Buyer Power in International Trade[1]

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Abstract

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1 Introduction

The present paper investigates how buyer power, that is, the exercise of significant market power by retailers/wholesalers, might impact international markets and, in particular, how it may affect the volume of international trade, consumer prices and welfare.

In many countries, retailers have become significantly more powerful in recent years. The extreme case is Wal-Mart which is today the world's biggest company by sales (US$312.4 billion). It is the number-one grocer in the United States and in the world holding 16% of the US grocery market. In certain US cities, Wal-Mart has 25 to 30% of the grocery market.[1] In the EU food retailing market, the concentration ratio in retailing rose by 20% between 1993 and 1999 (Dobson et al., 2001). The aggregate concentration ratio is also much higher than in manufacturing, since the 20 largest retailing firms account for 43% of aggregate EU retail food turnover whereas the equivalent number for manufacturing is only 14.5%. The same phenomenon has been observed at the EU member level and in markets such as apparel and clothing retailing.[2]

There are several reasons why it is important to understand the role of buyer power for international markets. For one thing, retailers with buyer power participate extensively in international markets. Wal-Mart, for instance, accounted for an incredible 10% of total US imports from China in 2004 (Basker and Hoang Van, 2005; Fishman, 2006). It now imports more than half of its non-food products (Smith, 2004). In the apparel market, 12% of the apparel sold by US retailers in 1975 were imported against 48% in 1993.[3] It has been argued (Fishman, 2006) that without buyer power, imports from China would not have grown as quickly as they did over the last decade. Hence, it is the competitive pressure exercised by big retailers such as Wal-Mart on their domestic suppliers that has forced many of them to relocate production abroad. Of course, major retailers also buy directly

[1] The increase in market share comes in large part from superior product handling and distribution technology compared to competitiors. Indeed, some estimates indicate that for each job created at Wal-Mart, rivals lose 1.5 to 1.75 people (Fishman, 2006; Economist, 2006).

[2] In 1999, the five-firm concentration ratio in grocery and daily goods retailing was 63% in the UK, 76.7% in Sweden, 56% in France and 62.5% in Belgium. Other countries range between 40 and 60% except Greece (31%) and Italy (17.6%) (Dobson et al., 2001). See Gereffi (1999) concerning clothing retailing.

[3] See Gereffi (1999). The picture is similar for Europe.

from low cost producing countries. Indeed, by the mid-1970s, most major US retailers had overseas buying offices, especially in East Asia, with contacts with a large network of suppliers.[4] Gereffi (1999) sees the role of these buyers as critical to understand why, despite formidable spatial and cultural distances, countries like Japan, South Korea, Taiwan, Hong Kong, Singapore, and now China have been so successful and for so long in exporting to Western countries. In other words, East Asia sustained trade growth is probably better explained by the role of 'buyer-driven global commodity chains'[5] than by more traditional explanations such as the role of export-oriented policies. But buyer power has also been blamed for limiting trade by making import penetration more difficult than it would otherwise have been, thanks in particular to the use of exclusive agreements.

Another useful way of understanding why buyer power is important for international markets is simply to ask why buyer power seems to be on the rise. Beyond technological changes in transportation, handling and distribution, one of the fundamental reasons must be a greater prevalence of differentiated products in most markets. Unlike homogeneous products, for which there often are well established market clearing institutions, they require a lot of information and a good match between the characteristics of buyers and sellers (Rauch and Feenstra, 1999). Since prices are not enough to convey the necessary information, some institutions must emerge to handle these issues. The emergence of buyer power and buyer-driven commodity chains are surely in part responses to such needs.[6] If buyers are in the driving seat, it must because they know consumers' characteristics better than segmented and/or distant suppliers. In other words, buyer-driven commodity chains and buyer power may be especially useful in association with international markets. It should be apparent that buyer power can have far-reaching effects on international markets. It is however far from clear whether buyer power should increase or decrease trade and welfare. For all these reasons, it seems important to start investigating the role of buyer power for international markets.

The analysis of buyer power dates back to Galbraith (1952) who looked

[4]In 2002, Wal-Mart took over Pacific Resources Exports (PREL), its exclusive global buyer between 1989 and 2002. PREL lists over 6000 suppliers, 80% of which are located in China (Smith, 2004).

[5]In addition to large retailers, examples of buyer-driven chains include well-known marketers that carry no production such as Liz Claiborne, Nike and Reebok (see Gereffi, 1999).

[6]Along with other institutions such as networks; see Rauch (1999).

at it as a countervailing power, i.e., as offsetting manufacturers' market power. Since then the industrial organization literature has concluded that the impact of higher concentration in retailing on consumer prices and consumers' welfare was ambiguous.[7] Essentially, buyer power given monopolistic power at the manufacturing level constitutes a second-best solution. Thus, increased buyer power can lead to lower retail prices and higher welfare provided sellers themselves have power. If however sellers have little or no power, increased buyer power unambiguously leads to higher retail prices and lower welfare. The more recent industrial organization literature notes that sellers with buyer power have several different contractual tools at their disposal, and it aims at understanding the implications (on retail prices, degree of collusion, or manufacturers incentives) of some of these tools. For instance, Marx and Shaffer (2004) show that retailers with buyer power may use upfront payments, also known as slotting allowances, to exclude other retailers. Rey and al. (2005) consider the use of take-it-or-leave-it-offers made by buyers along with conditional payments, while Inderst and Wey (2004) look at the supplier's incentives to invest in product innovation in response to buyer power. This recent literature generally concludes that retailers with market power have considerable scope for anti-competitive behavior.

The present paper investigates buyer power by looking explicitly at the contractual arrangements between sellers and buyers. Hence its point of departure is the recent literature in industrial organization and it extends the analysis to an international environment characterized by barriers to trade and asymmetries in the market shares of manufacturers. We are particularly interested in understanding how trade liberalization affects consumer prices and welfare in the presence of buyer power, and how this compares to a world in which producers have market power. The existing international trade literature on intermediaries does not generally deal with buyer power.[8] Basker and Van (2005) is, to our knowledge, the only paper on buyer power

[7]Von Ungern-Sternberg (1996) and Dobson and Waterson (1997) show that increased concentration at the retail level does not necessarily lead to lower consumer prices. Chen (2003) shows that an increase in countervailing power does lower retail prices provided a competitive fringe is present in retailing.

[8]See Rauch (2001) on the role of networks in international trade, Feenstra and Hanson (2004) on the role of Hong Kong intermediaries with respect to Chinese products, Raff and Schmitt (2005, 2006) on the role of exclusive territory and exclusive dealing in international markets, and Richardson (2004) on the comparison between exclusivity in the distribution of domestic products and trade policy to restrict the market access of foreign producers.

in an international trade context. Their goal, however, is different from ours since they want to explain why, in the presence of economies of scale in retailing and in the import process, trade liberalization has led to an explosion of imports by large buyers (i.e., Wal-Mart).

The paper is organized as follows. In the next section, a simple model with two domestic retailers and two manufacturers, one domestic and one foreign, is presented. Sections 3 derives the autarkic equilibrium, and Section 4 derives the free-trade equilibrium. In Section 5, the effects of buyer power is compared to those resulting from seller power, while the welfare effects of trade liberalization in the presence of buyer power are presented in Section 6. Extensions follow in Section 7 and Section 8 concludes.

2 A Simple Model

Consider two differentiated retailers, R_1 and R_2, who distribute a homogeneous product in the domestic market. The product can be obtained from a domestic manufacturer, h, and/or a foreign manufacturer, f. Production involves a constant marginal cost, c; the marginal cost of distribution is normalized to zero.

Retailer differentiation comes from the fact that they have different characteristics, such customer service, parking facilities, location etc., that consumers value. The representative domestic consumer has a quasi-linear utility function:

$$U(q_1, q_2, y) = \sum_{i=1}^{2} q_i - \frac{1}{2}\sum_{i=1}^{2} q_i^2 - bq_1q_2 + y, \tag{1}$$

where q_i denotes the quantity of the good bought from retailer i, and y the consumption of the numeraire good. Parameter $b \in [0, 1]$ reflects the degree of substitutability between retailers. If $b = 0$, the retailer services are not substitutable and each retailer acts as a monopolist; if $b = 1$, the retailers are perfectly substitutable. Denoting income by I and the retail price of retailer i by p_i, the consumer's budget constraint is

$$\sum_i p_i q_i + y = I. \tag{2}$$

Maximizing (1) subject to (2) and inverting the resulting first-order conditions yields the following demand function for each retailer:

$$D_i(p_i, p_j) = \frac{1 - b - p_i + bp_j}{1 - b^2}, \quad i, j = 1, 2; \quad i \neq j. \tag{3}$$

Retailers have all the bargaining power in their relationship with the manufacturers, and hence make take-it-or-leave-it contract offers to the manufacturers. The contracts consist of a two-part tariff, i.e., a wholesale price and a fixed fee, and may be contingent on whether a manufacturer sells exclusively to the retailer or also supplies the other retailer. We denote the case of exclusivity by E and the case of non-exclusivity by N. The wholesale price (fixed transfer) offered by retailer $i = 1, 2$ to manufacturer $j = h, f$ is denoted by w_{ij}^k (T_{ij}^k), where $k = E, N$. A contract offer by retailer i to manufacturer j can hence be summarized by the pair (T_{ij}^E, w_{ij}^E) and (T_{ij}^N, w_{ij}^N). Retailers with accepted contracts then choose retail prices p_i, $i = 1, 2$.

The strategic interactions between the retailers and between them and the manufacturers can be summarized by the following three-stage game:

1. R_1 and R_2 make simultaneous contract offers to M_h and M_f. These offers are public knowledge.

2. M_h and M_f simultaneously decide whether to accept contracts from one retailer, both retailers or none of the contracts. These decisions are also public.

3. The relevant contracts are implemented and the retailers whose contracts were accepted choose retail prices simultaneously.

We solve this game for pure-strategy subgame-perfect equilibria, beginning with the case of autarky and then considering the case of free trade. In autarky, retailers can only buy from h, whereas in free trade they have equal access to both manufacturers. These two cases are interesting, not only because they allow us to derive results in a straightforward manner, but also because they give us strong results that are shown to hold in the more complex case where trading costs are positive but not prohibitive.

Notice that in the case of autarky, having the manufacturer accept an exclusive contract from one of the retailers implies foreclosure of the rival retailer, that is, the rival does not sell. In the case of free trade, an exclusive contract does not automatically lead to foreclosure of a retailer, since each retailer may have an exclusive contract with a different manufacturer. Foreclosure only occurs if both manufacturers accept an exclusive contract from the same retailer. We therefore have to distinguish between the type of contract (E or N) and the equilibrium outcome (foreclosure (F) or no foreclosure (NF)).

Before presenting the details of the autarky and free-trade equilibria, it is useful to define the maximum total industry profit that could be generated by all players acting together as Π^m, and the maximum joint profit that could be earned by a single active retailer i together with the manufacturers (when the other retailer does not sell) as Π_i^m. It is straightforward to show that $\Pi^m = \frac{(1-c)^2}{2(1+b)}$ and $\Pi_i^m = \frac{(1-c)^2}{4}$, so that for $b = 0$ we have $\Pi^m = 2\Pi_i^m$, and $\Pi^m < 2\Pi_i^m$ for $b > 0$.

3 Autarky Equilibria

With only one manufacturer our model becomes an application of Rey, Thal and Verge (2005). There are two types of equilibria that can arise. First, there always exists an equilibrium in which one of the retailers has an exclusive contract with the manufacturer and the other retailer does not sell (Lemma 1 of Rey, Thal and Verge (2005)). In this type of equilibrium, both retailers offer the manufacturer, conditional on exclusivity, a wholesale price equal to marginal cost and a fixed fee that transfers the entire monopoly profit to the manufacturer; the contract also specifies a sufficiently unattractive payment to the manufacturer in case the manufacturer also sells to the rival retailer. Obviously, it is a best response for each retailer to offer such a contract (and for the manufacturer to accept one of them), since a retailer on his own cannot escape the exclusivity outcome. The demand faced by the active retailer is simply $x = 1 - p$, and it is easy to derive that with a wholesale price of $w^F = c$ the active retailer's profit-maximizing retail price is $p^F = \frac{1+c}{2}$. The active retailer chooses a fixed transfer to shift the entire monopoly rent to the manufacturer, who therefore obtains a profit equal to $\pi_h^F = \frac{(1-c)^2}{4}$. Both retailers earn zero profit in equilibrium: $\pi_1^F = \pi_2^F = 0$. The intuition behind this distribution of rents is simple: the retailers are competing with each other—just like in Bertrand competition—to be the manufacturer's exclusive distributor. Competition forces them to "bid" their maximal willingness to pay for exclusivity.

Second, there may also exist non-exclusive equilibria in which both retailers carry the manufacturer's product (see Proposition 2 of Rey, Thal and Verge (2005)). We consider the one that is Pareto-undominated from the point of view of the retailers. This equilibrium is characterized by two conditions. First, the manufacturer must be indifferent between accepting one retailer's exclusive contract and accepting both retailers non-exclusive contracts. If the manufacturer strictly preferred the non-exclusive contract, then at least one retailer could reduce his transfer to the manufacturer. Second, the wholesale price offered by a retailer has to maximize the joint profit of the retailer and the manufacturer given the wholesale price offered by the rival retailer. If this were not the case, the retailer could adjust the wholesale price, keep the profit left to the manufacturer constant by adjusting the fixed fee, and thereby raise his own profit. It is this second condition that lets us tie down the equilibrium wholesale prices.

Let the joint profit of retailer i and the manufacturer when the rival retailer offers contract $(T_{-i}^{NF}, w_{-i}^{NF})$ be denoted by

$$\begin{aligned}\Pi_i^{NF}(w_i^{NF}, w_{-i}^{NF}) &\equiv (p_i(w_i^{NF}, w_{-i}^{NF}) - w_i^{NF})q_i(w_i^{NF}, w_{-i}^{NF}) \\ &\quad + (w_i^{NF} - c)q_i(w_i^{NF}, w_{-i}^{NF}) + (w_{-i}^{NF} - c)q_{-i}(w_i^{NF}, w_{-i}^{NF})) + T_{-i}^{NF}.\end{aligned}$$

It is straightforward to show that

$$\begin{aligned}\Pi_i^{NF}(w_i^{NF}, w_{-i}^{NF}) &= \frac{\left(2 - b - b^2 - (2 - b^2)w_i^{NF} + bw_{-i}^{NF}\right)^2}{(4 - b^2)^2 (1 - b^2)} \\ &\quad + (w_i^{NF} - c)\frac{\left(2 - b - b^2 - (2 - b^2)w_i^{NF} + bw_{-i}^{NF}\right)}{(4 - b^2)(1 - b^2)} \\ &\quad + (w_{-i}^{NF} - c)\frac{\left(2 - b - b^2 - (2 - b^2)w_{-i}^{NF} + bw_i^{NF}\right)}{(4 - b^2)(1 - b^2)} + T_{-i}^{NF},\end{aligned}$$

where the first term is retailer i's profit, the second term the manufacturer's profit from selling to retailer i (both gross of retailer i's fixed transfer), and the third term is the manufacturer's profit from selling to the rival retailer $-i$. Taking the derivative with respect to w_i^{NF} and setting it equal to zero gives us retailer i's best response function.

$$w_i^{NF} = \frac{1}{4(2 - b^2)}[(2 - b - b^2)(b^2 + (4 - b^2)c) + 4bw_{-i}^{NF}]. \tag{4}$$

Using (4) we obtain as (symmetric) equilibrium wholesale price:

$$\tilde{w}_i^{NF} = c + \frac{b^2(1 - c)}{4}. \tag{5}$$

The corresponding retail price is:

$$\tilde{p}_i^{NF} = \frac{2 - b + (2 + b)c}{4}. \tag{6}$$

This equilibrium can be shown to exist provided that the joint profit of the manufacturer and both retailers in the non-foreclosure equilibrium exceeds the joint profit of a single retailer-manufacturer pair, i.e., $\Pi_i(\tilde{w}_i^{NF}, \tilde{w}_{-i}^{NF}) + (p_{-i}(\tilde{w}_i^{NF}, \tilde{w}_{-i}^{NF}) - \tilde{w}_{-i}^{NF})q_{-i}(\tilde{w}_i^{NF}, \tilde{w}_{-i}^{NF}) - T_{-i}^{NF} \geq \frac{(1-c)^2}{4}$. This is satisfied if $b \leq 0.73205$, i.e., when the retailers are sufficiently differentiated. Only in this case are there enough rents to prevent retailers from deviating to offering an exclusive distribution arrangement to the manufacturer. More precisely, the rents obtained by each retailer correspond to his contribution to total industry profit (i.e. to the difference between industry profit in the non-foreclosure equilibrium and the joint profit that the manufacturer and the other retailer could generate by agreeing on an exclusive deal). The remaining rent goes to the manufacturer.

What can we say about equilibrium selection? Note that a foreclosure equilibrium always exists. From the retailers' point of view this equilibrium is payoff dominated by the non-foreclosure equilibrium. Hence whenever the non-foreclosure equilibrium exists, cheap-talk between the retailers is sufficient to implement the preferred equilibrium. Hence, we conclude that, in autarky, there are two different *equilibrium outcomes* depending on the degree of differentiation between the two retailers. When $b \leq 0.73205$, both retailers buy from the manufacturer under non-exclusive contracts, and when $b > 0.73205$, the manufacturer sells exclusively to one retailer whereas the other retailer is foreclosed.

4 Free-Trade Equilibria

4.1 Characterization of the Equilibria

Now consider the case where there are no trading costs so that retailers have access to both manufacturers. Obviously this makes it more difficult for a retailer to foreclose his rival, since he would have to sign exclusivity contracts with both manufacturers. To see why this is the case, suppose that retailer $-i$ offers an exclusive contract to both manufacturers. Note that he has to offer both manufacturers the same payment, since otherwise retailer i would find it easier to convince the manufacturer receiving the less advantageous deal from retailer $-i$ to sell to him. The best deal that $-i$ can offer the manufacturers is to set the wholesale price equal to the manufacturers' marginal cost and to pay each manufacturer a fixed fee equal to half the monopoly profit that he earns. Now we have to check the best response of retailer i. Obviously, he cannot offer more than retailer $-i$ if he were to make offers to both manufacturers. But we have to check if retailer i could profitably make an offer to just one manufacturer j.

With retailer $-i$ setting a wholesale price $w_{-i}^E = c$ and retailer i a wholesale price of w_i, profit maximizing retail prices are:

$$p_i = \frac{(2-b-b^2+2w_i+bc)}{4-b^2} \quad \text{and} \quad p_{-i} = \frac{(2-b-b^2+2c+bw_i)}{4-b^2}. \tag{7}$$

The joint profit of retailer i and the single manufacturer j hence is

$$\Pi_{i,j}(w_i,c) = (p_i(w_i,c)-c)\frac{(2-b-b^2-(2-b^2)w_i+bc)}{(4-b^2)(1-b^2)}. \tag{8}$$

Maximizing this joint profit over w_i yields as solution

$$w_i = \frac{1}{4(2-b^2)}[b^2(2-b-b^2)+c(8-6b^2+b^3+b^4)], \tag{9}$$

and the resulting joint profit is equal to

$$\Pi_{i,j} = \frac{(1-c)^2(1-b)(2+b)^2}{8(1+b)(2-b^2)}. \tag{10}$$

Now the question is whether this profit is higher than half the monopoly profit that retailer $-i$ could offer in an exclusive deal with both manufacturers, which is equal to $\frac{(1-c)^2}{8}$. Thus we have to check whether

$$\frac{(1-c)^2(1-b)(2+b)^2}{8(1+b)(2-b^2)} - \frac{(1-c)^2}{8} = \frac{(1-c)^2(1-b-b^2)}{4(2-b^2)(1+b)} > 0 \tag{11}$$

This is the case, if $1-b-b^2>0$ or $b<\frac{1}{2}\sqrt{5}-\frac{1}{2}=0.61803$. Hence for $b<0.61803$, a retailer will find it profitable to break his rival's exclusive deal with both manufacturers and thereby escape being foreclosed. For $b \geq 0.61803$, there exists an equilibrium in which one of the retailers does not sell. In this foreclosure equilibrium, the active retailer transfers all of his profits to the two manufacturers. If he did not, his rival would outbid him and establish a monopoly himself.

Next we examine whether there exist equilibria in which both retailers are active. There are two possibilities: (i) each retailer deals exclusively with one manufacturer; (ii) at least one retailer buys from both manufacturers under a non-exclusive contract. We first show that case (ii) cannot occur in equilibrium and then characterize equilibria in which each retailer buys from a single manufacturer.

Suppose then, by way of contradiction, that each retailer buys strictly positive quantities from both manufacturers. The wholesale price of retailer $i = 1, 2$ that is accepted by both manufacturers in equilibrium must then maximize the joint profit of retailer i and the two manufacturers given the wholesale price offered by rival retailer $-i$:

$$\bar{w}_i = \arg\max_{w_i}\{(p_i(w_i, w_{-i}) - w_i)q_i(w_i, w_{-i}) + (w_i - c)q_i(w_i, w_{-i}) \\ + (w_{-i} - c)q_{-i}(w_i, w_{-i})) + T_{-i}\}.$$

In addition, transfers to the manufacturers must be such that each manufacturer weakly prefers accepting the non-exclusive contracts from both retailers. It is easy to show that these wholesale prices exceed marginal cost (see the derivation of (5)). Now consider the following deviation by retailer i: offer a wholesale price $w_i = \bar{w}_i - \varepsilon$ to manufacturer j only and adjust the transfer to j so as to keep his profit unchanged. This deviation must raise i's profit, since he does not compensate manufacturer $-j$ for the profit reduction he incurs due to the decline in shipments to retailer $-i$. Hence retailer i will only offer a contract to one manufacturer.

Next, notice that, just like in autarky, the possibility of foreclosure limits how much rent retailers may earn in equilibria in which both are active. Let the profits of retailer $i = 1, 2$ and the manufacturers in the case of no foreclosure be given by π_i^{NF}, π_h^{NF} and π_f^{NF}, and let $\Pi^{NF} \equiv \pi_1^{NF} + \pi_2^{NF} + \pi_h^{NF} + \pi_f^{NF}$ denote the total industry profit when both retailers are active.

Suppose a non-foreclosure equilibrium exists. Then it necessarily must be the case that retailer i and manufacturer j together earn at least as much as they could if they foreclosed retailer $-i$ while compensating manufacturer $-j$ for not selling to retailer $-i$:

$$\pi_i^{NF} + \pi_j^{NF} \geq \pi_i^m - \hat{\pi}_{-j}, \tag{12}$$

where $\hat{\pi}_{-j}$ is the compensation payment. Note that $\hat{\pi}_{-j} \leq \pi_{-j}^{NF}$, since there is no need to pay f strictly more than he would have earned in equilibrium. In other words, the joint profit obtained by retailer i and manufacturer j must be no less than the joint profit they obtain under foreclosure net of the compensation payment. Using the definition of total profit in the non-foreclosure equilibrium, this inequality can be transformed into

$$\pi_{-i}^{NF} \leq \Pi^{NF} - \pi_i^m + (\hat{\pi}_{-j} - \pi_{-j}^{NF}). \tag{13}$$

Since $\hat{\pi}_{-j} \leq \pi_{-j}^{NF}$, this inequality implies that a retailer's non-foreclosure profit cannot exceed his contribution to total industry profit. Individual rationality implies $\pi_i^{NF} \geq 0$ and hence a necessary condition for a non-foreclosure equilibrium to exist is:

$$\Pi^{NF} \geq \pi_i^m - (\hat{\pi}_{-j} - \pi_{-j}^{NF}) \geq \pi_i^m. \tag{14}$$

Another implication is that the sum of manufacturers' profits must be positive. To see this, we can write this sum as:

$$\pi_h^{NF} + \pi_f^{NF} = \Pi^{NF} - \pi_1^{NF} - \pi_2^{NF} \tag{15}$$

Using (13), we obtain

$$\pi_h^{NF} + \pi_f^{NF} \geq \Pi^{NF} - (\Pi^{NF} - \pi_2^m + (\hat{\pi}_h - \pi_h^{NF})) - (\Pi^{NF} - \pi_1^m + (\hat{\pi}_f - \pi_f^{NF})).$$

Simplifying and re-arranging, we have

$$\hat{\pi}_h + \hat{\pi}_f \geq \pi_1^m + \pi_2^m - \Pi^{NF}.$$

Since it must be true that $\pi_1^m + \pi_2^m - \Pi^m > 0$, where Π^m is total integrated monopoly profit, and $\Pi^m \geq \Pi^{NF}$, it follows that $\pi_1^m + \pi_2^m - \Pi^{NF} > 0$ so that

$$\hat{\pi}_h + \hat{\pi}_f > 0.$$

Finally, since $\hat{\pi}_f \leq \pi_f^c$ and $\hat{\pi}_f \leq \pi_h^c$, we have

$$\pi_h^c + \pi_f^c > 0.$$

In an equilibrium in which both retailers are active the wholesale price offered by retailer i to "his" manufacturer j has to maximize their joint profit given the wholesale price of retailer $-i$: $(p_i(w_i, w_{-i}) - w_i)q_i(w_i, w_{-i}) + (w_i - c)q_i(w_i, w_{-i})$. This profit is equal to:

$$(p_i - w_i)\frac{(2 - b - b^2 - (2 - b^2)w_i + bw_{-i})}{(4 - b^2)(1 - b^2)} + (w_i - c)\frac{(2 - b - b^2 - (2 - b^2)w_i + bw_{-i})}{(4 - b^2)(1 - b^2)},$$

where

$$p_i = \frac{(2 - b - b^2 + 2w_i + bw_{-i})}{4 - b^2}. \tag{16}$$

Maximizing with respect to w_i and using the resulting best-response functions, we obtain the following equilibrium wholesale and retail prices:

$$\hat{w}_i = \frac{1}{4 - b(2 + b)}[c(4 - 2b - 2b^2 + b^3) + b^2(1 - b)] \tag{17}$$

$$\hat{p}_i = \frac{1}{4 - b(2 + b)}[2(1 - b) + c(2 - b^2)]. \tag{18}$$

Note that $\widehat{p}_i > c$ for $b \in (0, 1)$.

Next, we want to show that the following complete contract offer of retailer i constitutes an equilibrium strategy:

- $w^N_{i,j} = \hat{w}_i$, $w^N_{i,-j} = 0$,
- $T^N_{i,j} = \pi_i(\hat{w}_i, \hat{w}_{-i}) - \Pi^{NF} + \frac{1}{2}(\pi^m_1 + \pi^m_2)$, $T^N_{i,-j} = 0$,
- $w^E_{i,j} = w^E_{i,-j} = c$,
- $T^E_{i,j} = T^E_{i,-j} = \frac{1}{2}\left(\pi^m_1 + \pi^m_2 - \Pi^{NF}\right)$.

Note that it is a best response for each manufacturer to accept the non-exclusive offer given that the rival manufacturer accepts this contract. In particular, each manufacturer is indifferent between accepting this contract and accepting an exclusive contract from one of the retailers. Retailer i earns exactly his contribution to overall profit in the non-foreclosure equilibrium, namely $\Pi^{NF} - \pi^m_{-i}$. This is weakly greater than the profit i could earn by having both manufacturers sell exclusively to him, which cannot be higher than $\pi^m_i - \left(\pi^m_1 + \pi^m_2 - \Pi^{NF}\right)$.

Existence of a non-foreclosure equilibrium requires—similar to the autarky case—that the total industry profit in this equilibrium be higher than the joint profit that can be earned by one retailer and the two manufacturers setting up an exclusive arrangement, $\Pi^{NF} \geq \pi_i^m$, or

$$\frac{4(1-b)(2-b^2)(1-c)^2}{(1+b)(4-2b-b^2)^2} \geq \frac{(1-c)^2}{4}. \tag{19}$$

The sign of the above expression is non-negative provided that $16(1-b)(2-b^2)-(1+b)(4-2b-b^2)^2 \geq 0$. This holds if $b \leq 0.67209$.

It is interesting to note that the non-foreclosure equilibrium is harder to sustain than under autarky. This makes sense, since it yields lower industry profits and hence a deviation to a foreclosure arrangement is more attractive for retailers. This is why a lower b is needed in free trade than in autarky to obtain a non-foreclosure equilibrium.

Note that a non-foreclosure equilibrium exists for $b \leq 0.67209$ and a foreclosure equilibrium for $b > 0.61803$. Hence, in the range $0.61803 \leq b \leq 0.67209$, there is an equilibrium selection problem. However, like in the autarky case, the non-foreclosure equilibrium Pareto-dominates from the point of view of the retailers the foreclosure one and cheap-talk will again be enough to implement it. Hence, in free trade, the outcome has two active retailers for $b \leq 0.67209$ and a single active retailer for $b > 0.67209$.

4.2 The Effects of Trade Liberalization

It is now simple to compare free trade and autarky. The outcome strongly depends on the degree of differentiation between the two retailers (i.e., the value of b). The results are summarized below:

Result 1: *(i) When* $b \leq 0.67209$, *the equilibrium outcome is a non-foreclosure distribution arrangement under both autarky and free trade. In this case, autarky retail prices are higher than those in free trade; (ii) When* $0.67209 < b \leq 0.73205$, *both retailers are active in autarky, but only one is active in free trade. As a result, retail prices are higher in free-trade than in autarky; (iii) When* $b > 0.73205$, *only one retailer is active under both autarky and free trade, and retail prices are the same in autarky and in free trade.*

To show these results, compare autarky and free-trade retail prices. In the first case, $(\widetilde{p}_i - \widehat{p}_i)$, as given by (6) and (18) respectively, gives:

$$\frac{2-b+(2+b)c}{4}-\frac{2(1-b)+c(2-b^2)}{4-b(2+b)}=\frac{(1-c)b^3}{4[4-b(2+b)]}>0. \tag{20}$$

In Case (ii), a non-foreclosure equilibrium prevails under autarky, but foreclosure occurs in free trade. Hence, computing $(\widetilde{p}_i-\frac{1+c}{2})$, free-trade retail prices are higher than those in autarky since:

$$\frac{2-b+(2+b)c}{4}-\frac{1+c}{2}=-\frac{b(1-c)}{4}<0. \tag{21}$$

In Case (iii), there is foreclosure of one retailer under both autarky and free trade so that the retail price is equal to $\frac{1+c}{2}$in autarky and in free trade.

Clearly, buyer power may have the exact opposite effect with respect to the standard effects of free trade. Indeed Case (ii) is one where the concentration ratio in retailing is higher in free trade than in autarky at least as viewed by consumers. Although, in both cases, there is just one manufacturer selling, the distribution involves two retailers in autarky and only one of them in free trade.

5 Buyer vs. Seller Power

The size of the rents accruing to the retailers and to the manufacturers is not the same whether it is the retailers or the manufacturers who have all the bargaining power. But this is not the main difference between seller and buyer power. In this section, we want to underline another key difference between buyer and seller power, namely that the equilibrium prices and consequently the competitive effects of free trade are different.

To see this, assume that the manufacturers have all the bargaining power and make take-it-or-leave-it contract offers to the two retailers. In autarky and thus in the presence of a single manufacturer and two retailers, manufacturer i sets wholesale price equal to

$$\bar{w}_i=c+\frac{b(1-c)}{2} \tag{22}$$

Equilibrium retail prices are:

$$\bar{p}_i=\frac{1+c}{2} \tag{23}$$

and the manufacturer uses the fixed fee to extract all profits from the retailers. Hence, the manufacturer's profit is equal to the overall integrated profit Π^m:

$$\bar{\pi}^m = \Pi^m \equiv \frac{(1-c)^2}{2(1+b)}. \tag{24}$$

As we see from the retail price, the manufacturer is able to completely monopolize the market. He does so by setting a high wholesale price that internalizes the competition between the retailers. Obviously then, the profit earned by the manufacturer is higher than in the foreclosure equilibrium with buyer power, since in the latter equilibrium only one retailer is active. It is also higher than in the non-foreclosure equilibrium. More significantly,

Result 2: *The autarky retail prices are higher under seller power than they are under buyer power.*

To show this, it suffices to compute $(\overline{p}_i - \widetilde{p}_i)$ as given by (23) and (6) respectively, which yields

$$\frac{1+c}{2} - \frac{2-b+(2+b)c}{4} = \frac{b(1-c)}{4} > 0. \tag{25}$$

Next, we examine retail prices under free trade. The case of seller power, where manufacturers simultaneously offer two-part tariffs to retailers, has been examined by Shaffer (1991). In Shaffer's paper there is a continuum of manufacturers. However, it is straightforward to show that his result also holds for the case of two homogenous manufacturers. Moreover, the equilibrium retail prices that Shaffer obtains are the same that we compute for the non-foreclosure equilibrium under buyer power. The reason for this is has to do with the fact that in the non-foreclosure equilibrium—just like in Shaffer (1991)—each retailer buys from a single manufactuer, so that equilibrium wholesale prices maximize the joint profit of a retailer/manufacturer pair given the equilibrium price(s) of the other pair(s). However, the rents are shared differently between retailers and manufacturers, with manufacturers obtaining a positive share under buyer power and zero profit under seller power.

When free trade leads to a foreclosure equilibrium under buyer power, then retail prices must obviously be higher than under seller power. Hence:

Result 3: *When* $b \leq 0.67209$, *the free-trade retail prices are the same under buyer and seller power; but when* $b > 0.67209$, *buyer power leads to higher retail prices than seller power.*

A strong conclusion emerges from comparing Result 2 and Result 3:

Result 4: *The pro-competitive effect of free trade (as compared to autarky) is unambiguously greater under seller power than under buyer power.*

This is the case because, as compared to seller power, buyer power tends to lead to more price competition in autarky (the two retailers are active despite a single source of supply) but not in free trade where price competition is either as intense as under seller power (when both retailers are active) or less intense when one of the retailers is foreclosed.

6 Welfare

Domestic welfare is

$$W = CS + \sum_{i=1}^{2} \pi_i + \pi_h,$$

where π_i is retailer i's profit and π_h is domestic manufacturer's profit.

Consider first the case of foreclosure. In this case, there is one active retailer so that

$$CS = \frac{q_i^2}{2}$$

where $i = 1$ or $i = 2$ depending on which retailer is active. In autarky, $CS_F^{Aut} = \frac{(1-c)^2}{8}$, $\pi_i = 0$ and $\pi_h = \frac{(1-c)^2}{4}$. Hence $W_F^{Aut} = \frac{3(1-c)^2}{8}$provided $b > 0.73205$. In free trade, foreclosure leads to $CS_F^{FT} = CS_F^{Aut}$, $\pi_i = 0$ and $\pi_h = \frac{(1-c)^2}{8}$ since half the monopoly rents are earned by the foreign manufacturer. Thus, free-trade domestic welfare is equal to $W_F^{FT} = \frac{(1-c)^2}{4}$ provided that $b > 0.67209$.

Consider next the non-foreclosure equilibrium. In this case, consumer surplus (CS) is

$$CS = q_1 + q_2 - \frac{1}{2}(q_1^2 + q_2^2) - bq_1q_2 - p_1q_1 - p_2q_2$$

since both retailers are active. In autarky, $CS_{NF}^{Aut} = \frac{(2+b)^2(1-c)^2}{16(1+b)}$ and $\sum_{i=1}^{2} \pi_i + \pi_h = \frac{(4-b^2)(1-c)^2}{8(1+b)}$ provided that $b \leq 0.73205$. In free trade and provided that $b \leq 0.67209$, $CS_{NF}^{FT} = \frac{(2-b^2)^2(1-c)^2}{(1+b)(4-2b-b^2)^2}$. According to the equilibrium contracts, the rents accruing to the domestic manufacturer and the two retailers are equal to $\Pi^{NF} - \pi_f^{NF}$, where $\pi_f^{NF} = \frac{1}{2}\left(\pi_1^m + \pi_2^m - \Pi^{NF}\right)$.

The comparison between free trade and autarky is now immediate.

Result 5: *In the presence of buyer power, domestic welfare is unambiguously lower in free trade than in autarky.*

Consider each case separately. When $b > 0.73205$, the welfare gains from going from autarky to free trade are

$$W_F^{FT} - W_F^{Aut} = \frac{(1-c)^2}{4} - \frac{3(1-c)^2}{8} < 0.$$

When $0.67209 \leq b \leq 0.73205$, the welfare gains are

$$W_F^{FT} - W_{NF}^{Aut} = \frac{(1-c)^2}{4} - \frac{(2+b)^2(1-c)^2}{16(1+b)} - \frac{(4-b^2)(1-c)^2}{8(1+b)} < 0.$$

Finally, when $b < 0.67209$, the welfare gains are

$$\begin{aligned} W_{NF}^{FT} - W_{NF}^{Aut} = & \frac{(2-b^2)^2(1-c)^2}{(1+b)(4-2b-b^2)^2} + \frac{2(2-b^2)(1-b)(1-c)^2}{(1+b)(4-2b-b^2)^2} \\ & - \frac{(1-c)^2}{4} - \frac{(2+b)^2(1-c)^2}{16(1+b)} - \frac{(4-b^2)(1-c)^2}{8(1+b)} < 0. \end{aligned}$$

The fact that welfare falls when contracts switch from non-foreclosure in autarky to foreclosure in free trade is expected since the retail price increases and only one retailer is active in free trade. The fact that domestic welfare falls in the two other cases despite the fact that the type of equilibrium remains the same (foreclosure when $b > .73205$ or non-foreclosure when $b < .76209$) and retail prices do not increase is much more surprising. The reason obviously must be that the foreign manufacturer receives a significant share of the industry profits in free trade. This is straightforward in the case of foreclosure: half the industry profit now goes to the foreign manufacturer to prevent him from accepting an exclusive contract from the rival retailer. When there is no foreclosure, the reason that the foreign manufacturer, like his domestic counterpart, receives a positive profit is that here, too, he has to be compensated for not signing an exclusive contract with the rival retailer. Hence the rather paradoxical result that despite buyer power free trade induces a significant shift of rents to the foreign manufacturer.

7 Extensions

The first extension we consider is the introduction of trade costs. Consider first the foreclosure equilibrium. Recall that in free trade we can identify a critical value of b such that the inactive retailer is indifferent between breaking the foreclosure equilibrium and not. Consider this b and increase t infinitesimally starting at zero. Raising t does not change the joint profit accruing to the active retailer and the two manufacturers, since the retailer can buy from manufacturer h. Since the inactive retailer, ceteris paribus, would also prefer to buy from h, manufacturer h has to obtain more than half of the total foreclosure rent to keep him from breaking the foreclosure. Will the inactive retailer be able to break the foreclosure? The answer is no for two reasons: first, the rent he could generate to bribe one of the manufacturers to sell to him has to be lower due to the trade cost. Second, he would have to pay h more than before to sell to him, and would have to bear a trade cost if he dealt with f. Hence the critical b has to fall as t rises, implying that a foreclosure equilibrium can now be sustained over a larger interval of b.

Next, consider the non-foreclosure equilibrium. Note that the derivation of the necessary condition for existence of a non-foreclosure equilibrium, Equation (14), does not depend on the level of trade costs. Since the total industry profit in a non-foreclosure equilibrium depends on t, this necessary condition now is $\Pi^{NF}(t) \geq \pi_i^m = (1-c)^2/4$. Starting in free trade, an infinitesimal increase in t reduces Π^{NF}, since the negative direct effect associated with the resource cost dominates the indirect (or strategic) effect of softer price competition. This implies that the critical b below which a non-exclusive equilibrium may exist decreases with t. However, as t continues to rise, the strategic effect eventually dominates the direct effect and Π^{NF} then rises with t. When this happens, the critical b rises and non-foreclosure equilibria occur for a larger interval of b.

This suggests that the result that foreclosure is more likely to be seen under free trade than in autarky can be generalized to the statement that foreclosure is more likely to arise as trade costs fall, except for t close to zero. In turn this implies, that the result that retail prices may rise as trade is liberalized will still be observed, namely when the equilibrium switches from non-foreclosure to foreclosure.

8 Conclusions

Opening up markets to the forces of international trade has traditionally been seen as a policy tool capable of unleashing pro-competitive forces and inducing domestic industries that are imperfectly competitive to become competitive and more efficient. In essence, opening a country to international trade allows for rents to be re-allocated to the more efficient (and innovative) firms within an industry and ultimately to consumers. Typically in such a situation, the pro-competitive effects of freer trade are thought to be large not only because barriers that distort trade are being eliminated, but also because market power gets diluted with freer trade and firms become more efficient. The intellectual underpinning of the above process is of course linked to the Schumpeterian creative destruction process, and this process has surely been present in several freer-trade experiments. However, when manufacturers become more efficient and make rents in the process, the rents are not always dissipated by other equally or more efficient manufacturers. There are other agents ready to capture a share of these rents if they have an opportunity to do so. This is the case, in particular, for retailers, wholesalers and other intermediaries especially once they become unavoidable agents in the process of reaching consumers.

This paper has started to look at the implications of the existence of such intermediaries when they have market power. We obtain some surprising results. First, under some circumstances the rents existing at the manufacturer level in autarky can be completely captured by manufacturers once free trade is introduced even if additional sources of supply are available in free trade and even if there is (imperfect) competition among retailers. Hence buyer power does not necessarily mean that retailers capture the rents generated by trade liberalization. Second, price competition can be lower in free trade than in autarky because an equilibrium in which some retailers are foreclosed may be easier to sustain in free trade than in autarky. Thus, in these cases, it is not consumers who ultimately earn a large share of the rents associated with freer trade, not even the retailers with market power, but rather the manufacturers.

The role of buyer power may help explain why competitive and welfare gains from economic integration seem to have been sometimes significantly lower than expected. Even if other channels may explain such a discrepancy (see for instance Mercenier and Schmitt, 1996), the role of buyer power is worth examining in the context, for instance, of the disappointing impacts associated with the 1992 Common Market experiment.

It is important to keep in mind that the present paper does not propose a theory of buyer power in an international context since buyer power in our model is exogenous: the retailers have all the bargaining power irrespective of the trade environment. It only spells out the implications of the existence of buyer power in an international context. This is of course a first step, one that already produces interesting results that differ substantially from those associated with seller power. Thus the present paper has nothing to say with respect to the idea that buyer power might be a by-product of freer trade. It should be clear, however, that if it is true that trade liberalization is an important element in the emergence of buyer power, then our main conclusions would *a fortiori* hold.

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