Retail Mergers, Buyer Power and Product Variety*

Roman Inderst† Greg Shaffer‡

March 2004

Abstract

This paper analyses the impact of retail mergers on product variety. We show that following a merger, a retailer may want to enhance its buyer power *vis a vis* suppliers by delisting products and committing to a "single-sourcing" purchasing strategy. As we argue, the benefits of such a strategy may be more pronounced in case of *cross-border mergers.* Moreover, anticipating further concentration in the retail industry, suppliers will strategically choose to produce less differentiated products, which further reduces product variety. If negotiations are efficient, the overall loss in product variety reduces industry profits and, under quite standard assumptions, also consumer surplus and total welfare. With linear tariffs, however, there may be a countervailing effect as the more powerful retailer passes on lower prices to final consumers.

Keywords: Buyer Power; Retailing; Horizontal Mergers.

---

*We thank Chiara Fumagalli, Hans Normann, seminar participants at the Office of Fair Trading and, in particular, Paul Dobson for helpful comments and suggestions.

†London School of Economics & CEPR. Address: Department of Economics & Department of Accounting and Finance, London School of Economics, Houghton Street, London WC2A 2AE. Email: r.inderst@lse.ac.uk.

‡Simon School of Business, University of Rochester. Address: William E. Simon Graduate School of Business, University of Rochester, Rochester NY. 14627. Email: shaffer@simon.rochester.edu

1 Introduction

In many OECD countries retail markets have become increasingly concentrated.[1] Particularly in Europe, the consolidation process does not stop at national borders but involves an increasing number of cross-country mergers. As reported in Dobson (2002), the top ten retailers in the EU account now for more than 30% of sales of food and daily products.[2]

As consumers typically choose only among at most a handful of outlets in their neighborhood, cross-border retail mergers are unlikely to reduce competition.[3] Over the last years, however, policy makers and antitrust authorities have become increasingly concerned about the potential implications of creating international retail giants. As documented by numerous workshops and policy papers commissioned by competition authorities in the US and the EU, it is feared that the consolidation further increases retailers' power *vis a vis* suppliers, which in turn may have negative consequences for upstream product quality as well as for product innovation and product variety.[4] It is possibly the UK where competition authorities have started to look most seriously into retailer buyer power, as documented by the Competition Commission's study on grocery retailers' in 2000 and, as a result of this, the implemented Code of Practice governing the relationship with suppliers for the UK's top five retailers.[5]

This paper presents a theory to explain why retail mergers may increase buyer power and why they may lead to a socially inefficient reduction in product variety. We argue that, following a merger, the consolidated retailer may find it profitable to no longer carry the products of all previous suppliers. By delisting some suppliers, the retailer can make suppliers compete more aggressively for its patronage. This enables the large retailer to capture a bigger fraction of industry profits. The drawback is that, by delisting suppliers whose products provide a better fit to local preferences in some outlets, total industry profits are reduced. The trade-off for the retailer, then, is whether to adopt a single-sourcing policy and capture a larger share of lower

[1] See, for instance, the OECD (1999) report on buyer power and the FTC (2001) report on slotting allowances.

[2] Amongst the retailers that are now increasingly active across the EU are Germany's Rewe and Metro, the UK's Tesco and France's Intermarché. Also Wal-Mart operates now in several European countries after a string of acquisitions, including that of Asda (UK) and Wertkauf (Germany).

[3] In fact, this could be even said for many mergers at a national level. Moreover, in case two retailers serve overlapping markets, structural remedies are easily applied by prescribing the divestiture of critical outlets. On the other hand, by reducing the overall number of firms in the market, a merger or acquisition could facilitate collusion on a national level, i.e., it could have co-ordinated effects. (On this see, for instance, Competition Commission (2003).)

[4] Some of the major policy issues are discussed in Dobson and Waterson (1999) and Rey (2000). Exemplary policy reports are Dobson Consulting (1999) for Europe, FTC (2001) for the US and also OECD (1999).

[5] See Competition Commission (2000). In February 2003 the Competition Commission launched an inquiry into the effectiveness of the Code of Practice.

industry profits or be content with capturing a smaller share of higher industry profits. The former is sometimes more profitable.

According to our theory, a consolidated retailer can obtain better deals from suppliers not only because it threatens to no longer carry their products but because it actually *does* delist some of the previously stocked goods. This has immediate welfare implications, which sets our paper apart from most of the extant literature on buyer power, where delisting is only an off-equilibrium threat. (The literature is reviewed below.) Moreover, in our model it is essential for the exercise of buyer power that the various outlets of the merged retailers previously stocked different goods, e.g., due to regional or national differences in consumers' preferences and habits. Consequently, our theory applies particularly to cross-border mergers, where existing theories of buyer power have little to say.

The loss of variety due to a retail merger and subsequent single sourcing is further aggravated as suppliers, in anticipation of further consolidation among their buyers, optimally (re-)position their products and, thereby, reduce product differentiation. This makes suppliers better positioned to serve all outlets of a consolidated retailer. The overall reduction in product variety leads to an unambiguous reduction of industry profits and, under quite standard assumptions, also of total welfare. If retailers and suppliers negotiate over linear tariffs, i.e., if negotiations are not efficient, there exists, however, an important countereffect. Increased competition for the consolidated retailer's account and less product differentiation tend to reduce purchase prices. As some of these savings are passed on to consumers, this reduces the double-marginalisation problem and increases consumer surplus.

It is fair to say that currently there exists no consensus on the origins and welfare consequences of buyer power in retailing. It is, however, a widely held view among policy makers that suppliers will cut back on marketing and R&D expenditures when faced with stronger buyers, leading to a reduction in the quality and variety of goods. With the possible exception of the introduction of new products, the incentives for quality improvement and product innovation depend, however, not on suppliers' absolute profit levels but on their marginal change. Inderst and Wey (2002) show that this may often lead to the opposite result, i.e., suppliers facing fewer, but larger, buyers may have *higher* incentives for product improvement. From this perspective, our results may be important as they provide a strong underpinning for why cross-border retail mergers may have direct welfare implications in the form of reduced product variety.

The two predictions that consolidated retailers can obtain more favourable terms of supply and that they may also reduce their supplier base seem to accord well with casual observations. In fact, retailers often quote as a primary benefit of a planned merger cost savings achieved both by reducing the total number of suppliers and by obtaining better conditions from their remaining suppliers.[6] Moreover, preventing consolidated retailers from delisting, in particular, small and dependent suppliers seems to be a key objective of antitrust authorities and law makers in several European countries.[7]

While grocery retailing is a prime example for the growing power of large and increasingly international buyers, our results are also applicable to other areas. As a final motivating case, in Belgium, three large breweries (Interbrew, Alken-Maes, and Haacht) control the beverage stocking (soft drinks and other non-alcoholic beverages) decisions of thousands of outlets in the on-premise (hotels, restaurants, and cafes) distribution channel. Each has its own network of outlets. Rather than allow suppliers to negotiate with outlets separately, however, each brewery acts as the 'gatekeeper' to its own network, selling exclusive access in an all-or-nothing manner to whomever gives it the best deal. The European Commission has been concerned that his practice might unfairly favor some suppliers over others and blur to the detriment of consumers any differences in local and regional preferences among outlets in a network.[8]

The rest of this paper is organized as follows. Section 2 discusses the related literature. Section 3 contains our main results on how a consolidated retailer can use its newly acquired buyer power. Section 4 extends the model by endogenizing product characteristics. In Section 5 we consider linear contracts. In Section 6 we discuss various assumptions of the model and consider further implications. Section 7 concludes.

2 Related Literature

The paper contributes to the growing literature on buyer power. According to the extant literature, larger retailers can obtain more favorable conditions for the following reasons. Larger retailers may be able to break collusion between suppliers (Stigler (1964), Snyder (1996)). They may also be able to threaten more credibly to integrate backwards or to sponsor new entry in

[6] Competition Commission (2003) refers, for instance, to Asda's benefits from the global procurement strategy of Wal-Mart. Data collected for this report and an earlier report (Competition Commission (2000)) also document that the further consolidation of the UK grocery retail industry may have weakened suppliers' negotiating power and that it may have led to higher concentration in retailers' supplier base.

[7] For instance, one of the main remedies in the Carrefour/Promodés merger was that contracts with "economically dependent" suppliers must not be changed to their disadvantage over three years following the merger (Carrefour/Promodes EC/DGIV, 2000, Case No. COMP/M.1648). In France, "economically dependent" suppliers can sue if they are delisted. For more details on national dependency laws in the EU see Clarke, Davies, Dobson, and Waterson (2002).

[8] Such concerns have lead to the stipulation of a market share threshold in the Vertical Block Exemption rule, which took effect on 1 June 2000 (see Commission Reg. (EC) No 2790/1999).

the upstream industry (Katz (1987), Fumagalli and Motta (2000)). A number of papers have further shown - under varying assumptions - that larger buyers can purchase at a lower per-unit price if total industry profits are strictly concave (Chipty and Snyder (1999), Horn and Wolinsky (1988), von Ungern-Sternberg (1996), Dobson and Waterson (1997), Inderst and Wey (2003))[9]. Finally, in DeGraba (2003) larger buyers obtain a discount as they represent a more risky source of profits than several smaller independent buyers.

While these theories predict that the formation of a large buyer reduces suppliers' profits, they also assert that it does not affect buyers' choice of suppliers. This is markedly different in our theory. One implication of this difference is that our theory of buyer power has immediate welfare implications. In particular, it offers support for the often expressed view that the exertion of buyer power will lead to lower product variety.

Our analysis of the case with linear tariffs reveals a welfare trade-off between a reduction in variety and a reduction in final prices. This mirrors results in von Ungern-Sternberg (1996) and Dobson and Waterson (1997), who analyze the welfare trade-off between a monopolization of the downstream market and a reduction in the double-marginalisation problem.

3 The Main Model

3.1 The Economy

There are two suppliers $s \in S = \{A, B\}$, each of which produces a single good.[10] Goods can be sold in two retail outlets $r \in R = \{a, b\}$. We assume that the two outlets operate in independent markets, in which the respective retailers act as monopolists. This assumption allows us to abstract from the standard monopolization effects of a downstream merger.

The characteristics of the good of supplier s are fully captured by a real-valued parameter θ^s. (We denote parameters and functions relating to retailers by subscripts and those relating to suppliers by superscripts.) For the moment, the characteristics θ^s are taken as exogenously given. In Section 4 we let suppliers optimally choose the characteristics of their goods. We further assume that at each outlet only one good is stocked. This may be the case as goods A and B are sufficiently close substitutes, which makes it unprofitable to allocate limited shelf

[9] For experimental results on this see Norman, Ruffle and Snyder (2003).

[10] The assumption of an exogenous limit to the number of products offered by a single firm is standard. This could be justified by appealing to limited organizational capacities in production, marketing and distribution. Though an analysis of the case where suppliers can offer a range of products with different characteristics would be interesting, this would also introduce new - and well known - issues such as spatial preemption (and its credibility).

space at a given outlet to both goods. However, as we discuss in Section 6.1, such an assumption is not necessary and it may be optimal for strategic reasons not to stock more than one good at a given outlet.

If a good with characteristics θ is sold at price p, the demand at outlet r equals $D_r(\theta, p)$. We denote the respective inverse demand function by $P_r(\theta, x)$, where x denotes the sold quantity. We further assume that suppliers have symmetric and constant marginal costs c. (See, however, further below.) Denote next by $\Pi_r(\theta) := \max_x x[P_r(\theta, x) - c]$ the maximum feasible profits that can be realized when supplying a good with characteristics θ at outlet r. Note that $\Pi_r(\theta)$ would be realized by an integrated firm that controls both the production and the final sales of the good. Until Section 4, where θ^s is endogenously determined, we work with the following assumptions.

Assumption 1. *It holds that* $\Pi_a(\theta^A) > \Pi_a(\theta^B)$ *and* $\Pi_b(\theta^B) > \Pi_b(\theta^A)$.

That is, good A allows to realize strictly higher total profits at outlet a, while good B provides a better fit for outlet b. There are many reasons for why this may be the case. First, outlets a and b may be located in different regions or even different countries, where consumers have different tastes and preferences. Also, consumers may differ in income.[11] Still another possibility is that the brand of supplier A is only well established in the market where outlet a operates, while good B has brand recognition only for customers of outlet b. Again, this interpretation seems to be suitable in case the two outlets are in separate countries. In Section 4 we further show how Assumption 1 arises endogenously if suppliers optimally choose their product characteristics.

Finally, in Section 6.3 we extend our results to the case where suppliers are differentiated in how close their factories are located to the different outlets. We show that the resulting differences in (per unit) transportation costs generate the same outcome as product differentiation. Moreover, Section 6.3 also shows that our results are robust to the introduction of strictly convex costs.

3.2 The Benefits and Consequences of a Retail Merger

We consider two different scenarios. In the first scenario, the two outlets a and b are operated by different retailers. In the second scenario, the two outlets are operated by a single consolidated

[11] Admittedly, we have assumed that θ does not affect costs of production. We could, however, imagine that, holding production costs per sales unit (e.g., package) constant, a higher θ represents a smaller quantity of a good of higher quality. Consumers could then have different preferences along this quantity-quality trade-off. Alternatively, we can allow production costs to directly depend on θ, making it more costly to produce goods of higher quality.

retailer. For the moment, we assume that in each case the chosen supplier and the prevailing supply contracts are determined via an auction. Below we generalize our results by introducing bilateral negotiations. The analysis of negotiations will contain that of auctions as a special (corner) case. After supply contracts are determined, retailers set prices at the two outlets. Our main assumption is that contracts are sufficiently complex to disentangle profit maximization from the distribution of profits between the retailers and the suppliers. This ensures that there is no double-marginalisation problem. A simple contract that rules out double marginalisation is a forcing contract that stipulates that the retailer can purchase a pre-specified quantity - and only this quantity - at a lump-sum price. Alternatively, the two sides could agree on a two-part tariff, which allows the retailer to purchase goods at a price equal to the supplier's marginal costs, while the supplier receives a flat "fee".[12]

Separate retailers

The outcomes of two separate auctions run by retailers a and b are straightforward. Suppliers compete in a Bertrand-type fashion.[13] Take retailer a. As total profits are strictly higher with good A by Assumption 1, supplier A wins the auction. Supplier A has to leave the retailer with a fraction of total profits $\Pi_a(\theta^A)$ such that the retailer is just indifferent between taking up A's offer or that of supplier B. Supplier B, in turn, makes a best effort to win the account of retailer a. That is, B promises away all of the respective profits $\Pi_a(\theta^B)$. We thus have the following result.

Lemma 1. *In the case of two separate retailers, an auction results in profits $\Pi_a(\theta^B)$ for retailer a, which purchases good A, and in profits $\Pi_b(\theta^A)$ for retailer b, which purchases good B.*

Consolidated retailer

For the consolidated retailer, we distinguish between two different purchasing strategies. Suppose first the consolidated retailer invites separate bids for the two outlets. In this case, we can again analyze both auctions in isolation, as done for Lemma 1. Suppose next the consolidated retailer decides to resort to a single-sourcing strategy. That is, the retailer decides to stock the same good at both outlets and invites bids for the joint account. The outcome of this auction depends now on which supplier can promise higher total profits. In complete analogy to Lemma 1, we then obtain the following result.

[12] Such menu auctions are also considered in Rey and Stiglitz (1995) and O'Brien and Shaffer (1997).

[13] Precisely, this is the unique pure-strategy outcome of a "first-price" sealed-bid auction. Given that there is complete information, i.e., that the winner of the auction is known in advance, an open auction format such as an ascending auction could also result in different outcomes as the certain loser has no (strict) incentives to push up the price.

Lemma 2. *In case of a consolidated retailer, the auction result is the same as in Lemma 1 if the retailer invites separate bids for both outlets. If the retailer decides to stock the same good at both outlets, the auction yields the following outcome:*
i) If $\Pi_a(\theta^A) + \Pi_b(\theta^A) > \Pi_a(\theta^B) + \Pi_b(\theta^B)$, *supplier A wins the auction and the retailer's profits are* $\Pi_a(\theta^B) + \Pi_b(\theta^B)$.
ii) If $\Pi_a(\theta^A) + \Pi_b(\theta^A) < \Pi_a(\theta^B) + \Pi_b(\theta^B)$, *supplier B wins the auction and the retailer's profits are* $\Pi_a(\theta^A) + \Pi_b(\theta^A)$.
iii) If $\Pi_a(\theta^A) + \Pi_b(\theta^A) = \Pi_a(\theta^B) + \Pi_b(\theta^B)$, *either supplier may win the auction. The particular outcome does not affect profits.*

Lemmas 1 and 2 provide us with our key result.

Proposition 1. *The consolidated retailer is strictly better off under the single-sourcing policy. This implies that a consolidated retailer can realize strictly higher profits than the two separate retailers jointly.*

Note that, under Assumption 1, single sourcing strictly reduces total industry profits. For instance, if A wins the retailer's "global account", good A is also stocked at outlet b even though good B provides a better fit.[14] For the retailer this is, however, more than compensated by the fact that it allows the retailer to obtain a larger fraction of total profits. This is achieved as single sourcing makes the two suppliers less differentiated at the level of the consolidated retailer.[15] In the extreme case where both suppliers are equally well positioned to serve both outlets (Case iii), this effect is most striking. Under a single-sourcing policy, the consolidated retailer can now pocket all of the industry profits.

What is key in making single sourcing profitable for the merged retailer is that the supplier base of the two outlets is different before the merger. As can be easily seen, if both retailers had originally the same supplier, i.e., either A or B, a merger would not generate profits and it would also not lead to a change in the goods carried at both outlets. As noted above, that outlets carry different goods before the merger may be due to differences in consumer taste or in brand recognition across regions or countries. Retail mergers across national borders may

[14] Under some additional and quite standard assumptions, the loss in variety also leads to a reduction in welfare. We explore this in detail in Section 4, where we formalize how θ affects demand and industry profits.

[15] This is analogous to why bundling can be optimal for a monopolist (e.g., Adams and Yellen (1976), Palfrey (1983), and McAfee, McMillan, and Whinston (1989)). In the procurement literature, the strand of literature closest to ours is that of split-award contracts. There, the focus of optimal lot design is, however, different. For instance, split-award contracts can limit suppliers' informational rents (e.g., Riordan and Sappington (1989)), they can attract more competition (e.g., Perry and Sakovics (2001)) and they can lead to more efficient production (e.g., Anton and Yao (1989)).

thus be particularly profitable. Resorting subsequently to a global procurement strategy, the retailer makes suppliers compete more aggressively for the global account. If supplier A wins the global account, we know from Lemmas 1-2 that retailers's gains from merging and adopting a single-sourcing strategy are equal to $\Pi_b(\theta^B) - \Pi_b(\theta^A)$. If this difference was zero, good A would provide an equally good fit for outlet b as good B. The larger is this difference and, therefore, the more differentiated are suppliers' products, the larger is the loss in total proits if good A is supplied instead of good B, but the larger are the retailer's gains from a single-sourcing strategy.

To obtain the result that a merger reduces product variety via the consolidated retailer's single-sourcing policy, we need two assumptions that so far we have not spelt out explicitly. First and foremost, the two separate retailers can not mimic the single-sourcing policy of the consolidated retailer. As we argue in detail in Section 6.2, it seems reasonable to assume that buyer groups have less scope in harmonizing their purchasing strategies and consolidating their supplier base than a single large retailer. Our second assumption is that the consolidated retailer can choose whether or not to stock the same good at both outlets. As is immediate from Lemmas 1 and 2, both suppliers would be strictly better off if they could commit not to participate in an auction for the global account and if they could, instead, force the retailer to resort again to running separate auctions. In practice, retailers should, however, enjoy considerable scope in determining how to allocate their shelf space. Moreover, in particular in the wake of a general re-organisation following a merger, a single-sourcing strategy may be made credible by implementing changes in the distribution system or by top management's directive to vigorously "prune" the supplier base of the two merging retailers.

3.3 Generalization to Bilateral Negotiations

The case of auctions, as considered in the previous section, is admittedly an extreme case. It puts suppliers in an extremely favourable position, allowing a winning supplier to fully extract the generated incremental surplus. For instance, we can see from Lemma 1 that supplier A realizes the profits $\Pi_a(\theta^A) - \Pi_a(\theta^B)$. Basically, this implies that retailers have *no* bargaining power. We now extend our previous results to the case where supply contracts are determined by bilateral negotiations, which allows to accommodate more general distributions of bargaining power.

Choosing a framework for negotiations, our first consideration is again to allow for sufficiently complex, i.e., efficient, contracts, ruling out double marginalisation. Suppose that each (independent) firm has two sales representatives (or account managers), who act independently but in the interest of the respective firm. Negotiations proceed simultaneously, and agents form rational expectations about the outcomes of all other negotiations. Suppose, for instance, that in equilibrium A will supply r. In this case, the contract agreed with supplier B serves again only as an outside option for negotiations between r and A. Following the Bertrand logic of the auction, we specify that B makes a best effort to obtain the contract, implying that the retailer could realize all profits $\Pi_r(\theta^B)$ with B.

Our next specification is that the winning supplier can extract the fraction $\beta \in [0,1]$ of the realized net surplus.[16]. Note that for small β the retailer has more bargaining power. For large β the supplier has more bargaining power. Our assumption of a fixed division of realized net surplus admits several interpretations. If the suppliers can make take-it-or-leave-it offers to the retailers we have that $\beta = 1$. If the retailers can make take-it-or-leave-it offers we have that $\beta = 0$. If the two firms divide the gains from trade equally, as in symmetric Nash bargaining, then $\beta = 1/2$.[17]

Separate retailers

In difference to Lemma 1, a winning supplier can now no longer extract all incremental surplus but only the fraction β. That is, supplier A realizes the profits $\beta[\Pi_a(\theta^A) - \Pi_a(\theta^B)]$. The following result is then immediate.

Lemma 3. *In the case of separate retailers and negotiations, retailer a is supplied by supplier A and realizes the profits* $(1-\beta)\Pi_a(\theta^A) + \beta\Pi_a(\theta^B)$, *while retailer b is supplied by supplier B and realizes the profits* $(1-\beta)\Pi_b(\theta^B) + \beta\Pi_b(\theta^A)$.

Note that for $\beta = 1$ we are back to the case of auctions considered in Lemma 1.

Consolidated retailer

Again, if a consolidated retailer does not choose single sourcing, the outcome of negotiations does not change compared to the case with separate retailers. Under single sourcing, the large retailer and the two suppliers now negotiate over a contract to serve both outlets. The following result generalizes Lemma 2.

[16] Note that we combine non-cooperative and cooperative concepts, which is common in the literature and allows to obtain a parsimonious model of negotiations. Moreover, our specification already selects a particular equilibrium of the bargaining game. For instance, it rules out the case where the two agents of a given retailer fail to co-ordinate. Precisely, without any restrictions there would be an equilibrium in which, for instance, retailer a is supplied by B under a forcing contract, i.e., $a's$ agent agrees to buy a fixed quantity from B. Anticipating this, the other agent of a optimally does not conclude a contract with A. One way to implement our specification is to require that any pair (r,s) negotiates over a menu of prices $T_r^s(x)$ that truthfully reflects the supplier's costs, i.e., where $dT_r^s(x)/dx = c$, while the level of $T_r^s(x)$ determines the distribution of surplus.

[17] A non-cooperative game with alternating offers would generate the same outcome (see Binmore, Rubinstein, and Wolinksy (1986)).

Lemma 4. *In the case of a consolidated retailer, the outcome of negotiations is as in Lemma 3, if contracts for each outlet are negotiated separately. If the retailer decides to stock the same good at both outlets, negotiations yield the following outcome:*
i) If $\Pi_a(\theta^A)+\Pi_b(\theta^A) > \Pi_a(\theta^B)+\Pi_b(\theta^B)$, *supplier A wins the auction and the retailer's profits are*

$$(1-\beta)\left[\Pi_a(\theta^A)+\Pi_b(\theta^A)\right]+\beta\left[\Pi_a(\theta^B)+\Pi_b(\theta^B)\right].$$

ii) If $\Pi_a(\theta^A)+\Pi_b(\theta^A) < \Pi_a(\theta^B)+\Pi_b(\theta^B)$, *supplier B wins the auction and the retailer's profits are*

$$(1-\beta)\left[\Pi_a(\theta^B)+\Pi_b(\theta^B)\right]+\beta\left[\Pi_a(\theta^A)+\Pi_b(\theta^A)\right].$$

iii) If $\Pi_a(\theta^A)+\Pi_b(\theta^A) = \Pi_a(\theta^B)+\Pi_b(\theta^B)$, *either supplier may win the auction. The particular outcome does not affect profits.*

Comparing Lemmas 3 and 4 generalizes Proposition 1.

Proposition 2. *With negotiations, the consolidated retailer is strictly better off under the single-sourcing policy if and only if* $\beta > 1/2$, *i.e., if suppliers have sufficient bargaining power.*

The intuition for Proposition 2 is again straightforward. On the one hand, single sourcing reduces total industry profits. On the other hand, single sourcing makes suppliers less differentiated and, thereby, allows the retailer to extract a larger fraction of total profits. If suppliers can extract more than half of their incremental contribution, i.e., if $\beta > 1/2$, the latter effect more than compensates for the reduction in industry profit, making a single-sourcing strategy optimal.

Some comments are in order regarding Proposition 2. Note first that we apply the same value of β both for separate retailers and for the integrated retailer - just as we used an auction for all market scenarios to derive Proposition 1. Instead of assuming, for instance, that β increases after a merger, we endogenize how buyer power is created by a merger. Deriving buyer power from first principles strikes us as an important ingredient of a model that tries to obtain welfare implications of retail mergers via their impact on the relationship between suppliers and retailers. Proposition 2 also shows that the insights of Proposition 1 are robust as long as retailers do not have too high bargaining power. This could, in particular, be the case if they deal with strong brands. In contrast, levering up their buyer power by single sourcing is not profitable when retailers deal with already weak suppliers.

This observation may engender some further, potentially testable, implications of our theory. If β is a catch-all measure of bargaining power arising from other sources, our theory would entail that product variety is lower in categories with strong brands. In order to explore this implication in more generality, we would, however, have to introduce other sources of retailer and supplier power so as to endogenize β. Incidentally, single sourcing - or, more generally, reducing the number of products in the same category - serves as an instrument to generate more power and profits for the retailer. That is, in our theory it is *not* the strong brand manufacturer that *demands* the exclusion of competitors, but it is the retailer for which this is optimal.

4 Endogenous Variety

4.1 Extending the Model

We now endogenize the choice of product characteristics θ^s. In doing so, we consider the following sequence of events. In the first period $t = 1$, suppliers choose θ^s non-cooperatively. In $t = 2$, a retailer merger may occur. The rest of the game is then as described above. That is, in the following period, $t = 3$, retailers choose their purchasing strategy, i.e., whether or not to commit to a single-sourcing policy. (This is only a non-trivial choice for a merged retailer.) Next, in $t = 4$ retailers and suppliers negotiate under the chosen purchasing strategy. In the final period $t = 5$, retailers set prices for final consumers, goods are supplied and payoffs are realized.

The newly introduced three stages $t = 1, 2, 3$ deserve some comments. Consider first the choice of product characteristics. We make now a set of assumptions that replace Assumption 1. Recall that $\Pi_r(\theta)$ denotes the maximum feasible profits that can be realized when supplying a good with characteristics θ at outlet r. We assume that $\Pi_r(\theta)$ is strictly quasiconcave (where $\Pi_r(\theta) > 0$) and that $\Pi_r(\theta) > 0$ holds for some θ. This ensures that there exists an interior optimum choice for θ, which we denote by $\widehat{\theta}_r := \arg\max_\theta \Pi_r(\theta)$. We assume that $\widehat{\theta}_a < \widehat{\theta}_b$, i.e., the choice of characteristics that maximizes profits at outlet a is strictly lower than the respective choice for outlet b.

That suppliers choose θ^s non-cooperatively at $t = 2$ is a standard assumption. It basically rules out negotiations with retailers over the jointly optimal choice of characteristics.[18] Finally, we specify that the merger at $t = 3$ happens with some exogenous probability μ. The choices $\mu = 0$ and $\mu = 1$ correspond to the cases where the merger occurs never or always. Note that in our model a merger is always (at least weakly) profitable for retailers. But a merger may not always be possible. For instance, the owners or the management of a retailer may not be prepared to relinquish control. Likewise, an acquisition or a merger may come at prohibitively high

[18] However, in our present setting with non-linear tariffs, it turns out that the suppliers' non-cooperative choices also maximize total industry profits.

transactions costs. What is more relevant for our discussion, however, is that the competition authority may adopt a more or less lenient merger policy for the retail industry, which is captured by μ in a short-cut way.[19]

4.2 Analysis

It is helpful to first consider the case where suppliers anticipate that no merger occurs, $\mu = 0$. In any pure-strategy equilibrium, one supplier optimally chooses $\widehat{\theta}_a$ and the other $\widehat{\theta}_b$, i.e., the product characteristics that maximize total profits. It is convenient to suppose that A chooses $\widehat{\theta}_a$ and that B chooses $\widehat{\theta}_b$. This is, however, no longer an equilibrium if $\mu > 0$. In this case, in any pure-strategy equilibrium one supplier, say A, anticipates that it will subsequently win the global account of a merged retailer and, consequently, chooses product characteristics that optimally balance consumer preferences at the two outlets. Precisely, using the more general bargaining framework with $\beta > 1/2$, supplier A chooses θ^A to maximize

$$\begin{aligned} &\mu\beta\left[\left(\Pi_a(\theta^A) + \Pi_b(\theta^A)\right) - \left(\Pi_a(\theta^B) + \Pi_b(\theta^B)\right)\right] \\ &+(1-\mu)\beta\left[\Pi_a(\theta^A) - \Pi_a(\theta^B)\right]. \end{aligned} \tag{1}$$

In contrast, for supplier B it is still optimal to choose $\widehat{\theta}_b$.We obtain the following result.

Proposition 3. *The game where suppliers optimally choose their product characteristics has an equilibrium in pure strategies with the following characteristics:*
i) $\mu < 1$: *In any pure-strategy equilibrium, one supplier, say* B*, chooses the same product characteristics* $\widehat{\theta}_b$ *regardless of the likelihood of a retail merger . In contrast, the other supplier, say* A*, chooses* $\widehat{\theta}_a$ *only if* $\mu = 0$*. For all* $\mu > 0$*,* θ^A *is strictly increasing in* μ *and it holds that* $\theta^A > \widehat{\theta}_a$*. Hence, goods become less differentiated the higher the likelihood of a retail merger.*
ii) $\mu = 1$: *In any pure-strategy equilibrium, a supplier who subsequently wins the consolidated account chooses the unique value* θ^s *that maximizes* $\Pi_a(\theta^s) + \Pi_b(\theta^s)$.

Proof. See Appendix.

The supplier that expects to win the consolidated account, say A, chooses more "average" product characteristics. While this repositioning of A's product increases industry profits *conditional* on there being a merger, an increase in the ex-ante likelihood of a merger, μ, unambiguously reduces expected industry profits. If no merger occurs, supplier A will have chosen

[19] Capturing merger policy in this way may be more permissible for our current analysis of retail merger and buyer power than for other cases. Regarding the consideration of buyer power, in particular in the case of cross-border mergers, it is fair to say that competition authorities have not yet developed a coherent framework that is applicable for a case-by-case analysis.

a suboptimal variety for outlet a. And if a merger occurs, delisting good B will further reduce product variety.

Corollary 1. *Total expected industry profits are strictly decreasing in μ.*

Proof. If supplier A is chosen under single sourcing, total expected industry profits are equal to

$$\mu \left[\Pi_a(\theta^A) + \Pi_b(\theta^A)\right] + (1-\mu)\left[\Pi_a(\theta^A) + \Pi_b(\theta^B)\right]. \tag{2}$$

Differentiating (2) with respect to μ and using that θ^A satisfies the first-order condition for (1) yields $\Pi_b(\theta^A) - \Pi_b(\theta^B)$. Since $\theta^A < \theta^B$ and $\theta^B = \widehat{\theta}^B$, strict quasiconcavity of $\Pi_b(\theta)$ implies that the derivative is strictly negative. The case where supplier B is chosen is symmetric. **Q.E.D.**

Without further assumptions on consumer preferences and local demand, we can not make any claims on how consumer surplus and total welfare change in μ. This is a well-known problem in the analysis of product differentiation and quality choice. One relatively standard case for which we can obtain results is the following. Inverse demand takes on the additive form

$$P_r(\theta, x) = \max\{p_r(x) + \psi_r(\theta), 0\} \tag{3}$$

and $P_r(\theta, x)$ is generated by the preferences of a representative consumer. That is, for the representative consumer at outlet r, the marginal utility from consuming another unit of a good is the sum of $p_r(x)$ and $\psi_r(\theta)$. One case where (3) is satisfied is that of linear demand, which is studied below. Assuming additionally that revenues are strictly quasiconcave (where positive), it is easily established that the sign of $\frac{d\Pi_r(\theta)}{d\theta}$ depends only on the sign of $\frac{d\psi_r(\theta)}{d\theta}$. Moreover, total welfare is increasing whenever $\frac{d\psi_r(\theta)}{d\theta} > 0$ and decreasing whenever $\frac{d\psi_r(\theta)}{d\theta} < 0$. We have the following result.

Corollary 2. *If the inverse demand is of the additive form in (3) and captures the preferences of a representative consumer, (expected) welfare is also strictly decreasing in μ.*

Proof. Since revenues are strictly quasiconcave and since $D_r = 0$ for high p, we obtain at each outlet r a unique optimal quantity $x_r^*(\theta)$. The envelope theorem then implies that $\frac{d\Pi_r(\theta)}{d\theta} = x_r^*(\theta)\frac{d\psi_r(\theta)}{d\theta}$. Moreover, implicit differentiation of the first-order condition for $x_r^*(\theta)$ shows that the sign of $\frac{dx_r^*(\theta)}{d\theta}$ is determined by the sign of $\frac{d\psi_r(\theta)}{d\theta}$. Total welfare at outlet r is $W_r = \int_0^{x_r^*(\theta)}[p_r(x) + \psi_r(\theta)]dx - cx^*(\theta)$. Differentiating welfare with respect to θ, we obtain $\frac{dW_r}{d\theta} = \frac{\partial W_r}{\partial \theta} + \frac{\partial W_r}{\partial x}\frac{dx_r^*(\theta)}{d\theta}$, where the signs of $\frac{\partial W_r}{\partial \theta}$ and $\frac{dx_r^*(\theta)}{d\theta}$ are equal to the signs of $\frac{d\psi_r(\theta)}{d\theta}$. Additionally, we have from standard results that $\frac{\partial W_r}{\partial x} > 0$ at $x = x_r^*(\theta)$.[20] Hence, we have established that welfare realized

[20] Precisely, note first that $\frac{\partial W_r}{\partial x} = P_r(\theta, x) - c$, while the first-order condition for profit maximization gives $\frac{d\Pi_r}{dx} = P_r(\theta, x) - c + x\frac{dP(\theta,x)}{dx}$. The claim follows as $P_r(\theta, x)$ is strictly decreasing whenever $P_r(\theta, x) > 0$.

at outlet r changes in the characteristics of the supplied good in the same way as industry profits change. The assertion follows then from Corollary 1. **Q.E.D.**

4.3 Example

With linear demand $D = 1 - d - p$ and constant marginal costs $c < 1 - d$, joint profits are maximized at the retail price $p = (1 + c - d)/2$, generating sales $x = (1 - d - c)/2$, profits $\Pi = (1 - d - c)^2/4$ and welfare $W = 3(1 - d - c)^2/8$.[21] For outlet a we set $d = \theta^2/z$ to obtain $D_a(\theta, p) = 1 - p - \theta^2/z$, while for outlet b we set $d = (1-\theta)^2/z$ to obtain $D_b(\theta, p) = 1 - p - (1-\theta)^2/z$ with $z > 0$. Consequently, the product characteristics $\widehat{\theta}_a = 0$ and $\widehat{\theta}_b = 1$ maximize industry profits at the respective outlets.

The case where suppliers can choose any value for θ has no closed-form solution if $\mu > 0$. Therefore, without losing much insight, we confine ourselves to the case where θ can only be chosen from a finite set $\theta \in \Theta = \left\{\widehat{\theta}_a, \theta^*, \widehat{\theta}_b\right\}$, where $0 < \theta^* < 0.5$. Moreover, we choose the parameters $c = 0$, $z = 5$ and $\beta = 1$. What product characteristics will suppliers choose? From Proposition 3 we have $\theta^B = \widehat{\theta}_b$. Substituting this into expression (1) shows that supplier A strictly prefers θ^* to $\widehat{\theta}_a$ if and only if

$$\mu > \theta^* \frac{10 - (\theta^*)^2}{16 - 4\theta^* + (\theta^*)^3 - 4(\theta^*)^2}. \tag{4}$$

The right-hand side of (4) is strictly increasing in θ^*. Intuitively, the larger the difference $\theta^* - \widehat{\theta}_a$ the more likely must be a merger to make it optimal to choose θ^*. For future reference, we now specify $\theta^* = 0.2$, for which (4) becomes $\mu > \frac{83}{627} \approx 13.2\%$. That is, the likelihood of a merger must exceed 13.2% to induce supplier A to choose the less differentiated product. Since demand satisfies (3), we finally have the following result.

Results for the linear example with efficient contracts:

i) If $\mu > 13.2\%$, supplier A chooses the less differentiated product variant $\theta^A = \theta^* = 0.2$. Otherwise, supplier A chooses the more differentiated product variant $\theta^A = \widehat{\theta}_a = 0$.

ii) Expected welfare is strictly decreasing in μ.

[21] To obtain the last expression we assume that the linear demand is generated by a representative consumer with quadratic utility function.

5 Linear Contracts

5.1 Analysis

So far we have assumed that negotiations are efficient. Retail contracts are indeed often complex, including, for instance, volume discounts, slotting fees (to obtain shelf space), pay-to-stay fees (for continuation of stocking), display fees (for special merchandise), and presentation fees (for the privilege of making a sales presentation). On the other hand, there seems to be a strong presumption among some competition authorities that increased buyer power is beneficial as lower purchase prices are passed on to consumers. With efficient negotiations this would not be the case as prices are not affected by how surplus is distributed between the supplier and the retailer.[22] In what follows, we now consider the opposite extreme where contracts determine only a uniform purchase price.

Separate retailers

Suppose that supplier A wins outlet a with a price of m_a^A. In this auction, B offers a the uniform price $m_a^B = c$.[23] To at least match B's offer, the price m_a^A offered by A must satisfy

$$\max_p \ (p - m_a^A) D_a(\theta^A, p) \geq \Pi_a(\theta^B). \tag{5}$$

In words, the maximum profit that retailer a can realize when buying from supplier A must be at least $\Pi_a(\theta^B)$. There are now two possible cases. In the first case, the constraint (5) is not binding for A's optimal choice of m_a^A. That is, even if supplier A were a monopolist it would optimally offer a sufficiently low price m_a^A such that retailer a's profits would still satisfy (5). Intuitively, this would be the case if goods A and B were sufficiently differentiated and consumers had relatively heterogeneous preferences.[24] In what follows, we focus on the more interesting second case where competition from B constrains A's offer. In this case, optimality requires that A chooses m_a^A such that (5) is just binding. As retailer a's profits are strictly decreasing in m_a^A (as long as $D_a > 0$), this yields a unique offer m_a^A at which the constraint (5) binds. Note also that, in equilibrium, the supplier whose product offers the highest feasible profits $\Pi_r(\theta^s)$ still wins the contract to supply r.

[22] For an endogenization of non-efficient contracts in retailing, see also Iyer and Villas-Boas (2003).

[23] The case with negotiations and $\beta < 1$ does not yield new insights beyond those obtained already for efficient negotiations. Moreover, we would have to establish that the bargaining set with linear contracts is still concave in order to apply the axiomatic Nash approach. While this holds for our linear example, it may not be satisfied for more general demand functions. (The standard remedy in this case would be to use lotteries over contracts.)

[24] Formally, suppose $p^*(m_a^A) := \arg\max_p[(p - m_a^A)D_a(\theta^A, p)]$ and $m^* := \arg\max_{m_a^A}(m_a^A - c)D_a(\theta^A, p^*(m_a^A))$ are unique. Then supplier A's offer is not constrained by $B's$ offer if $(p^*(m^*) - m^*)D_a(\theta^A, p^*(m^*)) \geq \Pi_a(\theta^B)$.

Consolidated retailer

Again, a merger of retailers does not affect results in the case of two separate auctions. Under a single-sourcing policy, each supplier offers to supply both outlets at the constant price m^s.[25] The analysis is then analogous to the case with separate retailers, i.e., (i) the supplier s for which $\Pi_a(\theta^s) + \Pi_b(\theta^s)$ is highest wins the account, (ii) the losing supplier offers $m^s = c$ and (iii) the winning supplier offers m^s such that the retailer is just indifferent between the two offers. As is easily seen, single sourcing is again strictly better for the retailer. If supplier A wins the global account, the retailer's profits under single sourcing are equal to $\Pi_a(\theta^B) + \Pi_b(\theta^B)$, which under Assumption 1 strictly exceeds the profits without single sourcing, $\Pi_a(\theta^B) + \Pi_b(\theta^A)$. The following proposition now summarizes our results for the case with linear contracts.

Proposition 4. *Suppose that suppliers compete in linear contracts and suppose that good A (B) is sufficiently attractive at outlet b (a) to constrain the offer of the other supplier. Then we have the following results:*
i) Separate retailers: Supplier A is chosen by retailer a and m_a^A uniquely solves

$$\max_p (p - m_a^A) D_a(\theta^A, p) = \Pi_a(\theta^B).$$

Supplier B is chosen by retailer b and m_b^B uniquely solves

$$\max_p (p - m_b^B) D_b(\theta^B, p) = \Pi_b(\theta^A).$$

ii) Consolidated retailer: Single sourcing is strictly profitable. Supplier A is chosen if $\Pi_a(\theta^A) + \Pi_b(\theta^A) \geq \Pi_a(\theta^B) + \Pi_b(\theta^B)$, and A's offer m^A solves

$$\max_p (p - m^A) D_a(\theta^A, p) + \max_p (p - m^A) D_b(\theta^A, p) = \Pi_a(\theta^B) + \Pi_b(\theta^B).$$

The case where supplier B is chosen is symmetric.

With efficient contracts, the only welfare effect of a merger is its impact on product availability and the choice of product characteristics. With linear contracts, we obtain a new effect. Increasing buyer power and shifting profits to the retailer is not welfare neutral as it reduces double marginalisation. Single sourcing reduces variety, but it also intensifies competition and reduces double marginalisation. This trade-off applies also if we endogenize product characteristics as done in Section 4. Again, as a higher μ makes suppliers more homogenous, this intensifies competition and further reduces double marginalisation. The trade-off between the

[25] Alternatively, supplier s could offer two different prices for supplying outlets a and b. This would, however, not be feasible as the merged retailer would optimally buy all goods at the lower of the two prices.

loss of variety and a reduction in double marginalisation complicates the welfare analysis with linear contracts. In what follows, we confine ourselves to discussing the implications on welfare in our previously introduced example with linear demand.

5.2 Example

Given the demand $D = 1 - d - p$ and a constant purchase price $m < 1 - d$, a retailer optimally chooses the price $p = (1 + m - d)/2$ and the resulting quantity $x = (1 - d - m)/2$ to realize the profits $(1 - m - d)^2/4$. We set $c = 0$ to facilitate the exhibition of results, implying that a supplier's profits are mx. Recall next that we substituted $d = \theta^2/z$ for $r = a$ and $d = (1-\theta)^2/z$ for $r = b$, where we further specified $z = 5$. Finally, recall that we restricted consideration to product characteristics in $\theta \in \Theta = \left\{\widehat{\theta}_a, \theta^*, \widehat{\theta}_b\right\}$, where $\widehat{\theta}_a = 0$, $\widehat{\theta}_b = 1$ and $\theta^* = 0.2$.

We consider first the auctions of separate retailers. For brevity we already assume, which is easy to show, that one supplier will always choose characteristics that are optimal at one outlet. We suppose again that this is supplier B, which chooses $\theta^B = \widehat{\theta}_b = 1$. In contrast, for A we have to consider both $\theta^A = \widehat{\theta}_a = 0$ and $\theta^A = \theta^*$. Take now A's offer to a, which must leave a at least with the profits $\Pi_a(\theta^B) = (1 - (\theta^B)^2/5)^2/4$, where we used that $m_a^B = c = 0$. With $\theta^B = \widehat{\theta}^B = 1$ we have $\Pi_a(\theta^B) = (1 - 1/5)^2/4$. Setting the retailer's profits with A, i.e., $\left(1 - (\theta^A)^2/5 - m_a^A\right)^2/4$, equal to $(1 - 1/5)^2/4$, we obtain $m_a^A = (1 - (\theta^A)^2)/5 = 0.2$.[26] We can proceed like this also for supplier B and retailer b. If $\theta^A = \widehat{\theta}^A = 0$, we get from symmetry that B offers $m_b^B = 0.2$. If $\theta^A = \theta^* = 0.2$, the offer of A becomes more attractive for b and we obtain $m_b^B = (1 - \theta^*)^2/5 = 0.128$.

It is now helpful to briefly stop and consider how the choice of θ^A affects welfare if retailers stay separate. We know that with efficient contracts welfare is strictly lower if $\theta^A = \theta^* = 0.2$. With linear contracts, however, it is easy to establish that the opposite holds. That is, welfare is now strictly higher under the less differentiated choice.[27]

Consider next single sourcing of a consolidated retailer. For $\theta^A = 0$, symmetry implies that suppliers realize zero profits and make the offers $m^A = m^B = c = 0$. If $\theta^A = \theta^*$, supplier A wins the auction and chooses m^A such that the retailer realizes $\Pi_a(\theta^B) + \Pi_b(\theta^B)$. As the retailer's profits with A are equal to the sum of $(1 - m^A - (\theta^A)^2/5)^2/4$, which is realized at outlet a, and

[26] It is easily checked that A is indeed constrained by competition from B. To see this, observe that A's optimal unconstrained choice would be $m_a^A = (1 - (\theta^A)^2/5)/2$, which is strictly larger than $(1 - (\theta^A)^2)/5$.

[27] We obtain for outlet b the quantity $\frac{1}{2} - \left(1 - \theta^A\right)^2/10$ and the resulting welfare $\frac{3}{8} - \frac{3}{40}\left(1 - \theta^A\right)^2$, while we obtain for outlet a the quantity $\frac{2}{5} - (\theta^A)^2/10$ and the welfare $\frac{8}{25} - \frac{7}{50}(\theta^A)^2 + \frac{3}{200}(\theta^A)^4$. Summing up, we then obtain the total welfare $\frac{3}{25}(\theta^A) - \frac{11}{50}(\theta^A)^2 + \frac{1}{50}(\theta^A)^3 + \frac{1}{100}(\theta^A)^4 + \frac{16}{25}$, which yields for $\theta^A = 0.2$ and $\theta^A = 0$ the respective values 0.655 and 0.640

$(1 - m^A - (1 - \theta^A)^2/5)^2/4$, which is realized at outlet b, we obtain with $\theta^A = 0.2$ and $\theta^B = 1$ that $m^A = 0.0285$.[28]

Putting results together and solving for the optimal choice of θ^A, we obtain the following results. (See the Appendix for the complete calculations.)

Results for the linear example with linear contracts:
i) If $\mu > 11.1\%$, *supplier A chooses the less differentiated product variant* $\theta^A = \theta^*$. *Otherwise, supplier A chooses the more differentiated product variant* $\theta^A = \widehat{\theta}_a$.
ii) Expected welfare is strictly decreasing in μ *over both regimes, i.e., for* $\mu < 11.1\%$ *and* $\mu > 11.1\%$. *At* $\mu = 11.1\%$, *where supplier A switches to* θ^*, *expected welfare jumps up. This is also the highest feasible value for expected welfare.*

We can now compare the outcomes with efficient and linear contracts. In the former case, a very stringent merger policy ($\mu = 0$) is best. In contrast, with linear contracts expected welfare is maximal at an interior choice $\mu = 11.1\%$. In fact, we can show that *ex post* welfare would be maximal if $\theta^A = \theta^*$ and no merger took place.[29] However, to induce the supplier to choose a less differentiated product it is necessary to have $\mu < 0$.

Though our comparison is clearly confined to a very specific example, it highlights an important question for analyzing welfare implications of buyer power. Should we reasonably assume that contracts are sufficiently complex to allow for efficient contracting or should we assume that contracts are relatively incomplete and simple, with linear contracts as a good approximation? In the first case, shifting rents to retailers has no direct impact on output and welfare, whereas in the second instance it increases output and welfare. An answer to this question, while being key for the analysis of welfare, may depend on the specific circumstances.

6 Discussion

6.1 Sourcing Policy at an Individual Outlet

We so far assumed that each outlet stocks only one of the two goods A and B. One way to rationalize this is limited shelf space, which may make it optimal for a retailer to only stock a

[28] Precisely, note that $\frac{1}{4}\left(\frac{124}{125} - m^A\right)^2 + \frac{1}{4}\left(\frac{109}{125} - m^A\right)^2$ is for sufficiently low m^A strictly decreasing in m^A. The first value m^A where it becomes equal to $\frac{41}{100}$ is $m^A = \frac{233}{250} - \frac{1}{50}\sqrt{2041} \approx 0.0285$. It is also again straightforward to show that B's offer constrains A.

[29] In fact, the total welfare order is as follows: (1) With no merger and $\theta^A = \theta^*$ welfare equals $W = 0.655$; (2) with a merger and $\theta^A = \theta^*$ we have $W = 0.641$; (3) without a merger and $\theta^A = \widehat{\theta}_a$ we have $W = 0.640$; (4) with a merger and $\theta^A = \widehat{\theta}_a$ we have $W = 0.615$.

very limited number of goods in each category. As we show in this section, however, such an assumption is not needed. Faced with the choice of two goods that are substitutes, we find that a retailer will optimally stock only one good. The argument for why this is optimal is analogous to the argument for why single sourcing across the two outlets is optimal for the consolidated retailer.

Suppose thus that both goods could be stocked at each outlet. In a slight abuse of notation, we denote for outlet a the maximum profits that can be achieved with both goods by $\Pi_a(\theta^A, \theta^B)$. We focus on the interesting case where $\Pi_a(\theta^A, \theta^B)$ is strictly larger than the maximum profits that can be achieved if only one good is stocked. Moreover, we assume that goods are substitutes. With these additional specifications, Assumption 1 transforms as follows.

Assumption 2. *For outlet a we have that* $\Pi_a(\theta^A, \theta^B) > \Pi_a(\theta^A) > \Pi_a(\theta^B) > 0$ *and* $\Pi_a(\theta^A, \theta^B) < \Pi_a(\theta^A) + \Pi_a(\theta^B)$. *For outlet b symmetric conditions hold.*

Consider now the auction at outlet a. If the retailer is willing to stock both goods, the following result is immediate. In equilibrium, both goods are stocked and each supplier again extracts the full incremental surplus, i.e., $\Pi_a(\theta^A, \theta^B) - \Pi_a(\theta^A)$ for A and $\Pi_a(\theta^A, \theta^B) - \Pi_a(\theta^B)$ for B. This leaves the retailer with profits of[30]

$$\Pi_a(\theta^A) + \Pi_a(\theta^B) - \Pi_a(\theta^A, \theta^B). \tag{6}$$

Suppose now that outlet a only dedicates a limited shelf space to this product category, making it impossible to stock more than one good. We are then back to the original case, for which we know from Lemma 1 that the retailer realizes profits of $\Pi_a(\theta^B)$. Comparing this with (6), we can see that stocking only one good is strictly profitable. The same argument applies to outlet b, where it is again optimal to stock only one good.[31]

6.2 Buyer Alliances

A merger enhances retailers' buyer power as it allows to bundle their purchases. This poses the question why this is not a feasible strategy for separate retailers, which could form a buyer alliance (or buyer group). While we concede that, in practice, buyer groups may bestow certain advantages on retailers - not in the least by reducing purchasing prices - we would assert that buyer groups are not a perfect substitute for mergers.

[30] Note that (6) is strictly positive by Assumption 2. It is also straightforward to extend negotiations with the Nash bargaining solution to the case with multi-product supply. For a different bargaining procedure with multi-product supply, which leads to the Shapley value, see Inderst and Wey (2003).

[31] It is straightforward to show that the additional flexibility to stock two goods at both outlets is also not used by the consolidated retailer, which still strictly prefers to stock one and the same good at both outlets.

Suppose the two separate retailers could form a buyer group to bundle their purchases. Of course, this only makes a difference if they also decide to purchase only one good (single sourcing). By Assumption 1, this implies that at one outlet an inferior good is sold. Absent side payments between the two retailers, it may be difficult to ensure that the winning supplier's offer is beneficial to both retailers.[32] What is more, though this is admittedly outside our model, limited information about each others' profits may render even an agreement with side payments difficult. For instance, while it may be known that good B provides a better fit for outlet b, the extent to which good A reduces sales and profits at b may be $B's$ private information. Likewise, b may not know what profits a can make with the two different goods. As is well known from the bargaining and mechanism design literature, such two-sided private information typically leads to failure of agreement, at least with positive probability.

6.3 Suppliers' Costs

So far we made the following assumptions about suppliers' costs: (i) Suppliers have symmetric and constant linear costs equal to c, and (ii) these costs are the same when supplying different outlets. The assumption of symmetry is only made for convenience. In what follows, we discuss the remaining two restrictions.

Transportation costs: Cost differences in supplying different outlets

Transportation costs are an obvious reason why, for a given supplier s, the costs of supplying outlet a may be different from those of supplying outlet b. We argue first that such transportation costs can fulfill the same role as differences in consumers' preferences over the two outlets. Suppose thus that both outlets have the same demand function $D(p, \theta)$ and that both goods have the same characteristics $\theta^A = \theta^A = \theta$.[33] Producing and shipping an additional unit of good s to outlet r comes now at the constant costs $c + t_r^s$. If A's factory is closer to outlet a than to outlet b, we have that $t_a^A < t_b^A$. If a symmetric relation holds for B, i.e., if $t_b^B < t_a^B$, and if no supplier has lower costs in supplying both outlets, it is immediate that Assumption 1 is still satisfied. But this was all that we needed to derive our main results. By the same token, if supplier A has both lower transportation costs *and* a product that is more suitable for outlet a than supplier B - and if symmetric conditions apply for B - Assumption 1, obviously, continues

[32] Repeated interaction with mutual concessions over time could provide an (imperfect) substitute for side payments. A formal analysis for the case without side payments would have to determine (i) what decision rule the two retailers use to decide between the offers of A and B and (ii) how much flexibility offers can have so as to make them attractive to both retailers. Such an analysis is beyond the scope of this paper.

[33] To rule out benefits from single sourcing due to differences in demand it is, of course, sufficient that either of the two conditions holds, i.e., that local demand is homogenous or that goods are not differentiated.

to hold as well.

Convex costs

We now argue that our results also extend to the case where suppliers have strictly convex costs $c(x)$. As a full formal discussion of this case involves quite a bit of new notation, we relegate it to the appendix. In the main text, we thus restrict ourselves to a short illustration. We argue that convex costs are already a sufficient condition to make single sourcing optimal in case of an auction.

For an illustration, suppose that goods are not differentiated and that each outlet can sell at most one unit at price p. Each supplier can produce the first unit at zero costs and an additional unit at costs $0 < c < p$. Intuitively, with separate retailers each supplier sells exactly one unit and total industry profits are equal to total revenues $2p$. In an auction, the winning supplier again extracts the full incremental surplus. If a buys from A, the retailer's outside option is to buy at price c from B. Consequently, each retailer pays c and realizes profits of $p-c$. Turn next to single sourcing. Given symmetry, single sourcing turns both suppliers into perfect substitutes, making each of them willing to sell at zero profits. That is, the retailer can buy both units at total costs c. Consequently, with single sourcing the retailer obtains the all of the industry profits $2p - C$, which strictly exceeds the retailer's profits without single sourcing, $2(p - C)$. As in our previous case with linear costs but differentiated products, single sourcing reduces total industry profits: from $2p$ down to $2p - C$. For the retailer, however, single sourcing is profitable as suppliers get a much lower share of it, i.e., zero in the present case.[34]

7 Conclusion

This paper analyses the impact of retail mergers on product variety. In our main analysis, we compare two procurement strategies for a consolidated retailer. The larger retailer may either be willing to still buy from both previous suppliers or it may switch to a single-sourcing policy. A single-sourcing policy may be profitable as it increases competition between suppliers by reducing their differentiation. The resulting benefits may more than outweigh the loss in industry profits due to a reduction in product variety.

[34]This is reminscent of the finding in Chipty and Snyder (1999) and Inderst and Wey (2002). There, it is shown that if a supplier has strictly convex costs, larger buyers get a discount compared to similar quantities purchased by independent smaller retailers. However, there are different effects at work. There, smaller retailers negotiate more "at the margin", where marginal costs are higher. That is, with each small retailer the supplier takes the quantity sold to all other retailers already as given, implying that the *additional* quantity must be produced at relatively high unit costs.

As suppliers anticipate the single-sourcing strategy of a consolidated retailer, the likelihood of a retail merger influences their optimal choice of product characteristics. If negotiations are efficient, we find that, as mergers become more likely, e.g., due to a more lenient merger policy, expected industry profits and potentially also welfare are reduced. With linear contracts, however, there may be a countervailing effect as the merged retailer passes on lower input prices to final consumers.

Our model provides a parsimonious theory of the origins and (welfare) consequences of buyer power. It emphasizes the role of delisting, both as an (off-the-equilibrium) threat and as an active (on-the-equilibrium) strategy to exert buyer power. The profitability of a retail merger and of a subsequent single-sourcing strategy depends crucially on differences in retailers' *previous* supplier base and, thereby, on differences in consumer preferences at their respective outlets. This makes our theory of buyer power and retail mergers particularly applicable to cross-border mergers, where standard explanations based on horizontal merger theory seem to be less appropriate and where competition authorities often see no issues arising.

Looking at the *downstream* market, mergers between firms operating in "overlapping" markets should have more serious consequences for price strategies and welfare. In retail mergers, stipulating the divestiture of outlets in overlapping markets is a common way to deal with these concerns. In contrast, looking at the *upstream* market, our analysis suggests that mergers in non-overlapping markets may provide more scope for firms to lever up their position vis-a-vis their suppliers. As we show, this may have serious consequences for product variety and welfare.

There are some obvious ways to enrich the simple model studied in this paper. First, to obtain a descriptive theory of retail mergers, we would like to have a countervailing force that makes it sometimes unprofitable for retailers to merge. In the current model, a merger between retailers is always at least weakly profitable. Second, to study overall industry dynamics one should also allow for mergers between suppliers. These extensions are beyond the scope of this paper.

Appendix: Omitted Proofs

Proof of Proposition 4. Suppose that $\mu < 1$. We argue first that in any pure-strategy equilibrium one supplier chooses $\theta^s \in \left\{\widehat{\theta}_a, \widehat{\theta}_b\right\}$. Suppose this was not the case and none of the suppliers chooses $\theta^s \in \left\{\widehat{\theta}_a, \widehat{\theta}_b\right\}$. If one of the suppliers is not chosen in case of a merger, it can by $\mu < 1$ profitably deviate to some $\theta^s \in \left\{\widehat{\theta}_a, \widehat{\theta}_b\right\}$, which maximizes its profits in case no merger takes place. Hence, it must be the case that both suppliers are chosen with positive profitability under single-sourcing. As this implies that $\Pi_a(\theta^A)+\Pi_b(\theta^A)$ equals $\Pi_a(\theta^B)+\Pi_b(\theta^B)$, they both realize zero profits if a merger takes place. By $\mu < 1$, it is then again strictly profitable to deviate to some $\theta^s \in \left\{\widehat{\theta}_a, \widehat{\theta}_b\right\}$, which maximizes profits in case no merger takes place.

Note next that the previous argument also implies that in any pure-strategy equilibrium only one supplier can be chosen with positive probability under single-sourcing. If this was supplier A, it follows from strict quasiconcavity of $\Pi_r(\theta)$ (where positive) that also the objective function in (1) is strictly quasiconcave. Also, there exists a finite solution as the finiteness of $\widehat{\theta}_a$ and $\widehat{\theta}_b$ and strict quasiconcavity imply $d\Pi_r(\theta)/d\theta < 0$ for both $r \in R$ and all sufficiently high θ and $d\Pi_r(\theta)/d\theta > 0$ for both $r \in R$ and all sufficiently low θ. As industry profits are smooth in product characteristics θ, the strict monotonicity of θ^A follows from implicit differentiation and strict quasiconcavity.

It remains to show that in an equilibrium where supplier A is supposed to win in case of a merger B can not profitably deviate to some θ^B where supplier B is chosen under single sourcing, i.e., where $\Pi_a(\theta^B)+\Pi_b(\theta^B) > \Pi_a(\theta^A)+\Pi_b(\theta^A)$. Define by $\widetilde{\theta}^s$ the value of θ that maximizes the expected profit if s is chosen, i.e., the profits in (1) for supplier A and the symmetric expression for supplier B. Note next that quasiconcavity of profits implies that the derivative of supplier B's (A's) expected profits is negative (positive) for $\theta < \widetilde{\theta}^s$and positive (negative) for $\theta > \widetilde{\theta}^s$. Suppose now that $\Pi_a(\widetilde{\theta}^A)+\Pi_b(\widetilde{\theta}^A) \geq \Pi_a(\widetilde{\theta}^B)+\Pi_b(\widetilde{\theta}^B)$, i.e., supplier A would win under single sourcing if suppliers chose $\widetilde{\theta}^A$ and $\widetilde{\theta}^B$ respectively. (Otherwise, we can show existence of a pure-strategy equilibrium where supplier B is chosen under single-sourcing.)[35] If there exists no value θ^B such that $\Pi_a(\theta^B)+\Pi_b(\theta^B) \geq \Pi_a(\widetilde{\theta}^A)+\Pi_b(\widetilde{\theta}^A)$ we are clearly done as supplier B cannot successfully compete with supplier A. Otherwise, there exists by strict quasiconcavity a value $\overline{\theta}^B$ where $\Pi_a(\overline{\theta}^B)+\Pi_b(\overline{\theta}^B) = \Pi_a(\widetilde{\theta}^A)+\Pi_b(\widetilde{\theta}^A)$, while $\Pi_a(\theta^B)+\Pi_b(\theta^B) < \Pi_a(\widetilde{\theta}^A)+\Pi_b(\widetilde{\theta}^A)$ for all $\theta^B > \overline{\theta}^B$. Moreover, comparing supplier B's profits with total industry profits under single sourcing and appealing once more to strict quasiconcavity shows that $\overline{\theta}^B < \widetilde{\theta}^B$. Consider now supplier B's strategy to deviate from $\theta^B = \widehat{\theta}_b$ to some other θ where B is chosen under single sourcing. Clearly, any such deviation is only successful if $\theta^B \leq \overline{\theta}^B$. Deviating to $\theta^B = \overline{\theta}^B$ yields the expected profits $(1-\mu)\beta\left[\Pi_b(\theta^B)-\Pi_b(\theta^A)\right]+0\cdot\mu$ as both suppliers are equally attractive under single-sourcing. But by $\overline{\theta}^B < \widetilde{\theta}^B$ and strict quasiconcavity we know that a further decrease in θ^B will only reduce supplier B's expected profits even if it is chosen under single-sourcing. Hence, we have shown that $\theta^B = \widehat{\theta}_b$ is indeed supplier B's best response. This completes the

[35] Note that we do not claim uniqueness. There is some scope for the existence of two pure-strategy equilibria.

proof for Case (i).

In Case (ii) single sourcing will occur with probability one. As the retailer will choose the supplier with which $\Pi_a(\theta) + \Pi_b(\theta)$ is maximized and as $\Pi_a(\theta) + \Pi_b(\theta)$ is strictly quasiconcave, the claim follows immediately. **Q.E.D.**

Omitted calculations for Example 2

We first analyze the optimal choice of θ^A, given that $\theta^B = 1$. Suppose $\theta^A = 0$. If a merger takes place, supplier A realizes zero profits. If a merger does not take place, supplier A supplies retailer a at the previously derived price of $m_a^A = (1 - (\theta^A)^2)/5 = 0.2$. As retailer a chooses the output $x_a = (1 - (\theta^A)^2/5 - m_a^A)/2 = 0.4$, supplier A realizes $m_a^A x_a = 0.8$. Thus, if supplier A chooses $\theta^A = 0$, its expected profits are $(1 - \mu)0.8$. Suppose next that $\theta^A = \theta^* = 0.2$. If a merger takes place, we have $m^A = 0.0285$. Moreover, the merged retailer will choose $x_a = (1 - (\theta^A)^2/5 - m^A)/2 = 0.482$ for outlet a and $x_b = (1 - (1 - \theta^A)^2/5 - m^A)/2 = 0.422$ for outlet b. Hence, supplier A's profits are $(x_a + x_b)m^A = 0.0258$. If no merger takes place and $\theta^A = \theta^*$, we obtained $m^A = (1 - (1/5)^2)/5 = 0.192$ and the supply of $x_a = (1 - (\theta^A)^2/5 - m^A)/2 = 0.400$ to outlet a, yielding the profits $x_a m^A = 0.077$. In total, for $\theta^A = \theta^*$ the expected profits of A are $0.0258\mu + (1 - \mu)0.0768$. Comparing profits for $\theta^A = \widehat{\theta}_a$ and $\theta^A = \theta^*$, we obtain that supplier A prefers $\widehat{\theta}_a$ for $\mu < 0.111$.

We calculate next expected welfare for the two scenarios. Suppose first $\mu > 0.111$, implying $\theta^A = 0.2$. From previous results we know that total welfare equals 0.655 in case of no merger and 0.641 in case of a merger. This yields the *ex-ante* welfare $0.655 - 0.0140\mu$. Proceeding likewise for $\mu < 0.111$ and $\theta^A = \theta^*$, we obtain the expected welfare of $0.640 - 0.0250\mu$. Finally, substitution shows that welfare is maximized at the lowest feasible value μ at which $\theta^A = \theta^*$.

The general case with convex costs

We treat now the case with strictly convex costs $c(x)$ for both suppliers. That is, it holds that $c'(x) > 0$ and $c''(x) > 0$. For brevity, we assume that if A supplies a then there is a unique quantity $\widehat{x}^A > 0$ that maximizes joint profits. Likewise, $\widehat{x}^B > 0$ is the optimal quantity if B supplies b. We are also more specific about how θ influences demand at the two outlets.

Assumption 3. *At outlet a, for all quantities x where $P_a(\theta^a, x) > 0$ the marginal profit of selling an additional unit is strictly higher with θ^A than with θ^B. That is, $\frac{d}{dx}[xP_a(\theta^s, x) - c(x)]$ is strictly higher for $s = A$ than for $s = B$. For B and b the symmetric condition holds.*

We also have to modify the definition of maximum profits: $\Pi_r(\theta) = \max_x[xP_r(\theta, x) - c(x)]$. Given that B rationally anticipates to supply to b the quantity $\widehat{x}^B$, B's incremental costs of supplying to a the quantity x equals $c(\widehat{x}^B + x) - c(x_M)$. Hence, $a's$ outside option in the auction equals

$$\Omega_a(\theta^B) := \max_x [xP_a(\theta^B, x) - c(\widehat{x}^B + x)] + c(\widehat{x}^B).$$

Thus, a's profits in the auction are $\Omega_a(\theta^B)$. Likewise, b's profits are $\Omega_b(\theta^A)$. Note that, in case of linear costs, we have, for instance, $\Omega_a(\theta^B) = \Pi_a(\theta^B)$. With strictly convex costs, however, we have $\Omega_a(\theta^B) < \Pi_a(\theta^B)$.

Consider next single sourcing by a consolidated retailer. We denote the maximum industry profits that can be realized with supplier s by

$$\Gamma(\theta^s) := \max_{x_a, x_b} [x_a P_a(\theta^s, x_a) + x_b P_b(\theta^s, x_b) - c(x_a + x_b)].$$

Again, we have $\Gamma(\theta^s) = \Pi_a(\theta^s) + \Pi_b(\theta^s)$ in case of linear costs and $\Gamma(\theta^s) < \Pi_a(\theta^s) + \Pi_b(\theta^s)$ with strictly convex costs. If A wins, which is the case if $\Gamma(\theta^a) > \Gamma(\theta^b)$, the retailer's profits are again equal to its outside option: $\Gamma(\theta^b)$. Single sourcing is then strictly profitable if and only if

$$\Gamma(\theta^B) > \Omega_a(\theta^B) + \Omega_b(\theta^A). \tag{7}$$

We prove now that (7) holds. For this it is convenient to state this again more explicitly:

$$\begin{aligned} & \max_{x_a, x_b} [x_a P_a(\theta^B, x_a) + x_b P_b(\theta^B, x_b) - c(x_a + x_b)] \qquad (8) \\ \geq \; & \max_x [xP_a(\theta^B, x) - c(\widehat{x}^B + x)] + c(\widehat{x}^B) + \max_x [xP_b(\theta^A, x) - c(\widehat{x}^A + x)] + c(\widehat{x}^A). \end{aligned}$$

Denote now $\widetilde{x}_a := \arg\max_x [xP_a(\theta^B, x) - c(\widehat{x}^B + x)]$ and recall that $\widehat{x}^A = \arg\max_x [xP_a(\theta^A, x) - c(x)]$.[36] As $\widehat{x}^B > 0$ and $c''(x) > 0$, we have from Assumption 3 that $\widehat{x}^A > \widetilde{x}_a$. Denoting $\widetilde{x}_b := \arg\max_x [xP_b(\theta^B, x) - c(\widehat{x}^A + x)]$, we have likewise that $\widehat{x}^B > \widetilde{x}_b$. Using the optimal choices $\widetilde{x}_a$ and $\widetilde{x}_b$ and invoking Assumption 3, (8) surely holds if we (i) substitute in $\Gamma(\theta^B)$ the suboptimal choices $x_a = \widetilde{x}_a$ and $x_b = \widetilde{x}_b$ and if we (ii) substitute $P_b(\theta^A, x)$ by $P_b(\theta^B, x)$ in $\Omega_b(\theta^A)$. It then remains to show that

$$c(\widetilde{x}_a + \widetilde{x}_b) \leq \left[c(\widehat{x}^B + \widetilde{x}_a) - c(\widehat{x}^B)\right] + \left[c(\widehat{x}^A + \widetilde{x}_b) - c(\widehat{x}^A)\right].$$

But this holds even strictly by $c''(x) > 0$, $\widehat{x}^A > \widetilde{x}_a$ and $\widehat{x}^B > \widetilde{x}_b$.

[36] Again, it is convenient that $\widetilde{x}_a$ is uniquely determined, though this is not necessary for the proof.

References

Adams, W. and Yellen, J. (1976), Commodity Bundling and the Burden of Monopoly, Quarterly Journal of Economics 90, 475-498.

Anton, J. and Yao, D. (1989), Split Awards, Procurement and Innovation, Rand Journal of Economics 20, 538-552.

Binmore, K., Rubinstein, A., and Wolinsky, A. (1986), The Nash Bargaining Solution in Economic Modelling, Rand Journal of Economics 17, 176-188.

Chipty, T. and Snyder, C.M. (1999), The Role of Firm Size in Bilateral Bargaining: A Study of the Cable Television Industry, Review of Economics and Statistics 81, 326-340.

Clarke, R., Davies, S., Dobson, P. and Waterson, M. (2002), Buyer Power and Competition in European Food Retailing, Edward Elgar: Cheltenham.

Competition Commission (2000), Supermarkets: A Report on the Supply of Groceries from Multiple Stores in the United Kingdom, Report Cm-4842.

Competition Commission (2003), Safeway plc and Asda Group Limited (owned by Wal-Mart Stores Inc); Wm Morrison Supermarkets plc; J Sainsbury's plc; and Tesco plc: A Report on the Mergers in Contemplation.

DeGraba, P. (2003), Quantity Discounts from Risk Averse Sellers, mimeo.

Dobson, P. and Waterson, M. (1997), Countervailing Power and Consumer Prices, Economic Journal 107, 418-430.

Dobson, P. and Waterson, M. (1999), Retailer Power: Recent Developments and Policy Implications, Economic Policy 28, 133-164.

Dobson Consulting (1999), Buyer Power and its Impact on Competition in the Food Retail Distribution Sector of the European Union, Report produced for the European Commission, DG IV, Brussels.

Dobson, P. (2002), Retailer Buyer Power in European Markets: Lessons from Grocery Supply, Loughborough University Business School, WP 2002-1.

Fumagalli, C. and Motta, M. (2000), Buyers' Coordination, mimeo.

FTC (2001), Report on the Federal Trade Commission Workshop on Slotting Allowances and Other Marketing Practices in the Grocery Industry, Report by the Federal Trade Commission Staff, Washington, D.C.

Horn, H. and Wolinsky, A. (1988), Bilateral Monopolies and Incentives for Merger, Rand Journal of Economics 19, 408-419.

Inderst, R. and Wey, C. (2003), Market Structure, Bargaining, and Technology Choice in Bilaterally Oligopolistic Industries, Rand Journal of Economics 34, 1-19.

Inderst, R. and Wey, C. (2002), Buyer Power and Supplier Incentives, CEPR Discussion Paper No. 3547, London.

Iyer, G., and Villas-Boas, J.M. (2003), A Bargaining Theory of Distribution Channels, Journal of Marketing Research 40, 80-100.

Katz, M.L. (1987), The Welfare Effects of Third Degree Price Discrimination in Intermediate Goods Markets, American Economic Review 77, 154-167.

McAfee, R., McMillan, J. and Whinston, M. (1989), Multiproduct Monopoly, Commodity Bundling, and Correlation of Values, Quarterly Journal of Economics 29, 371-388.

Norman, H., Ruffle, B and Snyder, C. (2003), Do Buyer-Size Discounts Depend on the Curvature of the Surplus Function? Exerimental Tests of Bargaining Models, mimeo.

O'Brien, D.P. and Shaffer, G. (1997), Nonlinear Supply Contracts, Exclusive Dealing, and Equilibrium Market Foreclosure, Journal of Economics and Management Strategy 6, 755-785.

OECD (1999), Buying Power of Multiproduct Retailers, Series Roundtables on Competition Policy DAFFE/CLP(99)21, OECD, Paris.

Palfrey T, (1983), Bundling Decisions by a Multiproduct Monopolist with Incomplete Information, Econometrica 51, 463-484.

Perry, M. and Sakovics, J. (2003), Auctions for Split-Award Contracts, The Journal of Industrial Economics, 51, 215-242.

Rey, P., Retailer Buyer Power and Competition Policy, in: Annual Proceedings of the Fordham Corporate Law Institute (Chapter 27), 2000.

Rey, P. and Stiglitz, J. (1995), The Role of Exclusive Territories in Producers' Competition, Rand Journal of Economics 26, 431-451.

Riordan, M. and Sappington, D (1989), Second Sourcing, Rand Journal of Economics 20, 41-57

Snyder, C.M. (1996), A Dynamic Theory of Countervailing Power, Rand Journal of Economics 27, 747-769.

Stigler, G.J. (1964), A Theory of Oligopoly, Journal of Political Economy 62, 44-66.

von Ungern-Sternberg, T. (1996), Countervailing Power Revisited, International Journal of Industrial Organization 14, 507-520.