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# DO SLOTTING ALLOWANCES HARM RETAIL COMPETITION?

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# DO SLOTTING ALLOWANCES HARM RETAIL COMPETITION?

## Abstract

Slotting allowances are fees paid by manufacturers to get access to retailers' shelf space. Both in the USA and Europe, the use of slotting allowances has attracted attention in the general press as well as among policy makers and economists. One school of thought claims that slotting allowances are efficiency enhancing, while another school of thought maintains that slotting allowances are used in an anti-competitive manner. In this paper, we argue that this controversy is partially caused by inadequate assumptions of how the retail market is structured and organized. Using a formal model, we show that there are good reasons to expect anti-competitive effects of slotting allowances. We further point out that competition authorities tend to use an unsatisfactory basis for comparison when analyzing welfare consequences of slotting allowances.

JEL Code: L13, L42, L81.

Keywords: slotting allowances, retail competition, anti-trust policy.

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# 1 Introduction

Slotting allowances are fixed fees that manufacturers pay to retailers in order to get access to their shelf space. While slotting allowances were hardly known before the late 80's, they are now widely used, not least in the grocery industry. The boost of slotting allowances has coincided with a trend towards higher retail concentration. In Europe, in particular, the grocery retailing sector has become strikingly more concentrated over the last decades (Dobson and Waterson, 1999, and Clarke et al., 2002). Thereby retailers' market power over manufacturers has increased, and there is a broad consensus that this is the major reason why the use of slotting allowances has become more widespread.<sup>2</sup> However, economists (and policy makers) disagree as to whether slotting allowances tend to mitigate retail competition. The main purpose of the present paper is to help resolve this controversy, and draw some policy implications.

Two schools of thought dominate the debate over welfare effects of slotting allowances. The so-called market power school argues that slotting allowances may have anti-competitive rationales (Shaffer, 1991). To see why, suppose that a retailer can choose between contract A, with no slotting allowances and a low wholesale price, and contract B, where the retailer receives a slotting allowance from the manufacturer but in return pays a higher wholesale price. Since slotting allowances are up-front payments, marginal costs for the retailer are thus relatively high in contract B. By signing this contract, the retailer sends a signal to her rivals that she will be a soft competitor and set a relatively high end-user price. This in turn induces the rivals to raise their prices too. Shaffer shows that this mechanism may lead us to an equilibrium where retailers use slotting allowances as a device to increase end-user

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<sup>2</sup>According to a US-based survey by Bloom et al. (2000), retailers and manufactures agree that greater retail power has contributed to more use of slotting allowances also in this country. This is true even though retail concentration is much lower in the USA than in Europe. See also Rey, Thal and Vergé (2005), who further note that in the UK even the products of leading manufacturers typically "represent a very small proportion of the total business for each of the major suppliers". In contrast, also the largest manufacturers are highly depend on their major buyers (Rey et al 2005, p. 3).

prices. This has a negative welfare effect.<sup>3</sup>

In contrast, the efficiency school argues that slotting allowances have positive welfare effects, for instance by solving problems connected to uncertainty and/or asymmetric information, and by allocating scarce shelf space.<sup>4</sup> The efficiency school dismisses Shaffer's hypothesis that slotting allowances are used as a tool to soften retail competition, one of their main arguments being that retailers and manufacturers typically enter secret contracts. Thereby wholesale prices are unobservable, and cannot be used strategically to increase end-user prices.

In our view, a main problem with both the efficiency and the market power school is their assumption on how the market is structured and organized. First, both schools of thought presuppose that there are only two layers; manufacturers at the upstream level and retailers at the downstream level. A second presumption they have in common, is that each retailer behaves like a vertically integrated firm in its decision on procurement contracts and retail pricing. However, this is not a proper description of the grocery market, especially not in Europe. Indeed, what we have observed is that large retail chains have formed procurement alliances (buyer groups), such that the level of concentration is higher for procurement than for retailing (see Dobson and Waterson, 1999).<sup>5</sup> In these constellations, the headquarters of each buyer group typically deals with procurement, while the retail sub-chains take care of retailing (e.g. end-user pricing). Even when sub-chains are fully owned

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<sup>3</sup>Slotting allowances may also reduce product variety through foreclosure of smaller suppliers. Shaffer (2005) shows specific market structures where such practice may be optimal. Marx and Shaffer (2004) demonstrate that retailers may also benefit from foreclosure of suppliers, since this may shift profit from the manufacture-level to the retail level.

<sup>4</sup>See further discussion in Section 3.

<sup>5</sup>The largest food buyer in Germany is the buyer group Markant Handels. The buyer groups Euromadi and IFA Española are the two largest food buyers in Spain, and Intermarché dominates in France (Dobson and Waterson, 1999). In Norway, the largest retailer group, NorgesGruppen (NG), was formed as a buyer group in 1994. Even though there has been a process of closer integration, NG may still be considered as a buyer group where the headquarters takes care of procurement, and each store brand decides end-user prices autonomously. Several of the retail formats within NG are also independently owned by the retailers themselves. An overview of the Nordic markets is given by the Danish Competition Authority (2005).

by the procurement headquarters, they are typically organized as divisionalized firms.<sup>6</sup> We show that in this context each buyer group will use slotting allowances to dampen intra-retailer competition even if rival retail chains cannot observe the wholesale contracts. As long as the procurement contracts can be observed within each buyer group, which is a plausible assumption, they can transfer their buying power into the retail market by using slotting allowances.

This paper contains a relatively broad discussion of antitrust issues. First, we show that our findings are supported by several antitrust investigations of the grocery industry in Europe (European Commission, 1996, Competition Commission, 2000, Danish Competition Authority, 2005, and The Norwegian Competition Authority, 2005). Second, we emphasize the importance of recognizing the degree of substitutability that exists between different kinds of vertical restraints. Consider a buyer group of independent retailers. They cooperate in the procurement market, but compete at the retail level. Building on our formal model, we argue that by using a vertical restraint like a slotting allowance, the group can achieve the same outcome as they would with vertical integration. In the latter case, decisions on procurement and end-user pricing are taken by the group's headquarters. Consequently, it is pointless to outlaw slotting allowances if the competition authorities would not ban a merger among alliance members. Vice versa, if a potential merger between the firms raises serious doubts by the competition authorities, slotting allowances should raise the same concerns.

## 1.1 Related Literature

The present paper is an extension of Shaffer (1991), who considers competition between two retailers in the end-user market. By assuming that the retailers have

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<sup>6</sup>Thus, while the headquarters decide procurement contracts centrally, each sub-chain is relatively autonomous with respect to end-user pricing. The leading Finnish retailer groups, Kesko and Tuko, are organized in this a way (The European Commission,1996), and the same holds for ICA's retailing operations in Norway (NCA, 2005). Just one of the four dominating Norwegian retailer groups operates a completely vertically integrated firm with respect to procurement contracts and retail pricing (NCA, 2005).

complete bargaining power over manufacturers, Shaffer (1991) shows that it is in the interest of each retailer to set a high wholesale price in the contract with the manufacturer. When wholesale prices rise, retail competition softens. Thus the total profit made by the vertical chain increases, and this profit is captured by the retailers through slotting allowances.

Shaffer's idea is based on the strategic delegation literature, where Fershtman and Judd (1987) is the seminal paper. Gal-Or (1991), Bonanno and Vickers (1988) and Rey and Stiglitz (1988, 1995) build on the same framework, but they assume that the bargaining power is in the hands of the suppliers. Irmen (1998) shows that the outcome in this case resembles the one found by Shaffer (1991). The difference is the sign of the fixed fee.<sup>7</sup> Consequently, the strategic delegation theory is consistent with the observation that the use of slotting allowances has increased as bargaining power has been transformed from the manufacturing level to the retailing level.

A critical assumption within the strategic delegation literature is that the contract between a manufacturer and a retailer is irreversible, so that wholesale prices are determined prior to the price game between retailers. We agree with Rey and Stiglitz (1995) that this is likely to hold. The reason is that retailers rarely have long-term contracts with their customers, while the wholesale contractual arrangements often are set for no less than a year. Moreover, the type of wholesale contracts (e.g. slotting allowances or not) will typically be specified in long-term contracts (see e.g. discussion by Rey and Stiglitz, 1995).

The second critical assumption employed by Shaffer and other papers in the same tradition, is that wholesale tariffs are observed by rival retailers. This assumption is more dubious than that of irreversibility.<sup>8</sup> However, we show that slotting

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<sup>7</sup>If the retailers have the bargaining power, a fixed fee is paid by the suppliers, defined as a slotting allowance. If the suppliers have the bargaining power, the fixed fee is paid by the retailers, denoted as a franchisee fee.

<sup>8</sup>The Norwegian Competition Authority (NCA) doubts that slotting allowances can be used by retailers as a facilitating practice a la Shaffer (as claimed in the press), since they find the assumption of contract observability unrealistic (NCA, 2005, and Gabrielsen and Sjørgard, 2005). However, NCA has initiated an investigation to clarify the extent of information exchange between retailer groups.

allowances may be used as a tool to increase end-user prices even if wholesale tariffs are observable only within each buyer group. Indeed, this is one of the main messages of the present paper. Consequently, we show that the boost of slotting allowances may be related to the way the large retailer groups are organized, and not to the increase in retail market power as such. Slotting allowances have become more widespread at the same time as large retailer groups have started to operate several sub-chains as buyer groups or as divisionalized companies.

Finally, our paper is related to Rey, Thal and Vergé (2005), who analyze a context where two differentiated retailers sell goods bought from one common supplier (common agency situation). Rey et al assume that the retailers have complete bargaining power over the manufacturer, and show how retailers may use slotting allowances to obtain monopoly prices in the end-user market.<sup>9</sup> Even though Rey et al abstract from the formation of buyer groups, and we abstract from common agency problems, both papers thus find that slotting allowances may harm consumers by increasing end-user prices.

## 2 The model

We consider a market where  $n$  retail chains sell the same homogenous product. The consumers may differ in their chain preferences. To capture this we extend Shaffer (1991) to  $n$  retail chains, and use the following Shubik-Levitan (1980) utility function:

$$U(q_1, \dots, q_i, \dots, q_n) = v \sum_{i=1}^n q_i - \frac{n}{2} \left( (1-b) \sum_{i=1}^n q_i^2 + \frac{b}{n} \left( \sum_{i=1}^n q_i \right)^2 \right). \quad (1)$$

The parameter  $v > 0$  in equation (1) is a measure of the market potential,  $q_i$  is the quantity from retailer chain  $i$ , and  $n \geq 1$  the number of chains. The parameter

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<sup>9</sup>More precisely, Rey et al show how the retailers can solve the common agency problem and achieve monopoly profit by using slotting allowances and a conditional fixed fee (i.e., a fee which is conditional on the retailers actually purchasing from the manufacturer). Interestingly, this kind of tariff structure may eliminate the risk of anticompetitive exclusion. This is in contrast to the result in Marx and Shaffer (2004), who restrict attention to a two-part tariff.



$b \in [0, 1]$  is a measure of how differentiated the chains are; they are completely independent and have monopoly power if  $b = 0$ , while the consumers perceive them to be identical if  $b = 1$ . More generally, the chains are closer substitutes from the consumers' point of view the higher is  $b$ .<sup>10</sup> The merit of using this utility function is that the size of the market does not vary with  $b$  or  $n$  (see Motta, 2004).

Let  $p_i$  be the price charged by retail chain  $i$ . Solving  $\partial U / \partial q_i - p_i = 0$  for  $i = 1, \dots, n$  we find that the inverse and the direct demand curves are given by respectively:

$$p_i = v - \left( (1 - b) n q_i + b \sum_{j=1}^n q_j \right) \text{ and} \quad (2)$$

$$q_i = \frac{1}{n} \left( v - \frac{p_i}{1 - b} + \frac{b}{(1 - b) n} \sum_{j=1}^n p_j \right). \quad (3)$$

Assume that retail chain  $i$  pays  $w_i$  per unit of the manufacturing good, and let  $S_i$  be the fixed fee specified in the contract between the chain and the manufacturer. The profit level of chain  $i$  is then

$$\pi_i^R = (p_i - w_i) q_i(p_1, \dots, p_n) + S_i.$$

If  $S_i > 0$  we have a slotting allowance.

The profit level of the manufacturing firm serving chain  $i$  equals

$$\pi_i^M = w_i q_i(p_1, \dots, p_n) - S_i,$$

where we have normalized marginal cost at the manufacturer level to zero. As in Shaffer (1991), we assume that the manufacturing sector is perfectly competitive with a large number of firms producing the same good.

Below, we consider the following two-stage game:

- At stage 1, the procurement headquarters (PHQ) of each retail chain decides what kind of contract to offer a manufacturer. Without slotting allowances, the

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<sup>10</sup>Shaffer (1991) uses a general demand function, but uses the Shubik-Levitan specification with  $n = 2$  in his welfare analysis.

manufacturing firm's participation constraint requires that  $w_i \geq 0$ , while with slotting allowances the PHQ sets the tariff  $T_i = (w_i, S_i)$  such that  $\pi_i^M \geq 0$ .<sup>11</sup>

- At stage 2 the retail chains compete in prices.

The game is solved by using backward-induction. For the moment we shall assume that all prices are observable and irreversible. Setting  $\partial \pi_i^R / \partial p_i = 0$  for  $i = 1, \dots, n$  we find that the final stage gives rise to the reaction function

$$p_i = \frac{nv(1-b) + w_i(n-b) + b \sum_{j \neq i}^n p_j}{2(n-b)}, \quad (4)$$

and that the equilibrium price for chain  $i$  is given by:

$$p_i^* = \frac{nv(1-b)(2n-b) + (n-b) \left( n(2-b)w_i + b \sum_{j \neq i}^n w_j \right)}{(n(1-b) + (n-b))(2n-b)}. \quad (5)$$

The outcome of stage 1 depends on whether or not the retail chains have formed procurement alliances. We consider these two cases separately. First we consider a market structure without procurement alliances, as illustrated in Figure 1a (where  $n = 4$ ). This is the market structure which is typically assumed in the literature. Second, as illustrated in figure 1b, we consider a market structure with procurement alliances.

Each (sub-) chain consists of a large number of retail outlets, but we abstract from the competition between these. The reason for this is that competition between retail outlets belonging to the same sub-chain is typically eliminated through the franchising contract between the sub-chain and its retail outlets; e.g. since the end-user prices for the basic assortment are decided at the sub-chain level (see further discussion in Section 3).

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<sup>11</sup>While Shaffer (1991) assumes that the manufacturers announce the wholesale tariffs, we assume that each PHQ offers a take-it-or-leave-it contract. This does not affect the qualitative outcome.

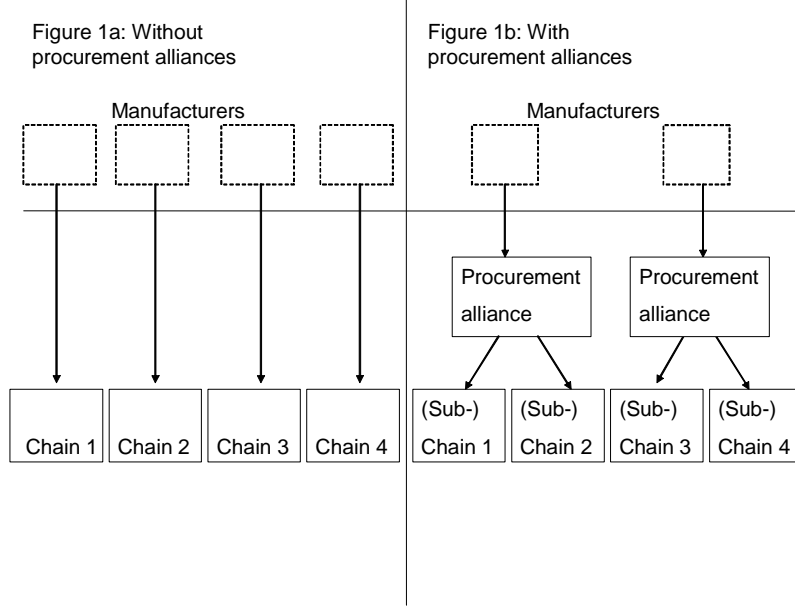


Figure 1: **Market structures**

## 2.1 Benchmark: No procurement alliances

Suppose that the retail chains do not cooperate on purchases. In the absence of slotting allowances, perfect competition in the manufacturing sector implies that  $w_i = 0$  and  $\pi_i^M = 0$ . In this case it follows from equation (5) that the end-user equilibrium price equals:

$$p_B^{nsa} = \frac{1-b}{n(1-b) + (n-b)}vn; \quad \frac{\partial p_B^{nsa}}{\partial b} < 0 \quad (6)$$

Equation (6) makes it clear that the end-user price is decreasing in  $b$ , reflecting the fact that the firms have to set a lower price the higher the competitive pressure. Note that we have marginal cost pricing ( $p_B^{nsa} = 0$ ) if  $b = 1$ , since the chains are then perceived to be perfect substitutes.

With slotting allowances, the procurement headquarters of each chain sets  $(w_i, S_i)$  to maximize  $\pi_i^R = (p_i^* - w_i)q_i^*(p_1^*, \dots, p_n^*) + S_i$  subject to  $\pi_i^M \geq 0$ . Since the manufacturing sector is perfectly competitive, we have  $\pi_i^M = 0$  and  $w_i q_i^* = S_i$ . This allows us to write the profit level of retail chain  $i$  as  $\pi_i^R = p_i^* q_i^*(p_1^*, \dots, p_n^*)$ . The first-order

condition at stage 1 is consequently given by

$$\frac{\partial \pi^i}{\partial w_i} = \frac{\partial p_i^*}{\partial w_i} q_i^* + p_i^* \frac{\partial q_i^*}{\partial w_i} = 0. \quad (7)$$

Equations (3) and (5) further yield

$$\frac{\partial p_i^*}{\partial w_i} = \frac{(2-b)n(n-b)}{(n(1-b) + (n-b))(2n-b)} \text{ and } \frac{\partial q_i^*}{\partial w_i} = \frac{1}{n^2(1-b)} \left( -(n-b) \frac{\partial p_i^*}{\partial w_i} + b \sum_{j \neq i}^n \frac{\partial p_j^*}{\partial w_i} \right). \quad (8)$$

In this section we shall make the following critical assumption:

**Assumption 1:** *Assume that the retail chains can commit to the wholesale tariffs and that the tariffs are observable by the rivals.*

If Assumption 1 holds, we can use equation (5) to write

$$\frac{\partial p_j^*}{\partial w_i} = \frac{b(n-b)}{(n(1-b) + (n-b))(2n-b)} > 0 \text{ for } b > 0. \quad (9)$$

Retail chain  $i$ 's end-user price is increasing in its own marginal costs. Since prices are strategic complements in retail competition, it follows that an increase in  $w_i$  leads the rivals to charge higher prices. This strategic effect explains why  $\partial p_j^*/\partial w_i > 0$  for  $b > 0$ .

In the symmetric equilibrium we can set  $w_i = w \forall i$ .<sup>12</sup> Using equations (7) - (9), we find that the per-unit wholesale price is given by:

$$w_B^{sa} = (1-b)b^2 \frac{(n-1)vn}{(n-b)(n^2(1-b)(3-b) + (n-b)^2)} \geq 0. \quad (10)$$

From equation (10) we immediately see that  $w_B^{sa}$  is positive if and only if  $0 < b < 1$ . The reason for this is that with imperfect competition, each chain has an incentive to choose a relatively high per-unit wholesale price in its contract with the manufacturing firm, since this will invoke a positive price response from the rivals. This strategic effect is, however, weak for small values of  $b$ , and non-existent for  $b = 0$ . Therefore  $w_B^{sa}(b = 0) = 0$ . It should further be noted that the direct effect

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<sup>12</sup>It can be shown that this is a unique equilibrium if Assumption 1 holds.

is always stronger than the strategic effect ( $\partial p_i / \partial w_i > \partial p_j / \partial w_i$ ). In particular, this means that if a retail chain should try to set  $w_i > 0$  for  $b = 1$ , then that chain would lose all its sales to its rivals. This explains why also  $w_B^{sa}(b = 1) = 0$ . The incentive to set a high value on the wholesale unit-price is consequently strongest for intermediate values of  $b$ .

Equation (10) further implies that  $\partial w_B^{sa} / \partial n < 0$ , reflecting the fact that the incentives to set a low per-unit wholesale price in order to steal business from the competitors is larger the greater is  $n$ .

Inserting for (10) into (5) we find that the equilibrium end-user price with slotting allowances becomes

$$p_B^{sa} = (1 - b) \frac{(2 - b) v n^2}{n^2 (1 - b) (3 - b) + (n - b)^2}, \quad (11)$$

while the size of the slotting fee equals

$$S = (1 - b) b^2 \frac{(n - 1) v^2 (n^2 (1 - b) + (n - b)^2)}{(n - b) (n^2 (1 - b) (3 - b) + (n - b)^2)^2}. \quad (12)$$

Equation (12) makes it clear that the relationship between  $S$  and  $b$  is hump-shaped, as illustrated in Figure 1.<sup>13</sup> This is a direct consequence of the fact that  $w_B^{sa}$  reaches a maximum for an intermediate value of  $b$ . Since  $w_B^{sa}$  is decreasing in  $n$ , we likewise see that the slotting fee is smaller the larger the number of retail chains.

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<sup>13</sup>In this figure we have set  $v = 10$ .

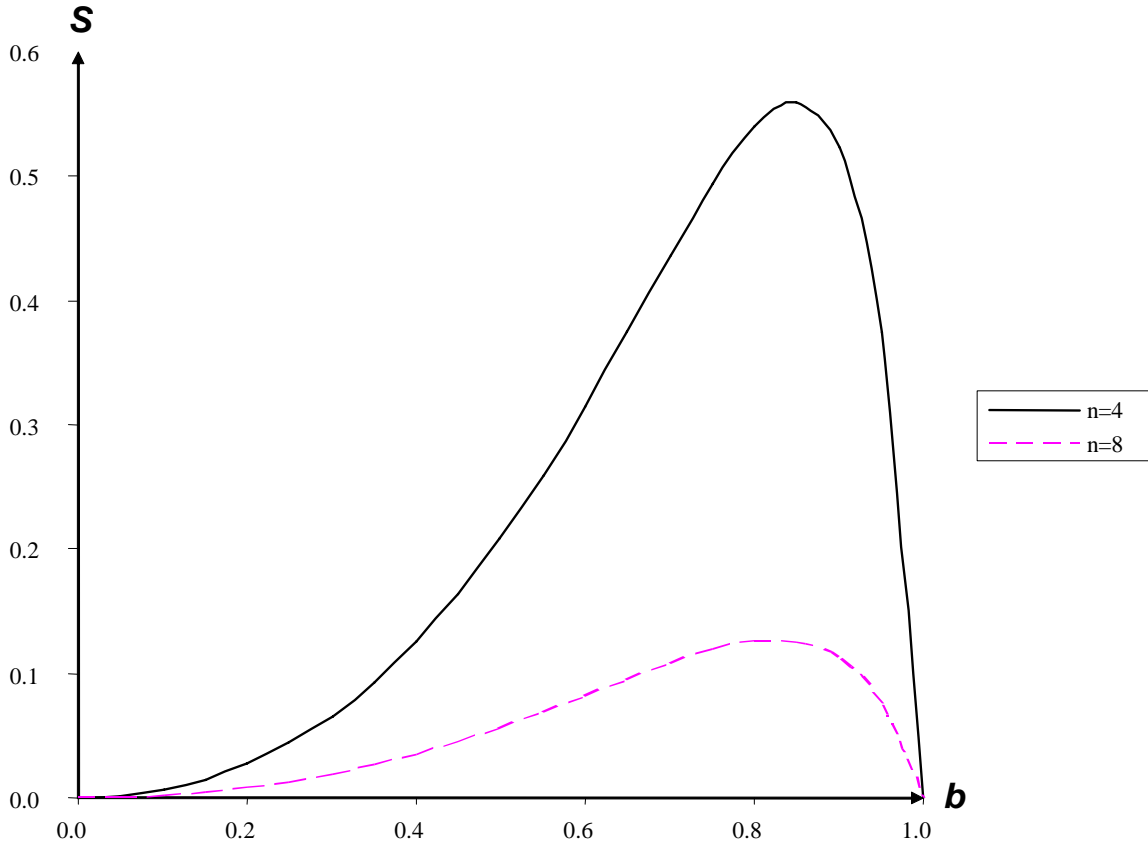


Figure 1: Slotting allowances and retail competition.

Using equations (6) and (11) we further note that

$$\Delta p = p_B^{sa} - p_B^{nsa} = \frac{n-b}{n(1-b) + (n-b)} w_B^{sa} \geq 0. \quad (13)$$

From (13) it is easily verified that the price difference with and without slotting allowances is hump-shaped, just like  $w_B^{sa}$  and  $S$ . The fact that the price difference reaches maximum for an intermediate value of  $b$  was first demonstrated by Shaffer (1991).

If Assumption 1 does not hold, the wholesale unit-price cannot be used for strategic purposes (since  $\partial p_j^* / \partial w_i = 0$  when chain  $j$  cannot observe  $w_i$ ). In this case it follows that  $w = 0$  and  $p = p_B^{nsa}$ .

We summarize the results in the following lemma:

**Lemma 1:** *Without procurement alliances:*

- (i) *Slotting allowances are not used if wholesale contracts cannot be observed.*
- (ii) *Slotting allowances are used to soften competition if the consumers perceive the retail chains to be imperfect substitutes,  $p_B^{sa} - p_B^{nsa} > 0$  for  $0 < b < 1$ .*
- (iii) *Slotting allowances will be highest for an intermediate degree of retail chain substitutability.*

Moreover, we have the following relationship between slotting allowances and the number of retail chains:

**Proposition 1:** *Slotting allowances are lower the larger the number of retail chains.*

These results are hardly surprising. Slotting allowances may be seen as a form of nonlinear wholesale pricing, i.e. a two-part tariff with a negative fixed fee. It is well known that it is generally harder to implement non-linear pricing when the degree of competition increases, whether this is due to a larger number of firms or a higher substitutability. Hence, the results in Lemma 1 and Proposition 1 simply resemble the outcome that two-part tariffs are harder to implement the stronger the competition.

Nevertheless, Sudhir and Rao (2006) claim that price raising slotting allowances theoretically should be higher the larger the number of chains and the less differentiated they are (captured by  $n$  and  $b$ , respectively, in our model).<sup>14</sup> In an investigation of whether slotting allowances have anti-competitive effects, the Norwegian Competition Authority (2005, p. 55) likewise maintain that "if [Shaffer's] theory is any good", one should observe slotting allowances to be higher the fiercer the competition between the chains. Lemma 1 and Proposition 1 make it clear that this is incorrect.

We suspect the belief that slotting allowances are increasing in the extent of competition, is partly caused by a lack of accuracy in distinguishing between incentives and abilities. The stronger the competition, the more the chains have to gain from using slotting allowances to raise prices. However, the gains from undercutting the

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<sup>14</sup>See Section B1 and the appendix in Sudhir and Rao (2006).

rivals are also particularly large if the consumers perceive the chains to be more or less identical. Indeed, this is very much the essence of the Bertrand Paradox.

## 2.2 Procurement alliances among retailer chains

Two key features of the grocery retail industry have not been taken into account in the literature. First, in most countries we observe relatively large buyer groups, each consisting of several sub-chains (or brands). Second, while the headquarters of the buyer groups take care of procurement activities, the sub-chains seem to be quite autonomous with respect to end-user pricing.

Let us now assume that we have two alliances at the procurement level. For the sake of simplicity we assume that there are two sub-chains in each buyer group, such that  $n = 4$ , with retail chains 1 and 2 belonging to PHQ1 and chains 3 and 4 to PHQ2. Hence, we have the market structure in Figure 1b. In order to focus on the differences from the benchmark case, we shall now make the following assumption:

**Assumption 2:** *Assume that wholesale contracts are observable within, but not between, each buyer group.*

We consider the same two-stage game as above, and without slotting allowances it is straightforward to show that the price,  $p_{PD}^{nsa}$ , resembles the outcomes from the previous sections. The subscript  $PD$  indicates procurement duopoly. Hence, with  $n = 4$  we have:

$$p_{PD}^{nsa} = p_B^{nsa} = 4v \frac{1-b}{8-5b}$$

With slotting allowances, it is useful to denote by  $w_i^{PHQ1}$  the wholesale unit price paid by sub-chain  $i = 1, 2$  in Alliance 1, and by  $w_k^{PHQ2}$  the corresponding prices in Alliance 2 (for  $k = 3, 4$ ). By using equation (5), we can then write the outcome in stage 2 for the sub-chains in Alliance 1 as:

$$p_i^{PHQ1} = \frac{4v(1-b)(8-b) + (4-b) \left( 4(2-b)w_i^{PHQ1} + bw_j^{PHQ1} + b \left( Ew_3^{PHQ2} + Ew_4^{PHQ2} \right) \right)}{(8-b)(8-5b)}, \quad (14)$$



where  $E$  is an expectation operator and  $i, j = 1, 2$ . From equation (3) we further find

$$q_i^{PHQ1} = \frac{v}{4} - \frac{1}{4(1-b)} \left( p_i^{PHQ1} - \frac{b}{4} \left( p_1^{PHQ1} + p_2^{PHQ1} + p_3^{PHQ2} + p_4^{PHQ2} \right) \right) \quad (15)$$

At the first stage PHQ1 solves

$$\Pi^{PHQ1} = \max_{w_1, w_2} \sum_{i=1}^2 (p_i - w_i) q_i + S_i$$

subject to  $w_i q_i + S_i \geq 0$  and equations (14) and (15). Since PHQ1 cannot observe the rival's wholesale contract, we have  $\partial p_1^{PHQ1} / \partial w_k^{PHQ2} = 0$ . Using that  $w_i q_i = S_i$ , the first order conditions for Alliance 1 is thus given by:

$$\begin{aligned} \frac{\partial \Pi^{PHQ1}}{\partial w_1^{PHQ1}} &= \sum_{i=1}^2 \left( \frac{\partial p_i^{PHQ1}}{\partial w_1^{PHQ1}} q_i^{PHQ1} + p_i^{PHQ1} \frac{\partial q_i^{PHQ1}}{\partial w_1^{PHQ1}} \right) = 0 \text{ and} \\ \frac{\partial \Pi^{PHQ1}}{\partial w_2^{PHQ1}} &= \sum_{i=1}^2 \left( \frac{\partial p_i^{PHQ1}}{\partial w_2^{PHQ1}} q_i^{PHQ1} + p_i^{PHQ1} \frac{\partial q_i^{PHQ1}}{\partial w_2^{PHQ1}} \right) = 0 \end{aligned}$$

Because wholesale contracts are unobservable between the buyer groups, the procurement headquarters cannot use the wholesale contracts strategically to raise the rival's prices. However, each buyer group is aware of the fact that the rival has incentives to use slotting allowances to soften competition between its own sub-chains. Assuming that each procurement headquarters has correct expectations about the rival's wholesale contract (which seems reasonable, since there is no uncertainty in the model), we find a unique symmetric equilibrium where

$$w_{PD}^{sa} = (1-b) b \frac{2v}{(4-3b)(4-b)}. \quad (16)$$

As in the benchmark case, we thus see that the wholesale unit price is positive for  $b \in (0, 1)$ .

By inserting for  $w_{PD}^{sa}$  into (14) we find that the equilibrium price in this case equals

$$p_{PD}^{sa} = 2 \frac{1-b}{4-3b} v. \quad (17)$$

Hence, the use of slotting allowances will in general increase the end-user price even though the wholesale contracts are unobservable across the buyer groups:

$$p_{PD}^{sa} - p_{PD}^{nsa} = \frac{2b(1-b)v}{(4-3b)(8-5b)} > 0 \text{ for } b \in (0, 1). \quad (18)$$

Equation (18) expresses one of the main messages of the paper, namely that wholesale tariffs need not be perfectly observable for slotting allowances to increase end-user prices.<sup>15</sup> It is sufficient that the tariffs are observable within each buyer group, which seems like a plausible assumption. First, it is reasonable to assume that the sub-chains have the right of access to the accounts of the alliance. Second, and more importantly, the sub-chains have a common interest in organizing the alliance system such that the wholesale tariffs are internally observable and credible. Thereby, each buyer group can profitably employ price raising slotting allowances. This is true irrespective of whether the other buyer group uses slotting allowances. Put differently, it is a dominant strategy for each buyer groups to use slotting allowances for  $b \in (0, 1)$ . This outcome does not depend on the symmetric market structure.

It is straight forward to show that the end-user price is independent of whether the sub-chains set prices competitively, as we have assumed, or whether the end-user price is set centrally by the procurement headquarters. In both cases the end-user price is given by equation (17). This clearly illustrates how effectively slotting allowances can be used to soften competition even if the wholesale contracts are unobservable across the buyer alliances. The assumption that the buyer groups have correct expectations about each other's wholesale contracts, is of course a simplification which is due to the information structure in the model. However, we believe that it corresponds pretty well with reality. In its investigation of the Norwegian retail market, the Norwegian competition authorities found that even

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<sup>15</sup>With perfect observability, the wholesale contracts could be used to soften competition between the buyer groups. This would not change the qualitative results, but would lead to even higher end-user prices.

though the contracts between each buyer group and the producers were secret, the essence of the procurement contracts was widely known. This was revealed by the internal documents found in the investigated firms by the Norwegian Competition Authority, and it was confirmed by the respective market participants.<sup>16</sup>

We summarize our results into the following two propositions:

**Proposition 2:** *With procurement alliances (buyer groups) among retail chains and  $b \in (0,1)$ , slotting allowances will increase end-user prices even though wholesale contracts are unobservable across buyer groups.*

**Proposition 3:** *With procurement alliances among competing retail chains, slotting allowances are used to transfer procurement market power into the less concentrated retail market. The anti-competitive effects of using slotting allowances are strongest for an intermediate degree of retail substitutability.*

Consequently, without slotting allowances (and other analogous vertical restraints) the degree of retail competition depends on the number of retail chains ( $n$ ) and the degree of differentiation ( $b$ ). With slotting allowances the degree of retail competition depends on the number of procurement alliances rather than the number of retail chains. In fact, if there is a monopoly at the procurement level we have the following result (proof, see Appendix) :

**Proposition 4:** *With slotting allowances and procurement monopoly, the procurement headquarters is able to ensure monopoly profit even if there is fierce competition between the retail chains. The consumers will be charged monopoly prices  $p_{PM}^{cp} = p_{PM}^{sa} = v/2$  independent of the number of retail chains and substitutability between the retail chains.*

To counteract the effects of retail chain competition, the PHQ thus sets a unit wholesale price which is increasing in  $b$  and  $n$  if we have a procurement monopoly. The procurement headquarters is consequently able to neutralize competition between the retail chains by choosing an appropriate wholesale unit price - the combination of retail competition and slotting allowances yields the same profit and

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<sup>16</sup>The Norwegian Competition Authority (2005, pp. 55).

consumer prices as if the procurement headquarters was able to eliminate retail competition and set the cartel prices directly. Thus, control over the end-user prices or the wholesale price schemes has the same impact on the end-user prices and profits.

The fact that there is a positive relationship between the size of slotting allowances and the extent of retail competition if and only if we have a procurement monopoly, has implications for empirical analysis. If Sudhir and Rao (2006) had found support for their hypothesis that slotting allowances are increasing in retail competition, we would have had an indication that the PHQs operate as a de facto cartel.<sup>17</sup> It is certainly reassuring that the data did not support this hypothesis. Nonetheless, the results above show that competition authorities should be highly suspect of cooperation between PHQs even if it could be proved that there is unrestricted competition between the retail chains. Moreover, we have recently observed a development towards procurement alliances among large buyer groups. In Norway, for instance, the three largest buyer groups (NG, ICA and Coop) are members of a joint venture that takes care of IT-systems on logistic and transport. Such procurement alliances may increase the information exchange between competing buyer groups, particularly if it is in their interest to do so.<sup>18</sup>

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<sup>17</sup>It should be noted that the theoretical approach employed by Sudhir and Rao is flawed. First, they use a utility function where the size of the market and the consumers' willingness to pay for a good are increasing in  $b$ . Second, they make a technical error which means that they are actually not considering a competitive equilibrium.

<sup>18</sup>In addition to the increased concentration at national level, we have witnessed cross national mergers as well as buyer groups. Cross-national procurement alliances have so far not raised antitrust concerns, since they generally tend to have only one member from each nation. However, Dobson, Waterson and Davies (2003) emphasize that the inter-linkages between national and cross-national procurement alliances combined with cross-ownership by the large multinational retailers increase the potential for information exchange.

### 3 Policy implications

The European Commission has generally approved both procurement alliances and horizontal mergers between retailers in the market for daily consumer goods (Dobson and Waterson, 1999, Clarke et al., 2002). One exception is the proposed merger between two of the leading Finnish retailer groups, Kesko and Tuko, which prior to the proposed merger had domestic market shares of approximately 40% and 20%, respectively.<sup>19</sup> Both Kesko and Tuko own several sub-chains, and these receive franchising fees from the connected retailers. Procurement conditions are taken care of by the headquarters of Kesko and Tuko, while end-user prices for the basic assortments are decided at the sub-chain level.<sup>20</sup>

In their merger application, Kesko claimed that it was organized as a pure buyer group with no vertical restraints limiting internal competition between their retail sub-chains. If this were the case, one could reasonably expect strict retail competition between the sub-chains and even between retailer outlets within the same sub-chain.

However, Kesko's argument was not accepted by the Commission. In their investigation the Commission revealed that competition between retailer outlets within each sub-chain was severely hampered by the franchising contracts. As mentioned above, end-user prices were decided on the sub-chain level for the basic assortment. Moreover, the Commission found that the franchising contracts did not include fees for the use of logotypes, slogans, marketing assistance and so forth. Instead, the sub-chains charged the outlets for such services through adding margins on the goods passed on to the retailers. Consequently, the retailers' marginal costs increased, which in turn raised end-user prices for products where each retail outlet decides the end-user price.

By the same token, Kesko's headquarters has incentives to implement restraints that limit competition between sub-chains. Indeed, the Commission argues that the relationship between the headquarters and the sub-chains resembles the relationship

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<sup>19</sup>See, European Commission Decision of 20 11 1996, Case no. IV/M. 784. - Kesko/Tuko.

<sup>20</sup>Additionally, there are also some independent retail chains that cooperate with Kesko and Tuko at the procurement level.

between the sub-chains and the retailers: “... it has to be concluded that the horizontal cooperation and lack of competition within each of these five Kesko chains constitutes a structural feature of the Kesko group, and as such of the Finnish retail market. The same is also true for whatever competition that may seem to exist between the five chains, since the main elements of that competition have, in fact, been centrally planned by Kesko”. Consequently, the Commission concluded that the market power at the procurement level could be transmitted into the retail market.

As shown in the present paper, slotting allowances may be used as an instrument to soften competition between sub-chains by increasing wholesale prices. This resembles the device used by Kesko’s sub-chains in the franchising contract with retailers, where marketing and other support services offered by the sub-chain were added on the goods rather than charged through fixed franchising fees. Moreover, a contract with a third party (the supplier) through slotting allowances has a higher degree of commitment and transparency than other forms of strategic transfer pricing. Other things equal, slotting allowances may be considered as a superior tool to implement strategic transfer pricing.

Most of the efficiency rationales behind slotting allowances are concerned with challenges regarding new product introduction. Under asymmetric information, where the manufacturer has private information about e.g. product quality, slotting allowances may be used as a signalling or screening device (Chu, 1992, Lariviere and Padmanabhan, 1997, and Desai, 2000). However, Bloom et al. (2000) and Rao and Mahi (2003) find no support for slotting allowances as a signalling device. Interestingly, in their survey Bloom et al. find that neither US manufacturers nor the retailers believe that slotting allowances serve as a signal or screening device. The Norwegian Competition Authority reports the same view among Norwegian manufacturers and retailers (NCA, 2005). In contrast, Sudhir and Rao (2006) and Sullivan (1997) find some empirical support for the signalling rationale. However, even proponents of the view that slotting allowances solve problems with asymmetric information, emphasize that there may be alternative instruments.<sup>21</sup> In cases

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<sup>21</sup>Desai (2000), for instance, argues that advertising by the manufacturers is a substitute to

where the retailer does not fear that the manufacturer will go bankrupt, buy-back guaranties are an alternative signalling and screening device (NCA, 2005). Manufacturers that accept buy-back guaranties are more likely to have high quality. Slotting allowances may also be used to balance the risk between manufacturer and retailers regarding new products.<sup>22</sup> However, buy-back guaranties will also be an alternative to slotting allowances for this rationale (Sudhir and Rao, 2006).

Moreover, the degree of information asymmetry in favor of manufacturers seems to be exaggerated. The majority of “new” products hardly gives rise to information problems, and slotting allowances are also used for established products (Federal Trade Commission, 2001, Competition Commission, 2000, and NCA, 2005).<sup>23</sup>

A final efficiency rationale is that slotting allowances help retailers to allocate scarce shelf space in an appropriate way (Sullivan, 1997, Larivieri and Padmanabhan, 1997 and Desai, 2000). Certainly, slotting allowances may be a way to bid for shelf space, but other instruments exist. The obvious one is for manufacturers to offer reduction in the unit wholesale price. In a recent analysis, the Norwegian Competition Authorities find that such rebates contingent on the access to attractive shelf space are used in Norway (NCA, 2005).

Thus, several analyses support the hypothesis that alternative instruments exist for the vast majority of the claimed efficiency benefits of using slotting allowances (Bloom et al, 2000, Sudhir and Rao, 2006, NCA, 2005). What begs a question then, is why do firms prefer to use slotting allowances to extract these efficiency benefits? Suppose that both slotting allowances and an alternative tool may solve a given efficiency problem. However, slotting allowances have the side effect that they soften retail competition. The latter effect will reduce the social gain from slotting allowances (even if the total effect on welfare should be positive). Consequently, it seems reasonable to assume that retailers prefer to use slotting allowances over an alternative tool that just solves the efficiency problem. These concerns suggest that

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slotting allowances in order to signal the potential of a new product. If advertising is effective, manufacturers will probably prefer to use advertising (given that the goal is only to signal quality).

<sup>22</sup>Bloom et al. (2000) find support for this among manufacturers as well as retailers.

<sup>23</sup>See e.g. Davies (2001) and Bloom et al (2000).

antitrust authorities should not just ask whether the efficiency effects of slotting allowances dominate the anti-competitive effects. They should also ask whether the efficiency effects could be achieved in other ways without the anti-competitive side-effects related to slotting allowances. Indeed, Rey and Stiglitz (1995 pp. 446) propose that competition authorities should be suspicious towards vertical restraints “unless there can be shown to be significant efficiency-enhancing effects that (a) could not be obtained (at reasonable cost) in other ways, without the ensuing anti-competitive effects, and (b) that outweigh any anti-competitive effects”.

Finally, our results indicate that competition authorities should have a more critical view on procurement agreements also on logistics, transport etc.<sup>24</sup> It is important to emphasize that buyer groups may benefit consumers even when involving competing firms.<sup>25</sup> Our concern is, however, that the buyer power at the procurement level may be reinforced at the retail level. Procurement alliances may have effects similar to those of cross licensing where firms reciprocally have access to patent protected technologies. As noted by Motta (2004, pp.205 and 206) “... the best situation for competition would arise when cross licenses are royalty free, or when they specify fixed payments rather than unit royalties, as the latter would amount to higher variable costs and reduced output”. Thus, Motta (2004) emphasizes that competition authorities should scrutinize “ancillary restraints” that call for payments of per-unit royalties to the joint venture. This is exactly what slotting allowances do - they implement per unit royalties to the procurement alliance.

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<sup>24</sup>The use of slotting allowances may be a part of a more comprehensive choice of procurement system (IT, logistic and transport systems). Göx (2000) shows that when transfer prices are not observable, a strategic alternative may be to commit to an accounting system which deviates from marginal cost pricing. When average costs are above marginal costs, a commitment to an accounting system based on full cost based transfer prices may resemble the outcome with observable transfer pricing. By the same token, the choice of a procurement system that incorporates slotting allowances may be a way to commit to transfer prices above the marginal costs.

<sup>25</sup>However, as shown by Dobson and Waterson (1997) countervailing buyer power may have negative welfare effects even without ancillary restraints.



## 4 Concluding remarks

Both in the USA and in Europe, the use of slotting allowances has attracted attention in the general press as well as among policy makers and economists. In Norway, which has the highest retail concentration in Europe<sup>26</sup>, slotting allowances generated a widespread debate during winter and spring 2005. The press claimed that the retailers used slotting allowances to dampen end-user competition, and in this paper we have shown that the emergence of large buyer groups has increased the potential for using slotting allowances to raise prices. As long as wholesale contracts are observable within each buyer group, slotting allowances may harm competition. Hence, the extensive and increased use of slotting allowances is consistent with the increase in buyer groups and divisionalized retailer groups that operate several retail sub-chains.

If the rationale behind slotting allowances and high wholesale prices is simply to reduce competition within a given buyer group, the practice may be seen as a form of strategic transfer pricing. An alternative could be that the procurement alliance operates a warehouse that charges the sub-chains a transfer price above the wholesale price.<sup>27</sup> Gabrielsen and Sørsgard (2005), in a study for the Norwegian Competition Authority, maintain that there is no reason why firms should prefer to use slotting allowances as a way to practice strategic transfer pricing. However, this argument hardly holds if there is also competition between retailers belonging to different buyer groups. The reason is that a contract with a third party (the manufacturer) has a higher commitment value than manipulation of internal transfer prices. Consequently, we believe that slotting allowances have a higher strategic potential than pure internal transfer pricing.

Theoretical as well as empirical analyses indicate that efficiency enhancing and anti-competitive rationales for slotting allowances coexist. Regarding policy implications, our main message is that analyses of slotting allowances should try to integrate efficiency enhancing and anti-competitive effects. Competition authorities should

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<sup>26</sup>The four dominating retail groups controlled 99.7% of the retail grocery market in 2000.

<sup>27</sup>See e.g. Schjelderup and Sørsgard (1997).

recognize the fact that alternative instruments exist for efficiency enhancing motives as well as for anti-competitive motives. When retailers (or manufacturers) prefer to use slotting allowances to solve efficiency problems, even if alternative instruments exist, there is reason to believe that slotting allowances have anti-competitive side-effects that benefit the firms.

## 5 Appendix

### Proof of Proposition 4

Maintaining the assumption that the retail chains compete in prices, the solution to the last stage is given by equations (4) and (5) also with a procurement monopoly.

At stage 1 the PHQ monopoly offers each manufacturer a take-it-or-leave-it contract, and maximizes aggregate profit for the retailers:

$$\max_{w_1, \dots, w_n} \sum_{i=1}^n \{(p_i - w_i) q_i + S_i\},$$

subject to  $w_i q_i + S_i \geq 0$  and equations (4) and (5). This gives rise to a unique symmetric equilibrium with

$$w_{PM}^{sa} = b \frac{n-1}{2(n-b)} v. \quad (19)$$

Differentiation of (19) yields

$$\frac{\partial w_{pm}^{sa}}{\partial b} = \frac{vn(n-1)}{2(n-b)^2} > 0 \text{ and } \frac{\partial w_{pm}^{sa}}{\partial n} = \frac{(1-b)bv}{2(n-b)^2} > 0.$$

To counteract the effects of retail chain competition, the PHQs thus set a unit price which is increasing in  $b$  and  $n$ . Indeed, inserting for (19) into (5) we find that  $p_{PM}^{sa} = v/2$ , which is identical to the monopoly price. *Q.E.D.*

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