Chain-Store Competition: Customized vs. Uniform Pricing

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Retail chains essentially practice one of two broad strategies in setting prices across their stores. The more straightforward is to set a chain- or country- wide price. Alternatively, managers of retail chains may customize prices to the store level according to local demand and competitive conditions. For example, a chain may price lower in a location with lower demand and/or more competition. However, despite having the ability to customize prices to local market conditions, some choose instead to commit to uniform pricing with a "one price policy" across their entire store network. As an illustration, we focus on UK supermarket chains. Is there an advantage to be gained from deliberately choosing *not* to price discriminate across locations? We show generally and illustrate through means of a specific model that there exists a strategic incentive to soften competition in competitive markets by committing not to customize prices at the store level and instead adopt uniform pricing across the store network, and to raise overall profits thereby. Furthermore, we characterize quite precisely the circumstances under which uniform pricing is, and is not, profitable and illustrate that under a range of circumstances uniform pricing may be the preferable strategy.

Key words: Chain-store retailers; price discrimination; uniform pricing; local pricing; commitment

1. Introduction

Different retail locations have different costs and, what is our concern here, different degrees of competition. For example, wage levels may vary by location and a particular market player may face fewer competitors in some locations than others. Hence, we might expect prices to be customized across locations. As an illustration, take the milestone antitrust investigation by the US Federal Trade Commission of the proposed Staples/Office Depot merger.[1] Here, a key element the FTC uncovered was the adoption of markedly differing pricing practices across locations of differing competitive intensity, with a clear link between the number of competing stores of similar type and the level of price.[2] This is third degree price discrimination, but in an oligopoly context (Borenstein 1985; Holmes 1989).

[1] *Federal Trade Commission v. Staples, Inc. and Office Depot, Inc*., Civ. no.97-701 (TFH), 1997.

[2] The FTC found that average prices varied by as much as 16% depending on the extent of local competition, with Staples and Office Depot respectively pricing on average 13% higher and 5% higher when they were respectively

A commonly held view is that firms are better off practicing this form of price discrimination between locations of differing competitive intensity. Against this view, Corts (1998) and other subsequent authors have shown that in situations of "best response asymmetry", where one player's strong market is the other's weak market, firms can be worse off practicing price discrimination. As Corts puts it, " … if firms differ in which markets they target for this aggressive pricing and competitive reactions are strong, prices in all markets may fall." (p. 321).[3] But in most retailing situations, such as office equipment supplies, rival firms will hold the *same* opinion about which market is strong and which is weak as a result of differing degrees of competition – a situation of best response symmetry rather than asymmetry. A market where they face significant competition from the other player or players will be a weak market, compared to a market where the other key player(s) is not present. Corts's analysis does not address this case.

Under these circumstances, a clear puzzle is why in some prominent cases of best response symmetry, in distinction to Staples/Office Depot, firms practice uniform pricing rather than varying price by location.[4] It is this puzzle that is the focus of our paper.[5] As we document in detail below, the key

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the only office stationery superstore present in a local market compared to when all three such players (including Office Max) were present. For a case summary, see Dalkir and Warren-Boulton (1999).

[3] Moreover, the finer the degree of market segmentation and the more precise the information on consumers, in the limit offering personalized pricing (i.e., first-degree price discrimination), the more exaggerated the net effect on prices and thereby profits may become. In this regard, see Shaffer and Zhang (2002), Chen and Iyer (2002), Liu and Serfes (2004), Acquisti and Varian (2005), and Ghose et al. (2005). On the related literature on using coupons to discriminate between groups of consumers in oligopoly, see Shaffer and Zhang (1995) and Bester and Petrakis (1996) on *inter*-store (geographic) discrimination and Besanko et al. (2003) on an *intra*-store discrimination (such as issuing customized coupons at the point of sale).

[4] Even so, it is quite apparent that price discrimination according to location is common across many retail sectors beyond office stationery, including US grocery retailing (Montgomery 1997; Chintagunta et al. 2003), fast food chains (Thomadsen 2005) and cars (Goldberg and Verboven 2005).

[5] In the situation analyzed by Corts (1998), best-response asymmetry resulting in "all-out competition" entails all profits being lower with price discrimination. Here a prisoner's dilemma situation exists whereby the competing firms have a *joint* incentive but not an *individual* incentive to avoid this situation by committing to uniform pricing. In contrast, as we have shown in an earlier paper (Dobson and Waterson, 2005) with a simple parametric model, both unilateral and joint incentives to commit to uniform pricing may exist in situations of best response symmetry. The present paper considers much more generally the nature of the trade-offs involved and characterizes more

players in the United Kingdom ("UK") supermarket industry, which has a turnover over five times as large as the US office equipment market, have maintained or enhanced their policies on uniformity of pricing across location within mainland Britain. Note it is crucial to the success of a uniform pricing policy that there is prior commitment to such a policy, rather than simultaneous choice of pricing policy and prices themselves. We show that UK supermarkets have made such commitments.

Given this underlying commitment, we demonstrate at a very general level that a profit incentive exists in favor of uniform pricing, in some but not all situations of best response symmetry. The argument is essentially as follows: It is well known that in a differentiated product market setting with Bertrand price competition, both players in a duopoly can benefit if one can commit to a higher price.[6] A commitment to uniform pricing will provide a commitment to a higher price if demand facing the firm in a monopoly market is less elastic than in the duopoly market. Then if the gain in profits from the duopoly market exceeds the loss from the monopoly market, the strategy is profitable.

We go on to further characterize analytically the type of market for which this incentive will exist. A key feature is that larger markets have consumers with a wider range of tastes than do small markets. Following this general analysis, we demonstrate using a parameterized example that a very wide range of degrees of competitive intensity is consistent with profits either being enhanced or at least reduced only slightly by a policy of uniform pricing. Thus, small positive benefits arising from other aspects of uniform pricing (including reductions in promotional costs and lessening of antitrust attention) may well be sufficient to ensure that uniform pricing develops as a resilient practice across the industry.

We proceed as follows. The next section sets out the nature of pricing and pricing commitment in the UK supermarket industry as an illustrative case. Following this, section 3 develops the general analytical framework just outlined and characterizes the circumstances where there can be a *unilateral* profit incentive for uniform pricing. Section 4 utilizes a parameterized example to illustrate the range of market circumstances conducive to uniform pricing being more profitable local pricing. Section 5 extends the domain to incorporate *joint* incentives to adopt uniform pricing in the presence of competing

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precisely the kind and range of market circumstances whereby commitment to uniform pricing can be a profitable strategy. For further background on these issues, see the detailed surveys by Stole (2007) and Armstrong (2006).

[6] For an example in a different context, see Bonanno and Vickers (1988).

chain-store retailers, also practical considerations where local pricing may be more expensive to operate than national pricing. Section 6 contains our concluding remarks.

2. Uniform Pricing in UK Grocery Retailing

In this section we chart sufficient material related to UK grocery retailing to show the very considerable extent to which the major chains price uniformly across areas despite facing very different competitive environments (and costs) across those areas. We also document the commitments firms use in maintaining their uniform pricing policies.

Grocery retailing represents the largest retail sector in the UK, worth around $160bn in 2005. Four retailers – Tesco, Sainsbury, Asda (a Wal-Mart subsidiary) and Morrison/Safeway – dominate the national market, accounting for 75% of sales of grocery items (i.e., food and drink, cleaning products, toiletries and household goods), and indeed 30% of *all retail sales* in the UK.[7] These four supermarket retailers have primarily positioned themselves as "one stop shops", operating with very wide product ranges in large format stores. As such, they jointly account for 95% of grocery sales for stores exceeding 1,400 sq meters (which has been viewed by the UK competition authorities as the critical size distinguishing one-stop grocery shops, serving primary shopping needs, from smaller stores catering for "top-up" and "convenience" grocery shopping).

While most of the retail grocery chains operate on a national level in the UK, there is considerable variation in regional and local market shares and concentration levels. Table 1 provides some summary evidence, based on a very detailed report into the sector undertaken by the UK's Competition Commission ("CC" hereafter) in 2000.[8] In particular, high levels of local concentration[9]

[7] For instance, see IGD (2005) and Mintel (2005), where the measure of retail sales covers all consumer retail expenditure on goods (i.e. excluding services) with the exception of automobiles. Tesco alone is estimated to take more than one eighth of UK consumer retail expenditure on this measure.

[8] The table shows the separate positions of Morrison and Safeway prior to their merger in March 2004.

[9] In determining the degree of local concentration and the extent of store choice facing consumers at the local level, the UK competition authorities decided to examine local markets in respect of drive times between stores or choice in postcode (zip code) areas. For UK supermarkets, the Competition Commission (CC 2000, Appendix 6.3) identified that out of 1,700 stores surveyed, 175 stores were found to have a "monopoly" or "duopoly" status in local catchments (in respect of 10-minute drive times in urban areas and 15-minute drive times in rural areas around each

were found in more rural areas[10] (notably in Scotland and Wales) and certain urban areas where a proliferation of stores from the same chain existed[11]. In addition to market structure differences, consumer income levels also differ from region to region (tending to be higher in the southern part of the UK) and from district to district (tending to be higher in urban areas as opposed to rural areas[12]), suggesting the presence of variation in local consumer demand, incomes and possibly willingness to pay.

Table 1. Market Characteristics in UK Grocery Retailing, 1999

Main UK grocery "one-stop shop" retailers	*General character & pricing policy**	*Total grocery stores*	*National Market Shares*		*Regional Market Shares*		*Local Concentration*	
			All grocery stores (%)	*Grocery stores > 1,400 sq m (%)*	*Highest regional share (12 broad UK regions) (%)*	*Highest broad postcode share (120 narrow regions) (%)*	*% stores in local monopoly (10/15-minute drive time)*	*% stores in local duopoly (10/15-minute drive time)*
Tesco	Value-led Hi/Lo	642	23.0	28.5	46.5	53.6	6.0	10.3
Sainsbury	Hi/Lo	424	18.7	24.8	35.9	56.7	0.5	4.1
Asda	EDLP	227	12.2	16.8	24.8	46.8	0.0	3.1
Safeway	Hi/Lo	498	11.5	13.8	28.4	51.0	9.2	9.8
Morrison	EDLP + deals	95	3.9	5.4	21.9	45.0	0.0	4.2

* Based on the authors' interpretation of retailers' submissions on their pricing practices (CC, 2000, Appendix 5.2), where "Hi/Lo" refers to "high-low" promotional pricing, and "EDLP" refers to "every day low pricing"

Source: Adapted from CC (2000; Tables 5.2, 5.3, & 8.30, Appendices 5.2 & 7.1)

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of the stores). However, when restricted to competition between the major "one-stop-shop" grocery retailers and with 10-minute drive times, then 627 out of the 1,700 stores were found to have "monopoly" or "duopoly" status.

[10] This is perhaps not surprising with rural areas being less densely populated and store replenishment being more difficult in remote areas (i.e. in the absence of a nearby regional distribution centre).

[11] For example, it has been estimated that the market leader, Tesco, has the largest market share in 67 of the 120 postal districts in the UK, having more than 40% of the market in 14 districts, and more than 45% in five towns ("Power of 'big four' revealed in new figures", *The Guardian* (London), Nov. 10, 2005). At the more disaggregated postal code level, it has been reported that out of the 1,452 postal areas of the UK, Tesco was found to have "an almost total stranglehold" on the retail food market in 108 areas, while accounting for over 50% of grocery spending in a further 104 areas ("Tesco profits feed fears of a stranglehold", *Sunday Times* (London), Apr. 18, 2004).

[12] Even so, the range of income per capita varies considerably within both urban and rural areas. For instance, the CC (2000, Appendices 13.4 and 13.5) found that for a sample of urban areas, at postcode sector level, income per capita ranges from as low 35% to as high as 155% of the national average.

With differences in both local competition and local demand conditions, it might be thought that retailers would seek to take advantage of opportunities to set prices differently from store to store. In particular, retailers might set higher prices in areas where local competition was limited and/or average income levels were high, while setting lower prices in areas of more intense local competition and/or low average incomes. However, for the sector as a whole, the CC (2000) found an almost even split between those firms that adjusted prices on a local basis and those that adopted uniform prices across all their stores. Of the fifteen main grocery chains operating in the UK, seven were found to vary prices from store to store based on local competition and demand conditions – a practice the CC called "local price flexing" – while eight used national pricing, with no local variation in prices.

Table 2 shows the extent and character of local price flexing identified by the CC amongst the big 5 firms in 1999. To this we have added data from a later CC report in 2003. In 1999, individual product prices were found in some retailers to vary considerably (by as much as 100%), but average prices differed across each chain by less than 3%. The CC investigated the basis on which local pricing operated, identifying the critical factors influencing store-level pricing. For the retail groups that did vary prices, both differences in local demand (in respect of income or regional effects) and local competition (in respect of local market power or facing particular price-focused competitors) were found to be important in determining the price band applied to individual stores and the variation in prices across the store chain.[13] Cost elements (like differences in store size) were also found to play a role, but not so significantly as to explain the full extent of store-to-store price variation.[14]

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[13] US evidence, e.g. the findings by Hoch et al. (1995) and Chintagunta et al. (2003) in relation to Dominick's Finer Foods ("DFF") (a large supermarket chain in the Chicago area), shows that zone pricing is mostly driven by differences in local consumer characteristics rather than by local competition or costs. More generally, on the range of pricing policies used in US grocery retailing, see Shankar and Bolton (2004) and Ellickson and Misra (2007).

[14] For instance, the CC undertook detailed analysis on the relative profitability of stores operated on different price tiers by Tesco and Sainsbury. In both cases, the CC found that the higher prices in their higher price tier stores were more than was required to meeting higher operating costs, or indeed higher asset costs (CC 2000; Tables 8.31 & 8.32, paragraphs 8.109 & 8.114).

Table 2. Local Price Flexing by UK Grocery Retailers

Store fascia	**1999**				**2003**
	Price-flexed products %	*Widest price range on any price-flexed product*	*Average price range for price-flexed products (%)*	*Basket price range across stores (sales weighted) (%)*	*Price-flexed products %*
Tesco	8.5	43.4	19.2	1.69	0
Sainsbury*	N/A	N/A	N/A	N/A	0
Asda	0	0	0	0	0
Morrison	0	0	0	0	0
Safeway	59.5	31	4.3	1.09	N/A

* Sainsbury provided its data in a different way, but it did exhibit some price flexing in 1999.

Source: 1999 data adapted from CC (2000, tables 7.2 and 7.3, Appendices 7.5 and 7.8); 2003 data adapted from CC (2003, paragraphs 5.35 to 5.41)

However, the pattern of pricing practices in the sector changed markedly over the following four years. While price flexing continued to be used by some of the smaller chains, by 2003, both Sainsbury and Tesco had voluntarily moved away from store pricing based on location (CC 2003; paragraphs 5.36 and 5.37).[15] Furthermore, in March 2004, Morrison acquired Safeway and set about converting all the latter's stores into the Morrison format, in the process abandoning Safeway's store-by-store promotional pricing policy in favor of its national pricing policy.

Remarkably, uniform pricing has become the dominant form of pricing in this sector, and the major retailers, including Tesco, reportedly the world's third largest retailer, have eschewed the opportunity to customize prices on a store-by-store basis in favor of national pricing.

Commitment Devices

If national pricing is to have any possible strategic role in influencing the pricing decisions of rival retailers (i.e. be seen as beyond mere "cheap talk"), then the chain-store retailer would need visibly to pre-commit to uniform pricing in such a fashion that the other retailers could be certain that the chain-store's hands are tied when it comes to actual determination of prices.

[15] However, while setting the same prices across the supermarket format, both retailers might vary prices between formats (i.e. between their separately branded convenience store chains as compared to their supermarket chains) – on the basis of operating cost differences.

In this regard, it is clear from the statements supermarket chains have made to the CC in 2003, that there is strong commitment to uniform pricing. Consider for example the following assessments made by the CC with respect to the two chains with the longest commitment:

> Asda said that it would be commercial suicide for it to move away from its highly publicized national EDLP pricing strategy and a breach of its relationship of trust with its customers, and it would cause damage to its brand image, which was closely associated with a pricing policy that assured the lowest prices always. (CC 2003, paragraph 5.38)
>
> Morrisons told us that it charged the same prices for its products in every one of its stores. It stated that adopting a policy of local prices would be contrary to its long-standing marketing and pricing policy, it would damage its brand and reputation built up over many years and would adversely affect customer goodwill, as well as being costly to implement and manage. (CC 2003, paragraph 5.40)

These assessments fit with the public statements made by senior managers of these two companies at the time of the 2003 CC inquiry:

> Asda pricing does not discriminate by geography, store size or level of affluence - we have one Asda price across the entire country. Our national pricing policy means that all our customers, no matter where they live, be it Elgin or Eastbourne, will pay the same low prices they deserve – always. (Tony De Nunzio, President and CEO, Asda Stores Limited - www.advfn.com/news_Statement-re-Safeway-PLC_4628216.html)
>
> We have a long established value-based national pricing policy - which has operated in Morrisons stores since 1958 - with the same single price for every product in each store, wherever a store is located. We have no intention of changing this strategy. It is at the heart of what we do. There will be no price flexing in Morrisons stores. (Bob Stott, Managing Director, Wm Morrison Supermarkets PLC - www.mmc.gov.uk/inquiries/completed/2003/safeway/pdf/morrisonnotes.pdf)

Moreover, the big 4 grocery retail chains continue to emphasize their commitment to uniform, national pricing. For instance, in the wake of yet another CC sector inquiry (begun in 2006 and due to conclude in 2008), Sainsbury and Tesco, as the two more recent converts to uniform pricing, have made the following public statements:

> Sainsbury's sets prices nationally by format and does not use price-flexing to exploit areas of higher or lower market share. (http://www.competition-commission.org.uk/inquiries/ref2006/grocery/main_party_submissions.htm)

> We [Tesco] understand that customers want low prices, but they also want fair prices. That is why we charge the same prices up and down the country. We sell our products on the basis of a national price list available for all to see on our website. Even in the few locations that are unable to support more than one supermarket, where we are 'the only supermarket in a town', we continue to operate on the basis of our national price list. (http://www.tesco.com/talkingtesco/lowPrices/)

The last point in the Tesco statement above is interesting as it shows that the firm is willing to support its commitment to uniform pricing by listing its prices on its own website (and even comparing those with its main rivals – www.tesco.com/pricecheck).

Other examples

Beyond UK supermarkets, uniform pricing is also witnessed in other retail sectors as well. As Dobson and Waterson (2005) observe, these further examples illustrate the range of possible commitment devices and policies that may be employed to support the credibility of a uniform pricing strategy. For instance, a retail chain may rely on some expensive commitment mechanism that would render its position worse were it not to adopt uniform pricing than if it did so. In the case of some retailers this comes about by publishing all prices in a catalogue which then applies across the whole country, e.g. IKEA in furniture and furnishings or Argos in the UK for general merchandise, with no scope for local price deviations. An alternative commitment can arise through national advertising to inform consumers about prices (such as practiced in UK electrical goods retailers Currys and Comet) or through use of integral price tags standard across a country, or even the whole Eurozone (e.g. top clothing retailers such as Sweden's multinational H&M and UK's Marks & Spencer).

A further possibility is for the chain-store retailer to remove local market boundaries to create essentially a national market for its own goods. For example, this might be possible if consumers were allowed full access to the store network regardless of their location, with orders taken from any part of the country then backed with either home delivery or delivery to the nearest available store (as offered for example by a number of UK clothing retailers including Marks & Spencer and Next). A similar effect could arise through a retailer developing an Internet operation to run alongside its store operations, i.e.

become a "clicks and bricks" retailer, making a commitment to offering online prices equal to the lowest store-level prices. Indeed, this is a move that Tesco, Asda and Sainsbury have adopted in developing online grocery sales in the UK and is also being rolled out by H&M for clothing.

With this background on UK grocery retailing and these other examples in mind, we now move to consider theoretically how pricing commitments to uniform pricing may affect market outcomes in a retail oligopoly context, examining how and when this might be – and equally when it might *not* be – a profitable strategy.

3. Analytical Framework

We start with a general examination of the strategic implications for adopting either a local or a uniform pricing policy across the stores operated by a multi-market retail chain. In the next section, we develop a further parameterized model to provide additional insights. Our starting point, though, is a general demand setting where we show the existence of a profit motive for a retailer to choose deliberately not to discriminate across the local markets it serves even when these markets differ in the extent of demand and intensity of competition (and so would naturally appear to be candidates for profitable price discrimination across localities). Specifically, when a retailer is not a monopolist in all its local markets, strategic considerations impact the decision over whether or not to price discriminate because they affect the pricing decisions of other retailers, and thus market outcomes.

We take the simplest case for illustration where a retailer operates in two local markets - in one market it faces no competition (i.e. a local monopoly), in the other it competes against another firm. We characterize the demand conditions that provide an incentive for pricing uniformly rather than locally, expressed in the form of a set of demand elasticity conditions for the two markets. We go on to examine the nature of preferences that are likely to give rise to this incentive.

Characterizing the general issue

Firm A sells in two independent markets, 1 and 2. Costs are the same in each market and marginal costs are constant, at a unit rate c. The demand functions are continuous and downward sloping.

We first state an obvious result, demonstrated in Holmes (1989):

LEMMA 1. *Ignoring competitive conditions, if a uniform price is to be set across the two markets, this price will be between the prices the firm would have set had it maximized profits by setting prices individually in each market.*

Now consider the following scenario. In market 1, firm A is a monopolist whilst in market 2, a larger market, it faces competition from another firm (B). Competition in the duopoly market is in prices, with the products of the two firms being imperfectly competitive substitutes ($|\partial q_i/\partial p_i| > \partial q_i/\partial p_j > 0$; $i, j = A, B$; $i \neq j$). We assume that the demand facing firm i, $q_i(p_i, p_j)$, is sufficiently concave in its own price, p_i, for profit to be strictly quasiconcave in p_i (Vives 1999, p149). The firm in question (A) has to consider whether to set uniform prices across the two markets, or alternatively to price locally.[16]

PROPOSITION 1. (a) Existence: *In the scenario outlined above, there is a range of demand parameters for which there is some profit incentive for firm A to set a uniform price across the two markets rather than pricing markets separately.* (b) Necessity: *The incentive arises when demand facing A is no less elastic in the duopoly market than in the monopoly market. The firms in market 2 must produce different products.*

PROOF. Consider the maximization problem for firm A, assuming it sets prices separately in each market. Its profits are

$$\pi_A \equiv \pi_1(p_1) + \pi_{A2}(p_{A2}, p_{B2}) = p_1 q_1(p_1) + p_{A2} q_{A2}(p_{A2}, p_{B2}) - c.(q_1(p_1) + q_2(p_{A2}, p_{B2}))$$

The first order conditions, succinctly written, are

$$\frac{\partial \pi_1}{\partial p_1} = \frac{\partial \pi_{A2}}{\partial p_{A2}} = 0 \qquad (1)$$

In the second condition for equality in (1) above, maximization is done assuming p_{B2} fixed. Call the prices thereby set p_1^* and p_{A2}^* respectively.

On the other hand, if firm A decides to practice, *and commit to*, uniform pricing, its profits are

$$\pi_A \equiv \pi_1(p_A) + \pi_{A2}(p_A, p_{B2})$$

[16] Note that Holmes (1989), who demonstrated existence of an incentive for uniform pricing through an example, did not examine cases where the number of firms differs across markets. Another important paper to investigate the topic, though in the very different context of "mill pricing", is Thisse and Vives (1988).

Suppressing arguments of the functions temporarily for simplicity, its first order condition is now

$$\frac{d\pi_A}{dp_A} = \frac{\partial \pi_1}{\partial p_A} + \frac{\partial \pi_{A2}}{\partial p_A} + \frac{\partial \pi_{A2}}{\partial p_{B2}} \cdot \frac{dp^*_{B2}}{dp_A} = 0 \tag{2}$$

since firm A now recognizes the full strategic impact of its price choice.[17] Call the optimal uniform price p^*_u. The second order condition for maximization under uniform pricing is $d^2\pi_A(p^*_u, .)/dp_A^2 < 0$.

Following Lemma 1, take the case where $p^*_1 > p^*_{A2}$. Turning to the final term in (2), note that since $\partial q_{A2}/\partial p_{B2} > 0$, it follows that $\partial \pi_{A2}(\ .)/\partial p_{B2} > 0$. Furthermore, $dp_{B2}{}^*/dp_A > 0$ since the products are strategic complements in market 2 by assumption. At p^*_{A2} we have

$$\frac{d\pi_{A2}(p^*_{A2}, p_{B2})}{dp_{A2}} \equiv \frac{\partial \pi_{A2}(p^*_{A2}, p_{B2})}{\partial p_{A2}} + \frac{\partial \pi_{A2}(p^*_{A2}, p_{B2})}{\partial p_{B2}} \cdot \frac{dp^*_{B2}}{dp_{A2}} > 0 \tag{3}$$

Therefore, there exists a non-empty set of prices $p^*_{A2} + \varepsilon$ ($\varepsilon > 0$) for which $\pi_{A2}(p^*_{A2} + \varepsilon, \bar{p}_{B2}) > \pi_{A2}(p^*_{A2}, \bar{p}_{B2})$, where $\bar{p}_{B2}$ is some fixed value. Then, defining the maximum value of ε in this set by $\pi_{A2}(p^*_{A2} + \varepsilon^*, \bar{p}_{B2}) = \pi_{A2}(p^*_{A2}, \bar{p}_{B2})$, a sufficient condition for profits to be higher under uniform pricing is the following

$$p^*_{A2} < p^*_1 < p^*_{A2} + \varepsilon^* \tag{4}$$

Using the first inequality in (4) together with the normal relationship between prices and demand elasticities coming from the first order conditions, we can infer that profits are weakly higher if

$$\eta^I_1(p^*_1) \leq \eta^F_2(p^*_{A2})$$

where the η's are price elasticities of demand, superscript I referring to the industry, F to the firm.[18] Therefore, assuming demand in each market is no more convex in the relevant prices than implied by constant elasticity of demand, it will be true that

$$\eta^I_1(p^*_u) \leq \eta^F_2(p^*_u) \tag{5}$$

The equality in this condition provides a lower boundary for the range over which profits are enhanced by uniform pricing.

Consider now the case where $p^*_1 < p^*_{A2}$. Using Lemma 1 in (3) shows that profits for firm A in

[17] Formally, we have a two-stage game. In the first stage, firm A commits to uniform pricing. In the second stage, both firms set prices. Our earlier assumptions on demand guarantee a locally stable Nash equilibrium price for B depending smoothly on A's price.

[18] In marketing, our industry elasticity η^I_i is referred to as the primary demand elasticity for good i (e.g., Bell et al., 1999).

market 2 would fall if uniform pricing were introduced. A rise in price in market 1 would also induce a fall in profits. So, the incentive cannot arise when demand facing *A* in market 2 is less elastic than in market 1.

Finally, where the products of firms *A* and *B* in market 2 are identical, competition in that market becomes homogeneous-product Bertrand in nature so that the only price which will result in any sales in market 2 is pricing at marginal cost and therefore profits will fall under uniform pricing as all profits from the monopoly market are ceded. *Q.E.D.*

The intuition for the main result is fairly clear. Given equal *industry* demand elasticities, a firm will want to set a lower price in the duopoly market than in the monopoly market. But competitive considerations cannot be ignored. The two firms' actions are strategic complements, that is for firm *A*

$$\frac{\partial^2 \pi_A}{\partial p_A \partial p_B}(R_B(p_A), p_A) > 0 \tag{6}$$

where R_B is firm *B*'s reaction function.

Thus if firm *A* sets a low price in market 2, this makes *A* a relatively fierce competitor for *B*, meaning that *B* would want to reduce its price (through the equivalent of equation (6)) for good 2. In the terminology of Bulow et al. (1985), investment in reducing price makes firm *A* "tough". By choosing a uniform pricing strategy, thereby raising price in market 2, firm *A* loses some potential profit in the monopolized market. However by being "soft" in setting a high price in the duopoly market, and as a result inducing firm *B* to set a higher price in market 2, *A* gains more profit in the duopoly market than it would do otherwise and hence may benefit in net terms.

On the other hand, if demand *facing A* in the duopoly market is relatively less elastic than demand in the monopoly market, setting a uniform price across both markets would imply reducing price in the duopoly market below the price based on elasticity in that market alone. This would toughen competition, which is not in *A*'s interest.

It is clear that part (a) of Proposition 1 relates to an existence result. Whilst uniform pricing will not be profitable should industry demand in the monopoly market be less elastic than in the duopoly market, it *may* but need not be profitable where industry demand in the monopoly market is more elastic. In order to characterize this latter situation somewhat more fully without descending immediately to specific parametric cases, we consider two general issues.

Consider a result due to Holmes (1989) that applies to our firms in the oligopoly market, namely

$$\eta^F(p) = \eta^I(p) + \eta^C(p) \tag{7}$$

where the C superscript shows a cross-elasticity of demand between the two firms' products. Since the products are substitutes, this is positive.

Taking (7) together with (5), it is necessary for profits to be higher under uniform pricing that

$$\eta_2^C(p_u^*) > \eta_1^I(p_u^*) - \eta_2^I(p_u^*) > 0 \tag{8}$$

This captures somewhat more specifically how the products in market 2 must be relatively similar to each other, but we have already seen they must not be too similar. Uniform pricing, then, only becomes profitable over a limited parameter range.

Furthermore, let us define a "simple magnification" of demand. Assume there is an atomless distribution of willingness to pay across consumers, $f(p)$, with support $[0, \bar{p}]$ in market 1 such that each consumer represented will purchase one unit if price is below their p value, zero otherwise. Therefore demand, $\tilde{q}$, in market 1 at any given price level $\tilde{p}$ will be given by

$$\tilde{q} \equiv \int_{\tilde{p}}^{\bar{p}} f(p).dp = F(\bar{p}) - F(\tilde{p}) \tag{9}$$

whence $dq(\tilde{p})/dp = -f(\tilde{p})$.

We define a *simple magnification* as occurring when the distribution of willingness to pay across consumers in market 2 becomes $(1+\theta)f(p)$, $\theta > 0$.

When market 2 is a simple magnification of market 1 then, by simple substitution in (9) we find that $\eta_1^I(\tilde{p}) = \eta_2^I(\tilde{p})$, violating condition (8) for uniform pricing to be more profitable. Therefore by contradiction, we have established the following proposition:

PROPOSITION 2: *The range of demand parameters under which there is a (strict) incentive for uniform pricing does not include cases where market 2 is a simple magnification of market 1.*

The meaning of a simple magnification is that the only difference between the two markets lies in the density of consumers.[19] Their distribution of tastes across the population remains unchanged. A clear

[19] This is an assumption made for example in Bresnahan and Reiss (1987) in relation to small towns in the Midwest of the US. In terms of a linear demand function, demand in market 2 would have the same intercept but a shallower slope than in market 1 under a simple magnification.

alternative view is that in larger markets tastes spread, so that there are some "high end" consumers in a large market not represented in a smaller market.

We define an alternative case where the larger market is a "valuation-expanding" magnification of the smaller market. This occurs when the distribution of willingness to pay in market 1 is $f(p)$ with support $[0, \bar{p}_1]$, whilst the distribution of willingness to pay in market 2 is $(1+\theta)f(\beta.p)$, $\theta > 0$, $\beta > 1$ with support $[0, \beta\bar{p}_1]$. Here, simple manipulations of the elasticity formula show that there is at least a region of demand where industry demand elasticity in market 2 is less than in market 1.[20] With valuation expansion, the formula for market 2's industry elasticity of demand (after slight simplification) is

$$\eta_2^I(\tilde{p}) = \frac{\tilde{p}f(\beta\tilde{p})}{F(\beta\overline{p}) - F(\beta\tilde{p})}$$

with a natural tendency for the denominator to be larger than that for market 1 at any price. So, we have

REMARK 1: *Where market 2 is a "valuation-expanding" magnification of market 1, there is a clear potential for uniform pricing to be profitable.*

4. Linear Demand Case

To take a specific case of the above framework, and give some further insight on the practical scope for uniform pricing representing a more profitable strategy than local pricing, consider the situation where chain-store retailer A operates in two separate local markets characterized by (potentially) different linear demand specifications. As a basis for making comparisons, we assume that in market 1, where it holds a monopoly position, the chain-store retailer faces normalized linear demand with unit intercept and unit slope such that inverse and direct demand take the respective form:

$$p_{A1}(q_{A1}) = 1 - q_{A1} \;;\; q_{A1}(p_{A1}) = 1 - p_{A1} \tag{10}$$

In market 2, where A competes with another (independent) retailer, B, and to allow for differences in the character and extent of demand across the two markets, we assume symmetric linear (inverse) demand of the following form:

$$p_{A2}(q_{A2},q_{B2}) = 1/(1-v) - (q_{A2} + s{\cdot}q_{B2})(1-m)/(1+m) \;;\; p_{B2}(q_{B2},q_{A2}) = 1/(1-v) - (q_{B2} + s{\cdot}q_{A2})(1-m)/(1+m) \tag{11}$$

[20] Again referring to the linear demand case, if $\beta > 1$ and $\theta = 0$ then we have demand in market 2 being parallel to but above demand in market 1. In that case, demand is less elastic at any price (up to $\bar{p}$) in market 2.

Here, $v \in [0,1)$ represents the extent of "valuation expansion" relative to the monopoly market (with a value of zero indicating no valuation expansion) and $m \in (-1,1)$ is the relative demand "magnification" factor, corresponding to consumer density increasing (respectively, decreasing) in the duopoly market vis-à-vis the monopoly market as m becomes higher (lower). Thus, a "simple magnification" corresponds to $v = 0$ for $m \geq 0$ (i.e. where consumer density is higher in the duopoly market than the monopoly market but both markets exhibit the same reservation prices). Parameter $s \in [0,1)$ captures the degree of "substitutability" between the retailers' products such that the products are demand independent when $s = 0$ and approach being viewed as perfect substitutes as $s \to 1$.

The direct demand functions in the duopoly market for retailers A and B are respectively

$$q_{A2} = \frac{(1+m)[1-s-(1-v)(p_{A2}-sp_{B2})]}{(1-m)(1-v)(1-s^2)}; \quad q_{B2} = \frac{(1+m)[1-s-(1-v)(p_{B2}-sp_{A2})]}{(1-m)(1-v)(1-s^2)} \tag{12}$$

Furthermore, to keep the analysis straightforward and tractable, we assume that in regard to operating costs the retailers operate under common constant marginal and unit costs in the respective markets they serve, which without further loss of generality are taken to be zero.

With these demand and cost assumptions in place, it is straightforward to determine the outcomes under local pricing and under uniform pricing, with the derivation shown in the online technical appendix in the e-companion. From this, we find that the combined profit (i.e., across both the markets served) for the chain-store retailer under local pricing (denoted by superscript L) and under uniform pricing (with superscript U) are respectively:

$$\pi_A^L = \pi_{A1}^L + \pi_{A2}^L = \frac{1}{4} + \frac{(1-s)(1+m)}{(1-m)(1-v)^2(1+s)(2-s)^2} \tag{13}$$

$$\pi_A^U = \pi_{A1}^U + \pi_{A2}^U = \frac{(1-s)[2-s^2(1-m)][4+s(3-m)-2v(1+s)(1-m)]^2}{(1-m)(1+s)(1-v)^2[8-s^2(5-3m)]^2} \tag{14}$$

Using (13) and (14), we find that the difference in combined profit for the chain-store retailer is

$$\pi_A^L - \pi_A^U = \frac{(1+m)[s-v(2-s)][s\,\mathrm{X}_A - v(2-s)\,\mathrm{Y}_A]}{4(2-s)^2(1-v)^2(8-s^2(5-3m))^2} \tag{15}$$

where

$$\mathrm{X}_A \equiv 32-32s+16s^2m+4s^3(5-3m)-s^4(11-5m) > 0; \; \mathrm{Y}_A \equiv 32-16s^2(2-m)+s^4(9-7m) > 0.$$

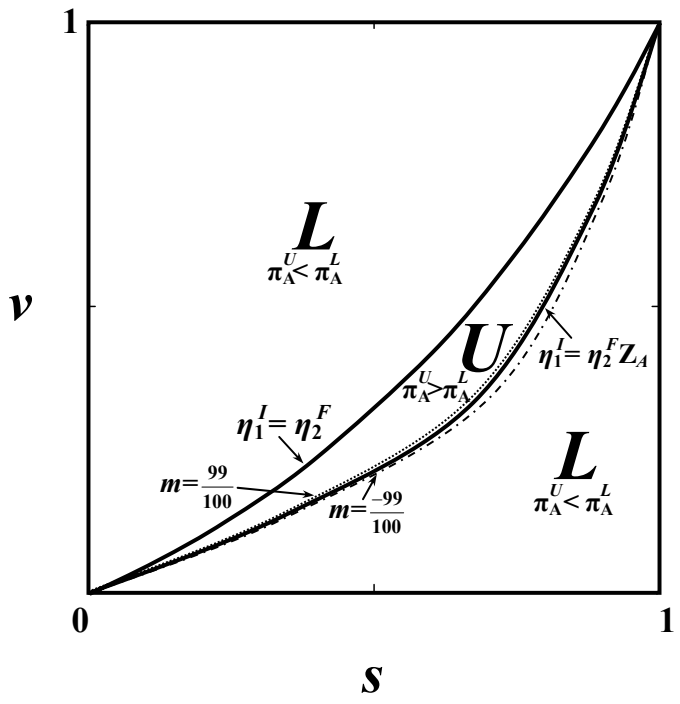
The denominator in (15) is positive and so is the first term on the numerator, thus the sign of the expression hinges on the sign of the two terms in square brackets on the numerator. We can establish that these two terms can be positive or negative and that the signs do not necessarily coincide. Specifically, conditions exist under which (15) is negatively signed with uniform pricing offering a greater profit than local pricing for the retailer, as summarized in the following result:

PROPOSITION 3. (a) *For* $v \in (0,1)$ *and* $s \in (0,1)$*, there exists a zone in (v,s) space for which the chain-store retailer strictly prefers uniform pricing. This zone has two boundaries. The first boundary is given by the condition that the price elasticity facing the firm is the same in both markets,* $\eta_1^I = \eta_2^F$*, which is unaffected by the value of m. The other boundary is* $\eta_1^I = \eta_2^F Z_A$*, where* $Z_A \equiv X_A/Y_A$*, and this lies below (i.e. outside) the first in (v,s) space, with the size of the zone where uniform pricing offers greater profit decreasing in m.* (b) *For* $v = 0$*, the chain-store retailer is strictly (weakly) better off with local pricing when* $s > (=) 0$*.*

PROOF. See the online technical appendix in the e-companion.

To provide some further insight into the nature and extent of the zone where uniform pricing offers the chain-store retailer greater profit than local pricing, Figure 1 diagrammatically represents the results in Proposition 3, taking $m = 0$ as the base case. In accordance with Proposition 1 in the previous section, the upper/inner boundary of this zone is where the elasticity of demand facing the chain-store retailer is the same in both markets, i.e. where $\eta_1^I = \eta_2^F$. This corresponds to where the prices are the same in both markets regardless of the chosen pricing policy, i.e. that under local pricing $p_{A1}^L = p_{A2}^L$ where $p_{A1}^L = 1/2$ and $p_{A2}^L = (1 - s)/[(1 - v)(2 - s)]$, so that this boundary is where $v = s/(2 - s)$. Above this line $\eta_1^I > \eta_2^F$, and here the retailer strictly prefers local pricing (as uniform pricing exacerbates competition in the duopoly market while also reducing profits in the monopoly market). Below this line, where $\eta_1^I < \eta_2^F$, there is a limited area of (v,s) space where a commitment to uniform pricing can sufficiently dampen competition in the duopoly market without unduly losing too much profit in the monopoly market from a lowered price to the extent that overall profits are higher compared to local pricing.

Figure 1. Pricing Policy Preferences for Chain-Store Retailer A ($m=0$)



As shown by Proposition 1, the other (in this case, lower/outer) boundary of this zone lies inside $s = 1$, such that were the products perfect substitutes then uniform pricing would result in prices collapsing to zero in both markets to ensure non-zero quantities (which must necessarily offer lower profits than local pricing when there is positive demand in the monopoly market). Moreover, as shown by Proposition 2, this other boundary lies above $v = 0$, equating to a simple magnification in the duopoly market compared to the monopoly market, so that a valuation expansion is required for uniform pricing to offer higher profits than local pricing

Figure 1 also shows the relevant boundaries when m is close to its respective extreme values, taking as illustrations the cases where $m = 99/100$ and $m = -99/100$ (i.e. where consumer density in the duopoly market compared to the monopoly market is respectively extremely large or extremely small). The upper/inner boundary is unaffected by the value of m (since this relates a price equivalence independent of m, i.e. where $v = s/(2 - s)$). The lower/outer boundary is, though, affected by the value of m. The boundary where $m = 99/100$ is shown as a dotted line and the case where $m = –99/100$ is shown as a dot-dashed line. As may be expected, the former lies above/inside the latter (since the cost to lost monopoly market profit is greater in order to raise duopoly market prices), with the solid line boundary

where $m = 0$ being between the two. Yet, it is striking how little difference the value of m makes on the size of the zone where uniform pricing offers higher profits, which is due to limited impact m has on the value of Z_A.[21] In other words, differences across the two market types in respect of consumer density *per se* do not significantly limit the scope for uniform pricing. Rather it is the extent of valuation expansion (v) and degree of product substitutability (s) that matter more significantly; where the greater the former then the greater the latter is required, and vice versa, for uniform pricing to be preferred.

5. Further Considerations

The results in the previous two sections, and diagrammatically illustrated in Figure 1, point to the scope for uniform pricing offering strictly higher profits than under local pricing being quite restricted. However, there may be other practical considerations, as we alluded to in the Introduction, which may extend the scope for adopting uniform pricing. In this section we build on the linear demand analysis in the previous section to illustrate two possible considerations: first, where other, rival chain-store retailers exist and they can coordinate their pricing policy choices; second where local pricing may involve some additional costs that reduce net profits under this pricing policy choice.

5.1. Competing chain-store retailers

The first consideration of how the presence of rival chain-stores might affect preferences is achieved through a straightforward extension of the linear demand framework by allowing retailer B to be in a symmetric position to retailer A such that whilst operating in market 2 in competition to A it also operates in a monopoly market of its own (market "3") which is identical to market 1 in respect of demand conditions. With this set up, we contrast the situation where both retailers adopt local pricing with where they both adopt uniform pricing to consider joint preferences over pricing policy.

When both chain-store retailers set local prices then the outcomes are the same as previously where a single chain-store retailer competes with an independent retailer using local pricing (since the presence of a separate monopoly market has no impact on the outcomes from competing in the contested duopoly market). Accordingly, we can denote (using the superscript LL) the total profit for the two chain-store retailers under local pricing as respectively π_A^{LL} and π_B^{LL}, given by (13).

[21] For illustration on the narrow range of values, see the online appendix in the e-companion.

The derivation of the outcomes when both chains adopt uniform pricing is given in the online appendix in the e-companion. From this, we find that the total profit for each chain-store retailer is

$$\pi_A^{UU} = \pi_B^{UU} = \frac{(1-s)(2+(1-m)s^2)[2-(1-m)(v+vs+s)]^2}{(1+s)(1-m)(1-v)^2[4-s(1+m)-2s^2(1-m)]^2} \tag{16}$$

The difference between the total profit for each chain-store retailer when they both use local pricing and when they both use uniform pricing is

$$\pi_A^{LL} - \pi_A^{UU} = \pi_B^{LL} - \pi_B^{UU} = \frac{(1+m)[s-v(2-s)][s\mathrm{X}_J - v(2-s)\mathrm{Y}_J]}{4(2-s)^2(1-v)^2(4-s(1+m)-2s^2(1-m))^2} \tag{17}$$

where

$$\mathrm{X}_J \equiv -8+4s(3+m)+s^2(1-7m)-4s^3(1-m); \quad \mathrm{Y}_J \equiv 8-8s-s^2(3-5m)+4s^3(1-m) > 0.$$

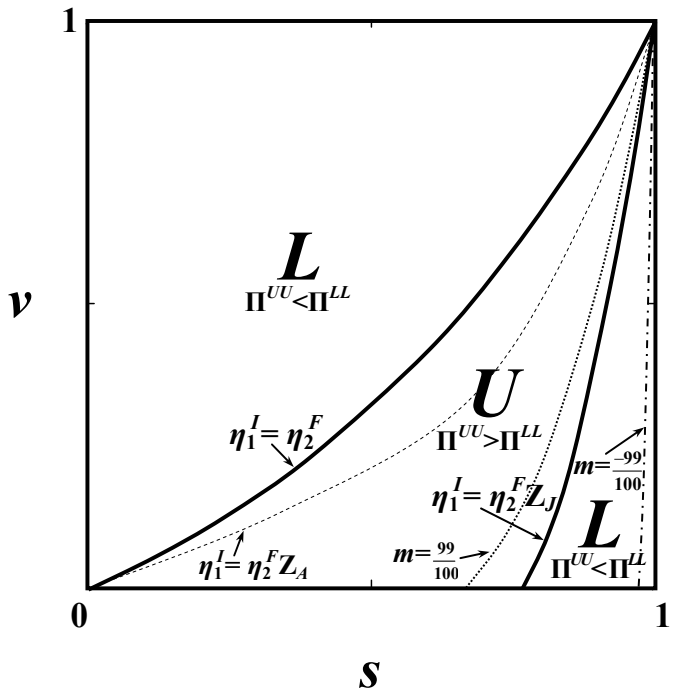
As with the previous profit comparison given by (15), the denominator in (17) is positive and so is the first term on the numerator, thus the sign of the expression hinges on the sign of the two terms in square brackets on the numerator. As before, we can establish that conditions exist under which (17) is negatively signed. Formally, as the following result shows, there is greater scope for a joint rather than a private preference over uniform pricing:

PROPOSITION 4. (a) *For $v \in (0,1)$, a zone exists in (v,s) space for which the retailers jointly prefer mutual uniform pricing over mutual local pricing, as defined by two non-overlapping boundaries, the upper/inner one in (v,s) space being $\eta_1^I = \eta_2^F$, and the lower/outer one being $\eta_1^I = \eta_2^F Z_J$, where $Z_J \equiv X_J/Y_J$.* (b) *This zone covers a greater range of (v,s) space than the zone for private preferences towards uniform pricing as established in Proposition 3.*

PROOF. See the online technical appendix in the e-companion.

As Proposition 4 establishes, comparing the competing chain-store retailers' joint profits when they both adopt uniform pricing with when they both adopt local pricing reveals that they have joint incentive to adopt uniform pricing across a greater region of (v,s) space than when only considering their private incentives. The extent of this increased scope for uniform pricing is illustrated in Figure 2, where the solid lines correspond to respective boundaries for the case where $m = 0$.

Figure 2. Joint Preferences for Two Chain-Store Retailers ($m = 0$)



Here, the upper/inner boundary of the zone supporting a joint preference for adopting uniform pricing remains the same, i.e. where $\eta_1^I = \eta_2^F$ with $v = s/(2 - s)$. However, the lower/outer boundary is shifted out significantly. Accordingly, if the two chain-store retailers can devise a means to coordinate their pricing policy choices, e.g. simultaneously make mutually binding commitments to uniform pricing, then the scope for uniform pricing increases substantially.

Moreover, as Figure 2 shows, this significant scope for a joint incentive for uniform pricing applies regardless of the value of m, though the area of (v,s) space supporting joint uniform pricing increases as m declines (since proportionately less profit has to be sacrificed in the respective monopoly market to soften competition and thereby boost profits in the duopoly market).

Finally, since Z_J can be negative for certain parameter values (i.e., when X_J is negative), it follows that a valuation expansion, i.e. $v > 0$, is not a necessary condition to support a *joint* preference for uniform pricing. Specifically, the zone in (v,s) space where uniform pricing offers greater profits than local pricing includes negative values of v, with the implication that the result from Proposition 2 does not necessarily hold for joint preferences over pricing policy. In other words, it is possible even with a valuation contraction (with lower reservation prices in the duopoly market compared to the monopoly

market) for a joint preference for uniform pricing to exist. However, the key result from Proposition 1, that the elasticity of demand facing the retailer be no less in the duopoly market than in the monopoly market is still seen to apply as a necessary condition to support uniform pricing since the upper/inner boundary remains the same as with private preferences, i.e. $\eta_1^I = \eta_2^F$ with $v = s/(2 - s)$.

5.2 The costs of local pricing

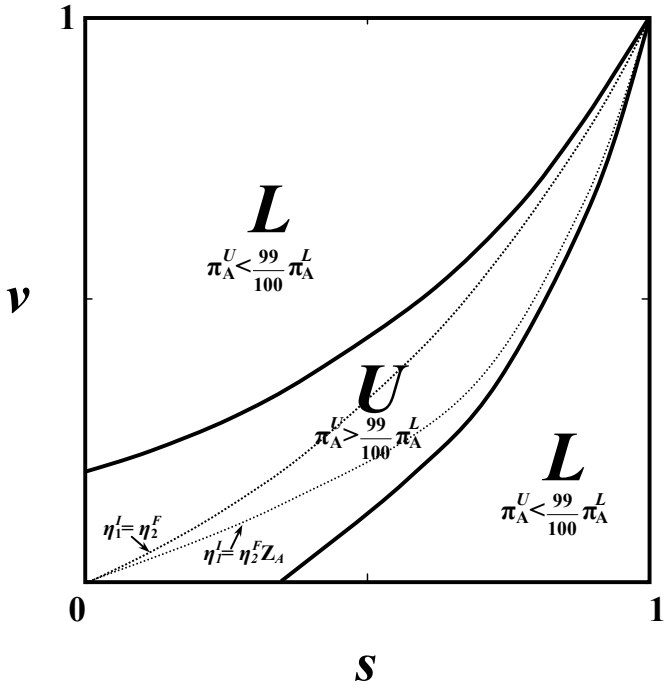
Turning to the second of these considerations, while going back to the context of unilateral preferences addressed in section 4, Figure 1 showed the profit boundaries when the chain-store retailer's combined profits are equal under each pricing policy choice. However, we can also consider how much the boundaries alter if the chain-store retailer is willing to accept a limited gap in (gross) profits between uniform pricing and local pricing. For instance, this might be considered by the retailer when local pricing entails some additional cost that impacts on net profits, e.g. where adjusting pricing on a local basis is more expensive than on a national basis (e.g. costs due to separate labeling and ticketing as well as more administration and management time) or alternatively where there is a risk of a consumer backlash or other adverse sentiment from resentment over geographic price discrimination.

In order to show just how sensitive the profit comparisons are to such costs, we can illustrate the case where these costs reduce local pricing profits by 1%.[22] This is shown in Figure 3, where the boundaries correspond to the maximum considered gross profit gap of 1% between the level attainable under local pricing compared to that under uniform pricing (for the case where $m = 0$). This reveals that the upper/inner boundary swings up to the left from the top right corner while the lower/outer boundary swings down to the right from the top right corner.[23] Accordingly, if the chain-store retailer can accept gross profits from uniform pricing being marginally lower than under local pricing then this significantly increases the zone where uniform pricing might be chosen. Note that this particularly applies to lower values of v, which we might expect to apply in a practical sense. For instance, $v = 1/6 \approx 0.167$ implies a

[22] This 1% figure is used purely to represent a very marginal difference. However, it is interesting to note that the UK retailer Safeway, prior to being taken over in 2004 by the uniform-pricing retailer Morrisons, was an extensive user of local pricing and promotions but where the discounts, printing and administration were estimated to cost around 1% of its turnover (McGoldrick 2002, p. 386).

[23] The formulae for the boundary lines in Figure 3 are provided in the e-companion.

Figure 3. Preferences allowing for 1% profit gap ($m = 0$)



valuation expansion of 10% but the zone applies to s values from zero up to $s \approx 0.55$. In contrast, the zone is less expanded for higher values of v, but note that $v > 0.5$ covers the perhaps less realistic situations where valuations expand by over 100%. Here it is useful to recall that any impact of differential pricing on profits will be a second-order effect (change in price and change in quantity); the example illustrates how attenuated the profit effect can be as a result in this case.

6. Conclusion

Large national or regional chain-store groups now dominate most sectors of retailing. Competition has become focused on a battle between large chains with a resultant squeeze on independents. In their relentless drive for further growth, chains often appear to have the best of both worlds. They have the cost savings and marketing clout of a large purchaser coupled with the potential flexibility to tailor offers across the local markets they serve. This potential flexibility has been realized through developments in information gathering and processing, allowing marketeers to customize marketing mix variables to the store-level (Montgomery, 1997). The central question for managers we

examine is whether the prospect of tuning prices to particular local conditions can have negative impacts on the firm through the competitive process.

One concern for managers customizing pricing at the store level might be negative consumer sentiment towards a retailer using discriminatory practices that would detrimentally impact on the chain's image and/or have an adverse effect on overall demand.[24] Another might be arbitrage.

In contrast, our focus has centered on competitive aspects. Specifically, a retailer's use of geographic price discrimination may impact on competition across the network of local markets served. In this context we have shown quite generally that market conditions exist where it will be both individually and jointly profitable for retailers to eschew customizing prices and instead set uniform prices across their stores. This means the retailer forgoes high prices and high profits in the local markets where it has monopoly power and instead leverages this market power across all its markets to raise prices in those markets where the intensity of competition otherwise makes them low. It entails sacrificing some local profits, but with the benefit of softening competition more broadly and sufficiently to raise firm profits overall.

However, given the profit trade-offs involved in determining the aggregate effect, our analysis shows that the market conditions that support *unilateral* action in this manner are quite limited, unless there are other practical considerations that tip the profit balance in favor of uniform pricing, such as higher costs (for ticketing and administration) or reduced demand (arising from negative consumer sentiment) from using local pricing. The main message regarding *unilateral* choice of a uniform price strategy is that it will not be worthwhile if larger markets have a similar character to smaller ones, apart from their size.

Nevertheless, there is considerably more scope for raising aggregate profits through uniform pricing if other industry players are already committed to uniform pricing (or where such pricing is required by a competition authority either formally through a ban on localized price discrimination or as

[24] Anderson and Simester (2001) raise a quality signaling issue in this regard. More generally, if negative consumer sentiment is the concern then the retailer might look to so-called "micro-marketing" strategies that have broadly neutral consumer welfare effects. For practical suggestions, see Montgomery (1997) and Chintagunta et al. (2003).

an implicit condition to allow for other actions, e.g. mergers or store acquisitions from rivals[25]). Indeed, in the example considered, there was very little to lose from choosing uniform pricing. This conclusion is perhaps the opposite of what a simple consideration of the problem might suggest.

Beyond our stripped-down model there are likely to be other factors, apart from concerns about retail image and pricing costs, which may influence retail managers' choice of pricing policy. Demand differences between markets may be difficult to determine in practice and be shrouded by uncertainty, rendering the second-order profit gain involved in local pricing somewhat speculative.[26] Additional considerations may temper or reinforce the considerations addressed in this paper. For instance, in favor of local pricing is its greater flexibility and potential for driving out existing competitors or even deterring new competitors from entering local markets through selective targeting, allowing the retailer to consolidate its local position. In contrast, the relative inflexibility and greater transparency of uniform pricing may be advantageous if it assists in providing a clear, consistent policy that may facilitate greater price understanding and easier price monitoring between rivals, lessening competitive intensity (though could ultimately be deemed illegal if it amounts to tacit collusion in the form of full parallel pricing).

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[25] For example, further to our discussion of UK grocery retailing in section 2 and especially in the context of several major acquisitions that have been made by large (often national-pricing) retailers, the UK competition authorities have taken keen interest in even relatively small acquisitions made by retailers using local pricing (e.g. CC 2005).

[26] Introducing uncertainty is likely to have two opposing effects on the deterministic equilibria modeled here in sections 3 and 4. It makes local pricing less likely because the process of determining appropriate prices becomes more difficult. But it also renders strategies like precommitment less plausible.

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