulated as follows: When transfer pricing is higher than the limit of ALS, it would be helpful to decrease the transfer price by raising the domestic tax rate or through reducing the foreign tax rate on MNE. On the contrary, when transfer pricing is lower than the limit of ALS, the transfer price needs to be increased via reducing the domestic tax rate or raising the foreign tax rate[9].

3. Intra-brand and inter-brand competition under oligopoly

This section analyses brands proliferation strategy of MNEs who use transfer pricing as a strategic device in duopolistic quantity competition environment. Let \( n \) denotes the number of brand divisions that MNE has and \( m \) denotes the number of brand divisions that local enterprise has. Each enterprise uses brand proliferation to expand its market share and anticipates earning much more profit. Both \( n \) and \( m \) are treated exogenously[10]. Each division acts independently and chooses output so as to maximize its brand’s profit. Nevertheless, the interaction among brand division should not be overlooked.

The demand side assumption for MNE refers to previous section. For local enterprise, we assume \( Q^* \) represents the sum of output produced by these brand divisions for local enterprise and \( q^*_j \) represents the output produced by the \( j \)th brand division of local enterprise, then \( Q^* = \sum_{j=1}^{m} q^*_j \) and \( \bar{Q}_j = Q^* - q^*_j \). Assume that output is differentiated across brand divisions and symmetrically differentiated and let \( p_i = p_i(q_i, \bar{Q}_i, Q^*) \) and \( p^*_j = p^*_j(q^*_j, Q, \bar{Q}_j) \) denote the inverted demand function for brand divisions \( i \) and \( j \) respectively. For differentiated products, the inverse demand functions are specified as:

\[
p_i = p_i(q_i + \delta \bar{Q}_i + \delta Q^*), \quad i = 1, 2, \ldots, n
\]

\[
p^*_j = p^*_j(q^*_j + \delta Q + \delta \bar{Q}_j^*), \quad j = 1, 2, \ldots, m
\]

with \( \delta \in [0, 1] \). We interpret parameter \( \delta \) as the degree of brand differentiation between final products. For \( \delta = 1 \), brand divisions supply homogeneous brands and they are perfect substitutes, while when \( \delta = 0 \) brand divisions for each enterprise supply to the independent market.

The setup described above implies that the brand manager for each brand division is induced to maximize divisional profits, which are defined as:

\[
\text{MAX}(1 - t^f) \pi_i^{q_i} = (1 - t^f)[p_i(q_i + \delta \bar{Q}_i + \delta Q^*)q_i - r q_i], \quad i = 1, 2, \ldots, n
\]

\[
\text{MAX}(1 - t^*) \pi_i^{q^*_j} = (1 - t^*)[p^*_j(q^*_j + \delta Q_2 + \delta \bar{Q}_j)q^*_j - c^* q^*_j], \quad j = 1, 2, \ldots, m
\]
where $t^f$ is the net tax rate imposed on the profit of MNE's brand divisions and $t^*$ is the net tax rate imposed on the profit of local enterprise's brand divisions by the local government of host country.

The joint profit of the MNE is the sum that comes from domestic and brand divisions, and the net profit after tax can be written as:

$$\text{MAX } \Pi(r) = (1 - t^d)\Pi^d + (1 - t^f)\Pi^f$$

(18)

The first term of equation (18) refer to equation (4), but MNE divisions after-tax profits are expressed by $(1 - t^f)\Pi^f = (1 - t^f)\sum_{i=1}^{n} \pi^f_i$. It should be pointed out here that $\pi^f_i$ is affected by the demand function $p_i = p_i(q_i + 3Q_i + \delta Q^*)$.

Again, the model is solved backward for optimization. In the second stage, all brand divisions absorb transfer prices as the cost, and choose outputs simultaneously to maximize respective brand profit, yielding the following reaction function from first-order conditions:

$$p_i(q_i + 3Q_i + \delta Q^*) + q_i p_i(q_i + 3Q_i + \delta Q^*) - r = 0, \quad i = 1, 2, ..., n$$

(19)

$$p_j(q_j + 3Q + \delta Q^*_j) + q_j p^*_j(q_j + 3Q + \delta Q^*_j) - c^* = 0, \quad j = 1, 2, ..., m$$

(20)

Again, the symmetric output level is expressed as $q_i = Q/n = q$, and $q_j = Q^*/m = q^*$. The transfer pricing will indeed affect the level of output.

Consider the case of linear demand in order to simplify computation. Substituting symmetric output level into equations (19) and (20), and taking total differentiation yields:

$$[2 + 3(n - 1)]p^d dq + 3mp^d dq^* = dr$$

(19')

$$\delta np^d dq + [2 + 3(m - 1)]p^* dq^* = dc^*$$

(20')

where $[2 + 3(n - 1)]p^d < 0$, $[2 + 3(m - 1)]p^* < 0$ and(11)

$$|DB| = \begin{vmatrix} [2 + 3(n - 1)]p^d & 3mp^d \\ \delta np^d & [2 + 3(m - 1)]p^* \end{vmatrix} > 0$$

Solving equations (19') and (20') by Cramer's rule, we obtain:

$$\frac{dq}{dr} = \frac{p^*[2 + 3(m - 1)]}{|DB|} < 0$$

(21)

$$\frac{dq^*}{dr} = -\frac{\delta np^*}{|DB|} > 0$$

(22)

$$\frac{d(q + q^*)}{dr} = \frac{p^*[2 + 3(m - n - 1)]}{|DB|} \geq 0 \iff n \geq (m - 1) + \frac{2}{\delta}$$

(23)
Facing brand competition, the headquarters will reduce transfer prices to increase its market share. From equations (21) and (22), it can be found that decreasing the transfer pricing \( r \), will increase MNE’s output and decrease the local enterprise’s output. The net effect for the industrial equilibrium output depends on the number of brands between two enterprises and the degree of brand differentiation, as expressed in equation (23). The results can be summarized as follows:

**P6.** Decreasing the transfer pricing will increase MNE’s output and decrease the local enterprise’s output. The net effect for the industrial equilibrium output depends on the number of brands between two enterprises and the degree of brand differentiation.

Comparing to strategic trade policy (Dixit, 1984; Brander and Spencer, 1984, 1985), the transfer price in the present model plays the role of export tariffs/subsidy with many foreign rivals. The deviation from the Nash strategy in the partially centralized setting by the headquarters would be credible acts in prior action on setting an adequate transfer price.

Under WTO’s guideline, a number of restrictions are put in place in order to remove trade obstacles for liberalization; therefore, strategic trade policy is difficult to implement with government interference. We argue that the operation of vertical integration through using of transfer pricing instead of implementing the strategic policies of government is more feasible and practicable.

Substituting equilibrium output of \( q(r) \) and \( q^*(r) \) into equation (18) and maximizing equation (18) with respect to \( r \) yields the following first-order condition:

\[
\frac{n}{(1 - t^d)}[q + (r - c)q_r] + (1 - t^f)[-q + \delta(n - 1)p'q_r + \delta m p'q^*_r] = 0 \quad (24)
\]

Again, the second-order condition \( \Pi_{rr} \) will be negative as long as the demand curve is not too convex.

From equation (24), we obtain:

\[
r = c + \left[ \frac{t^d - t^f}{1 - t^d} \left( \frac{q}{q_r} \right) \right] + \left[ -\frac{1 - t^f}{1 - t^d} \delta(n - 1)q' \right] + \left[ -\frac{1 - t^f}{1 - t^d} \delta m p'(q^*_r) \right] \quad (25)
\]

In which the transfer price will be determined by four components: marginal cost, tax differential effect, intra-brand competition effect and inter-brand competition effect [in the sequence of the right hand side of the equation (25)].

**P7.** The level of transfer pricing is hinging upon the strength of intra-brand competition and inter-brand competition, which works in opposite direction.

*Proof:* the third term of the right hand side of equation (25) is the effect of intra-brand competition:

\[
\left[ -\frac{1 - t^f}{1 - t^d} \delta(n - 1)q' \right] > 0
\]

which indicates that a higher transfer price is for intra-brand competition. The fourth term of the right hand side on equation (25) is the effect of inter-brand competition:
which indicates that a lower transfer price is for inter-brand competition. \textit{QED}.

The MNE employs the transfer pricing policy for the same objective, but the direction of the transfer price affected by intra-brand competition and inter-brand competition is always opposite. In view of proposition 6, the transfer pricing above or below marginal cost depends on the number of these two enterprises’ brands. In the oligopoly market setting, methods of utilizing strategic policy to direct the Cournot equilibrium to reach the profit goal of Stackelberg leader, have already been demonstrated in the literature. The subtlety of our analysis is that we use transfer pricing as the engine of strategy in launching the chain reaction of a brand division’s output, and then pursue the maximization goal of the group’s profits. This strategic goal has been applied in accounting and management performance studies, but here we have extended it into a global setting of brand proliferation – intra-brand competition and inter-brand competition with product differentiation.

In order to probe into the influence of these two pieces of the model further, but putting aside the tax difference by setting \( t_d = t_f \), equation (25) can be rewritten as:

\[
\begin{align*}
    r &= c + \left[ -\delta(n-1)qp' \right] + \left[ -\delta mqp'(\frac{\bar{q}_r}{q_r}) \right] \\
\end{align*}
\]

Substituting equations (21) and (22) into equation (25'), equation (25') can be rewritten as:

\[
\begin{align*}
    r &= c + \left[ 1 + \frac{n(\delta - 2)}{2 - \delta + \delta m} \right] \delta qp' \\
\end{align*}
\]

which implies:

\[
\begin{align*}
    r &> c \text{ iff } n > \left( \frac{\delta}{2 - \delta} \right) m + 1 \\
\end{align*}
\]

Whether competitive conditions drive all firms to price their output near marginal cost or not, depends on the number of brand proliferations and the degree of brand differentiation. In addition, transfer pricing lower than marginal cost provides us an explanation for what can be called “marginal cost dumping”.

This finding is similar to what obtained from strategic trade policy, but we are allowing brand differentiation. In the case of brand mutually independent, \( \delta = 0 \), the transfer price should be higher than marginal cost in order to avoid intra-brand competition. In the case of perfect brand substitution, \( \delta = 1 \), the transfer price should be higher than marginal cost if the number of intra-brands is more than the number of inter-brands plus one. When \( 0 < \delta < 1 \), even though the number \( n \) is lower than \( m + 1 \), the transfer price may still be higher than marginal cost because of \( \frac{\delta}{2 - \delta} < 1 \).

4. Conclusions

Brand proliferation has been rationalized as an organizational innovation, to generate differentiated products, and as an entry-deterring strategy by an incumbent
monopolist. In this paper, we firstly examine a monopoly model of brand differentiation and analyze the use of transfer pricing to eliminate various externalities from organizational divisionalization. This shows that higher transfer pricing will induce easier collusion amongst the brand’s divisions in developing an intra-brand competition framework, and in which if the number of brand proliferation increases, the headquarters will charge a higher transfer price for the subsidiary to lower output, when the degree of brand differentiation decreases, the headquarters will charge a higher transfer price to soften brand-differentiated competition. Nevertheless, transfer pricing cannot be used to eliminate brand differential externalities totally, if a degree of brand differentiation exists. Taking tax into consideration, the optimal transfer pricing moves the MNE’s equilibrium to the monopoly solution if the taxation rates of the two countries are the same.

Multinational enterprises may use transfer pricing as a strategic instrument to tackle the issues of brand proliferation in oligopoly competition. The headquarters’ prior action on setting transfer pricing is to backup the brand divisions in their output decision-making. With regard to the level of transfer pricing, it hinges upon the strength of intra-brand competition and inter-brand competition, which is working in opposite directions. It also shows that the optimal transfer pricing is affected by the tax differences between two countries.

There are other aspects of strategic transfer pricing that have not been addressed here. Our analysis is restricted to the case of quantity competition with brand differentiation in the final product market. The results obtained may not carry over to the case of price competition under duopoly without brand proliferation; the firm may implement a strategic markup rather than provide the subsidization. However, in our setting of oligopoly model with brand proliferation, it seems reasonable to assume that firms compete with quantity. In fact, by announcing brand proliferation decision, the firm will be able to weaken price competition and lead the situation to quantity competition.

Notes
2. Transfer pricing legislation is normally based on the concept of the arm’s length standard (ALS) which says that all MNEs’ intra-corporate activities should be priced as if they took place between unrelated parties in competitive markets (Edén et al., 2001). Sakurai (2002), Raimondos-Møller and Scharf (2002) focused on direct regulation of transfer prices, rather than the selective use of optimal taxes in an environment characterized by transfer prices as constrained by exogenous rules.
3. This specification is used by Dixit (1979).
4. This specification is similar to that in Ziss (1998), and our results do not depend on the specification.
5. For more detail, see Brander and Spencer (1984) where \( n \) was set as 1.
6. This well-known result is widely accepted from the point of industrial organization theory (Tirole, 1988).
7. See Brander and Spencer (1984), it requires $1 + n + nR \neq 0$ where $n = 1$.
8. Evolution of the arm’s length standard in North America is evident in the twentieth century.
9. Focusing not on tax-saving objective of transfer prices, OECD (1995) suggests that organizations adopt a wide range of practices and believes that will keep MNEs independent in contract behavior.
10. The optimal number $n$ for deterring entry of rival enterprises into the market was considered by Schmalensee (1978), where it is supposed that $n$ and $m$ are endogenous.
11. It is also the Routh-Hurwitz condition for the stability of reaction function that implies global uniqueness in the equilibrium.

References


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