

The impact of recommended retail prices on bilateral bargaining and retail pricing*

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Abstract

Following the breakdown of resale price maintenance (RPM) in the mid 1990s, UK book retailers became free to set retail prices. However, publishers continue to set Recommended Retail Prices (RRPs) and retailers then bargain with publishers over wholesale price discounts on the RRP. This paper examines the impact RRP have on this bargaining process and the resulting retail prices. These outcomes are then compared with those under RPM. We show that the supplier has an incentive to set the RRP above the retail price it sets under RPM. In addition, if retailer bargaining power is sufficiently low, retail prices will also rise.

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1 Introduction

Resale price maintenance (RPM) is a form of vertical restraint in which the supplier determines the price at which retailers must sell the product. In European competition law RPM is an ‘object’ infringement under Article 101 TFEU and is therefore presumed to be anti-competitive, similarly in the US until recently RPM has been treated as *per se* illegal (see Bennett et al., 2010). This changed in the US in 2007 when the Supreme Court decision in the *Leegin* case abandoned *per se* illegality in favour of a rule of reason approach¹. This treatment of RPM is more in line with evidence from economic theory which shows that RPM can have both pro- and anti-competitive effects (see for example Bennett et al., 2010).

In Europe, one of the few exceptions where RPM has been allowed to continue is in the market for books. In Germany for example, fixed book prices continue to be strictly enforced by publishers (see OFT, 2008). RPM has been tolerated in this market predominantly because of the cultural importance of the product (see Ringstad, 2004) and for example the judgement in the 1962 UK Restrictive Practice Court decision to allow RPM to continue emphasised that ‘books are different’. The Net Book Agreement in the UK operated through out most of the 1900s. The agreement was enforced by a publisher-wide refusal to supply to any firm that priced below a common price chosen by the publisher. However, it broke down in the mid 1990s in part due to pressure from the European Commission because of the cross border nature of the agreement (UK and EIRE), and was formally abolished in 1997. In addition, the entry into book retailing of supermarkets with considerable buyer power and an unwillingness to stick to the publishers’ chosen price also significantly contributed to the breakdown of the agreement (see Davies et al., 2004, Chapter 4). The focus of this paper is on what happened once RPM was abolished. Retailers were now free to set prices however publishers continue to set Recommended Retail Prices (RRPs) which are printed on books. This is in contrast to for example Sweden where RPM

¹*Leegin Creative Products, Inc v PSKS, Inc*, Supreme Court of the United States, 28 June 2007.

ended in 1970 and publishers are forbidden from printing RRP on books (Stockmann, 2004, p.50). Evidence from the UK book industry suggests that these RRP have an impact on the bargaining over wholesale prices that takes place between publishers and retailers. Two leading high-street retailers told the Competition Commission (2006, Appendix B, para. 9) that ‘they would generally negotiate overall terms with the publisher which would include a standard discount off the RRP (and sometimes promotional discounts).’ The aim of this paper is therefore to introduce the RRP into the bargaining over wholesale prices and consider the impact this has on the resulting retail prices.

Since RPM was abolished in the UK increasingly large retail price discounts on RRP have been offered and by 2005 best-sellers were sold on average at 75% of the RRP (Competition Commission, 2006, Appendix C, para. 11 and 12). In particular, the supermarket and internet low cost entrants have rapidly gained market share by offering considerable discounts on RRP. It is therefore somewhat surprising that evidence suggests that post the NBA book prices have increased more rapidly than an index of prices for all goods (OFT, 2008). Fishwick (2008) provides an explanation for this increase in prices after the abolition of RPM by returning to an argument accepted by the court when they allowed the NBA to continue in the 1960s. He argues that the increased retail competition absent the NBA would lead to an increase in concentration and that this would then result in an increase in retailer buyer power. This increased bargaining power would then allow retailers to extract greater wholesale price discounts on RRP from publishers. If this was the case, he suggests publishers would then compensate by increasing the RRP they set.

This explanation is therefore consistent with both the role of RRP in the bargaining process as described to the Competition Commission, and the evidence of increasing retail prices at the same time as increased discounts on RRP. In addition, the increased retailer buyer power could equally arise from the entry of supermarket and internet retailers following the abolition of the NBA (see OFT, 2008). However, whilst the recent theoretical literature on vertical restraints have modelled bargaining and the subsequent

retail pricing under RPM and free-pricing (Dobson and Waterson, 1997 and 2007) as yet the impact RRP's have on the bargaining process has not been considered. The model of bilateral bargaining and retail pricing developed in this paper is therefore an attempt to formalize the argument made by Fishwick. The model draws on the earlier models of bilateral bargaining and retail pricing developed by Dobson and Waterson (1997 and 2007). Dobson and Waterson (1997) considered bargaining between a single supplier and several symmetric retailers, with retailers then free to set retail prices. Then in the latter paper inter-brand competition between suppliers is also introduced and comparisons between the bargaining and retail outcomes under free-pricing and RPM are made. They show that RPM, despite preventing intra-brand competition between retailers, may result in lower prices. This is because free-pricing may result in substantial double marginalisation where suppliers charge high transfer prices and retailers then impose a significant retail mark-up on this. This situation arises when retailer bargaining power is low and intra-brand competition is weak. As intra-brand competition becomes less intense a slight cost disadvantage compared to other retailers is less crucial and therefore retailers bargain less hard over transfer prices. This increase in transfer prices then complements the direct effect of lower intra-brand competition in raising retail prices.

Our model introduces a third possibility in which, whilst the supplier cannot determine retail prices, it can set RRP's. The RRP is set by the supplier in order to influence retail market competition and improve its own outcome when bargaining over wholesale prices. The impact of RRP's is examined in a modelling framework similar to Dobson and Waterson (1997) however we also allow for asymmetry between retailers. Having, described the bargaining and retail outcomes from this alternative we then make comparisons with those that would result from RPM.

A related paper is Foros et al. (2011) who consider the impact of banning industry wide adoption of RPM. They show that this can lead to a reduction in economic welfare. This is because the retailers that continue to operate under RPM act as price leaders and this dampens retail competition. In our model we show that the *RRP* can have a similar effect. However, an

important difference between the two papers is that we model bargaining between the supplier and the retailer, whilst Foros et al. (2011) assume that the retailers have all the bargaining power.

Our results show that the competition dampening effect of raising the RRP enables the supplier to charge higher wholesale prices. We then show that this provides an incentive for the supplier to set the RRP higher than the retail price it would charge under RPM. Furthermore, if retailer bargaining power is sufficiently low, retail prices will also be higher than under RPM. From a policy perspective, these findings suggest that even if RPM is prohibited, RRPs may provide a less direct means for suppliers to influence retail competition and this may increase retail prices.

Whilst the motivation for this paper stems from the book industry, RRPs are also used in many other industries. For example in a recent UK case RPM was used by suppliers to coordinate on retail prices for children's toys at the RRP (see Giovannetti and Stallibrass, 2009). More generally, survey evidence (OFT, 2010, Appendix B) shows that reference prices are also commonly used by a wide range of internet retailers. In addition, whilst the focus of this paper is on the impact RRPs have on the bargaining process between suppliers and retailers, however in the concluding section we also discuss the impact RRPs may have on consumer demand.

The remainder of the paper proceeds as follows: section 2 outlines the setup of the model and describes the bargaining equilibrium. Sections 3 and 4 describe the bargaining and retail outcomes under RPM and RRPs respectively, with comparisons between these two alternatives then made in section 5. Finally, section 6 considers possible extensions to the model, discusses the policy implications and concludes.

2 Model

2.1 Demand

We will consider a setting in which a monopoly supplier sells (at marginal cost normalised to zero) to the retail sector. Retail competition then takes

place between a price setting retailer (r) with marginal production costs of 0 and a perfectly competitive fringe (f) with marginal production costs of $0 \leq c < 1$. Denoting the retail price of firm i ($i = r, f$) then the indirect demand for retailer r will be given by

$$p_r = 1 - q_r - \gamma Q_f \quad (1)$$

where q_r is its own sales and Q_f is the total supply of the competitive fringe. The direct demand for retailer r is then

$$q_r = \frac{1 - p_r - \gamma + \gamma p_f}{(1 - \gamma^2)} \quad (2)$$

Likewise, total demand for the competitive fringe is given by

$$Q_f = \frac{1 - p_f - \gamma + \gamma p_r}{(1 - \gamma^2)} \quad (3)$$

The degree of intra-brand rivalry is captured by γ ($0 \leq \gamma < 1$) with $\gamma = 0$ corresponding to independent retailers and as $\gamma \rightarrow 1$ retailers become increasingly close substitutes.

2.2 Bargaining

As explained in the introduction, we will compare two scenarios, first RPM where retail prices are set by the supplier and then an alternative scenario where the supplier sets only a recommended retail price. The outcomes from the model will therefore be determined in a number of stages. First, in stage 1 the supplier sets and commits to² either a common retail price or the RRP. Then, in stage 2 a per-unit transfer price is negotiated between the supplier and the retailers³. Finally, in the RRPs scenario, the price setting retailer

²For example by printing the price on the cover of a book.

³The assumption of a linear wholesale price is consistent with the evidence on the bargaining process in the UK book industry discussed in section 1. In addition, this also applies to a range of other retail industries (see Dobson and Waterson, 2007, footnote 5). It should however be noted that in other settings two-part tariffs may be used and can be theoretically shown to remove the double marginalisation problem discussed earlier.

is then free to decide the retail price it will charge. The supplier's decision in stage 1 will anticipate the impact on its bargaining outcome and this in turn depends upon the anticipated retail market competition. Therefore, in sections 3 and 4 we will solve for the subgame perfect equilibrium by first solving for the resulting retail outcomes.

The perfectly competitive fringe are assumed to have no bargaining power and receive take-it or leave-it offers from the supplier. In contrast, the equilibrium transfer price from retailer r to the supplier (w_r^*) will be determined by Nash bargaining⁴. Under the Nash bargaining solution⁵ w_r^* is characterised by:

$$w_r^* = \arg \max_{w_r} [\pi_s(w_r, w_f) - D_s(w_f)]^{1-\alpha} [\pi_r(w_r, p_f)]^\alpha \quad (4)$$

where π_r and π_s denote the profits of retailer r and the supplier respectively and D_s is the disagreement profit made by the supplier if no agreement is reached with retailer r and it therefore only sells to the competitive fringe at a wholesale price w_f ⁶. When bargaining with retailer r , w_f and therefore p_f are treated as given and, as will be outlined below, are determined by the supplier's decision in stage 1. The bargaining power of retailer r is captured by α : when $\alpha = 0$ the supplier has all the bargaining power and $\alpha = 1$ retailer r has all the bargaining power. The first order condition for (4) simplifies to

$$(1 - \alpha) \frac{\partial \pi_s(w_r, w_f)}{\partial w_r} [\pi_r(w_r, p_f)] + \alpha [\pi_p(w_r, w_f) - D_s(w_f)] \frac{\partial \pi_r(w_r, p_f)}{\partial w_r} = 0 \quad (5)$$

We can then solve (5) to find the equilibrium transfer price (w_r^*). Since (5) depends on r 's retail profits it is clear that the bargaining solution will in part depend on whether r operates under RPM or is free to set its own retail price. Sections 3 and 4 will consider each of these alternatives in turn. First, in order to interpret the bargaining solutions, it will be useful to note that

⁴As used by Dobson and Waterson (1997 and 2007) and O'Brien (2002) for example.

⁵As shown by Binmore et al. (1986), this bargaining solution can be motivated by an alternating offer game as proposed by Rubinstein (1982). See Dobson and Waterson (2007, footnote 7) for an illustration.

⁶Note that the disagreement profit for retailer r is zero since there is a single supplier.

following O'Brien (2002) we can rewrite (5) as

$$\alpha \frac{-\partial \pi_r(w_r, p_f) / \partial w_r}{\pi_r(w_r, p_f)} = (1 - \alpha) \frac{\partial \pi_s(w_r, w_f) / \partial w_r}{\pi_p(w_r, w_f) - D_s(p_f)} \quad (6)$$

Therefore the bargaining equilibrium equates

$$\frac{\text{Retailer } r\text{'s weighted concession cost}}{\text{Retailer } r\text{'s net profit}} = \frac{\text{Supplier's weighted concession cost}}{\text{Supplier's net profit}} \quad (7)$$

with the weights being the supplier and retailer r 's relative bargaining powers. The firm with the lower concession costs relative to their potential gains is more willing to offer concessions in order to facilitate agreement.

3 Resale price maintenance

Following the practice in the UK Net Book Agreement, under RPM the supplier chooses and commits to a common retail price (p^{RPM}). The price set by the competitive fringe will be equal to $c + w_f$. Therefore, in order to induce the fringe to set p^{RPM} the supplier charges them a wholesale price of

$$w_f = p^{RPM} - c \quad (8)$$

This take-it or leave-it offer is accepted by the competitive fringe and they make zero profit. In setting p^{RPM} the supplier will also take into account the anticipated bargaining over transfer prices with retailer r . Therefore in order to solve for the price under RPM it is first of all necessary to determine the outcome from this bargain. Under RPM (2) becomes

$$q_r = (1 - p^{RPM}) / (1 + \gamma) \quad (9)$$

Therefore, retailer r and the supplier's profits under RPM are:

$$\pi_r = (p^{RPM} - w_r) \frac{1 - p^{RPM}}{1 + \gamma} \quad (10)$$

$$\pi_s = \frac{w_r (1 - p^{RPM})}{1 + \gamma} + \frac{(p^{RPM} - c) (1 - p^{RPM})}{1 + \gamma} \quad (11)$$

If bargaining breaks down, the supplier sells only to the competitive fringe and from (3) and (8) therefore earns a profit of

$$D_s = (p^{RPM} - c)(1 - p^{RPM}) \quad (12)$$

Solving for $\partial\pi_r/\partial w_r = 0$ and $\partial\pi_s/\partial w_r = 0$, and then substituting these along with (10), (11) and (12) into (5) allows us to solve for the equilibrium transfer price (w_r^{RPM}) agreed between the supplier and retailer r under RPM. This is given by

$$w_r^{RPM} = (1 - \alpha + \gamma\alpha)p^{RPM} - \gamma\alpha c \quad (13)$$

The equilibrium wholesale price is therefore increasing in the retail price set by the supplier. From (13) retailer r 's margin is then given by

$$p^{RPM} - w_r^{RPM} = p^{RPM}\alpha(1 - \gamma) + \gamma\alpha c \quad (14)$$

This shows that r 's retail margin is increasing in the retail price set by the supplier. In other words, the equilibrium wholesale price increases less than proportionately with an increase in the retail price. The intuition for this can be seen by returning to the explanation of the bargaining solution in section 2. The price set under RPM determines the total surplus to be bargained over. For a given retail price, increasing the transfer price increases the suppliers share of this surplus at the expense of the retailer. Consequently, the concession costs in (7) cancel out and the equilibrium transfer price is simply determined by net profits. This means that an increase in the retail price only increases the supplier's net profit if the retailer's profits also increase. Therefore, since an increase in the retail price reduces the quantity sold, retailer r 's margin must increase.

Having solved for the resulting equilibrium transfer price, we can now solve for the retail price set by the supplier. Substituting (13) into (11) gives

the supplier profits of

$$\pi_s = \frac{(p^{RPM}(2 - \alpha + \gamma\alpha) - c - \gamma\alpha c)(1 - p^{RPM})}{1 + \gamma} \quad (15)$$

The supplier can set p^{RPM} to maximize (15) and therefore

$$p^{RPM} = \frac{2 - \alpha + \gamma\alpha + c(1 + \alpha\gamma)}{2(2 - \alpha + \gamma\alpha)} \quad (16)$$

For $c = 0$, (16) simplifies to $p^{RPM} = 1/2$. This is the common price which maximizes the total surplus created by retailer r and the competitive fringe⁷. The supplier then extracts all of the fringe's share of this surplus and a share of retailer r 's determined by their relative bargaining power. For $c > 0$ it can then be shown that:

Corollary 1. *The price set by the supplier under resale price maintenance (p^{RPM}) is:*

- a) *increasing in retailer r 's bargaining power (α)*
- b) *increasing in the degree of intra-brand competition (γ)*
- c) *increasing in the marginal production costs of the fringe (c).*

Proof: *see Appendix A.*

In order to see the intuition behind Corollary 1, it is important to first note that once the competitive fringe has higher marginal production costs ($c > 0$) the supplier is no longer able to maximize the total surplus created by setting a single retail price. More specifically, now the retail price (denoted \bar{p}) which would maximize the bilateral surplus created by the fringe increases above $1/2$. On the other hand a price of $1/2$ continues to maximize the bilateral surplus created by retailer r . However, the supplier is constrained to setting a single retail price. The price which maximises the total surplus created jointly by retailer r and the fringe given this constraint (denoted p^{smax}) is therefore between $1/2$ and \bar{p} . If the supplier has all the bargaining power ($\alpha = 0$) then it will set p^{RPM} equal to p^{smax} . This is because with $\alpha = 0$

⁷The same result is obtained in Dobson and Waterson (2007) when there is no inter-brand competition.

the supplier can charge retailer r a transfer price equal to the retail price and extract all of the surplus r creates and a share $p^{RPM} - c$ of the surplus created by the fringe. As the bargaining power of retailer r increases ($\alpha \rightarrow 1$) the retail price set by the supplier increases (Corollary 1a) and $p^{RPM} \rightarrow \bar{p}$. This is because the bargaining position of the supplier becomes increasingly dependent on its disagreement profits from selling just to the fringe. A retail price equal to \bar{p} reduces the total surplus created, but crucially maximises the supplier's disagreement profits. As p^{RPM} is increased above $1/2$ the profits the supplier makes from supplying retailer r start to fall. However, this is compensated for by the positive impact on the supplier's profits from moving the retail price closer to the price which would maximize profits from the fringe (\bar{p}). Furthermore, profits from retailer r will fall less, the more rapidly w_r^{RPM} increases with p^{RPM} and (13) shows that this is the case as intra-brand competition becomes more intense⁸. Therefore, as intra-brand competition becomes more intense, it is more profitable for the supplier to increase p^{RPM} closer to \bar{p} (Corollary 1b). Finally, an increase in c leads to an increase in the price which maximizes the bilateral surplus created by the fringe (\bar{p}). This therefore also increases the single price which creates the largest joint surplus (p^{max}) and consequently increases p^{RPM} (Corollary 1c).

4 Recommended retail prices

Having considered RPM in section 3, we will now look at the alternative scenario where retailer r is free to determine its own retail price but the supplier can still influence the bargaining outcome and subsequent retail competition by setting a RRP. As before, the supplier can use w_f to determine the price charged by the competitive fringe. Therefore, it can establish a recommended retail price for the product by setting

$$w_f = RRP - c \tag{17}$$

⁸This is because an increase in intra-brand competition increases the supplier's disagreement profits and it makes less additional profit from also reaching an agreement with r . The supplier can therefore bargain harder and obtain higher wholesale prices in the bargaining equilibrium.

This then results in the competitive fringe charging the RRP. Using \hat{p} to denote the price set by retailer r under this RRP scenario, from (2) the profits of retailer r are

$$\pi_r = (\hat{p} - w_r) \left(\frac{1 - \hat{p} - \gamma + \gamma RRP}{1 - \gamma^2} \right)$$

Setting $\partial\pi_r/\partial\hat{p} = 0$ and rearranging gives

$$\hat{p} = \frac{1 - \gamma + \gamma RRP + w_r}{2} \quad (18)$$

A higher RRP increases the price charged by retailer r . Substituting (18) into (2) then gives

$$q_r = \frac{1 - \gamma + \gamma RRP - w_r}{2(1 - \gamma^2)} \quad (19)$$

Therefore, from (18) and (19) retailer r makes profit of

$$\pi_r = \frac{(1 - \gamma + \gamma RRP - w_r)^2}{4(1 - \gamma^2)} \quad (20)$$

Substituting (18) into (3) then gives the total quantity supplied by the competitive fringe:

$$Q_f = \frac{2 - \gamma(1 + \gamma) - RRP(2 - \gamma^2) + \gamma w_r}{2(1 - \gamma^2)} \quad (21)$$

Therefore using (17), (19) and (21) the supplier's profits are equal to

$$\pi_s = w_r \left(\frac{1 - \gamma + \gamma RRP - w_r}{2(1 - \gamma^2)} \right) + (RRP - c) \left(\frac{2 - \gamma(1 + \gamma) - RRP(2 - \gamma^2) + \gamma w_r}{2(1 - \gamma^2)} \right) \quad (22)$$

In addition, note that from (3) and (17) if the supplier fails to reach an agreement with retailer r it receives disagreement profits of

$$D_s = (RRP - c)(1 - RRP) \quad (23)$$

Solving for $\partial\pi_r/\partial w_r = 0$ and $\partial\pi_s/\partial w_r = 0$, and then substituting these along with (20), (22) and (23) into (5) allows us to solve for the equilibrium transfer price (w_r^{RRP}) agreed between the supplier and retailer r under the RRP scenario. This is given by

$$w_r^{RRP} = \frac{(1 - \gamma)(1 - \alpha) + 2\gamma RRP - c\gamma(1 + \alpha)}{2} \quad (24)$$

The transfer price paid by retailer r is increasing in the recommended retail price. There is therefore scope for the supplier to use the recommended retail price to push up the transfer price it can obtain from the retailer r . From (18) and (24) the resulting retail margin for r is given by

$$\hat{p} - w_r^{RRP} = \frac{(1 + \alpha)(1 - \gamma + c\gamma)}{4} \quad (25)$$

This shows that retailer r 's margin is independent of the RRP. It follows that retailer r 's output is also constant⁹. Consequently, retailer r 's profit is independent of the RRP. The intuition for this can be seen by comparing this outcome with the bargaining solution under RPM. As explained earlier, under RPM it was only profitable for the supplier to raise the retail price if retailer r 's profits also increased. Here, in contrast, the supplier can increase its own surplus whilst leaving the surplus for retailer r unchanged. This is because crucially retailer r can now compensate for an increase in the wholesale price it has to pay by raising the retail price it charges. By increasing the RRP, the supplier can soften retail market competition and retailer r will increase its price. This then allows the supplier to obtain a wholesale price increase from the bargaining process which is in line with the increase in r 's retail price.

Focusing just on the outcome from bargaining with retailer r , since the wholesale price increases and the quantity sold remains unchanged, the supplier clearly has an incentive to increase the RRP. However, overall this will only be profitable for the supplier if it does not result in a larger loss of profit from supplying the competitive fringe. We can now determine how far

⁹Using (18), (19) can be rewritten as $q_r = (\hat{p} - w_r^{RRP}) / (1 - \gamma^2)$.

the supplier will raise the RRP. The supplier will set the RRP taking into account the impact on its bargaining outcome. Therefore, substituting w_r^{RRP} into (22) and maximizing with respect to the RRP shows that the supplier will set the recommended retail price such that:

$$RRP = (1 + c)/2 \tag{26}$$

Because, as explained earlier, r 's retail margin and profits are unchanged following an increase in the RRP, this also means that both the supplier and the retailer's concession costs are also unchanged¹⁰. Therefore, returning to the explanation of the bargaining solution in section 2, from (6) it must be profitable for the suppliers to increase the RRP as long as its disagreement profits from selling to the fringe increase. This is true up until the price given in (26).

It is clear that (26) does not support the suggestion by Fishwick (2008) that increasing the RRP would allow book publishers to compensate for greater wholesale price discounts resulting from increased retailer bargaining power (see section 1). This is because, for a given RRP, an increase in retailer r 's bargaining power reduces the transfer price it pays. This then allows retailer r to charge a lower price and it therefore sells a higher output. As shown earlier, by increasing the RRP the supplier can now sell this fixed level of output at a higher wholesale price. Therefore, the increased output increases the supplier's incentives to raise the RRP. However, since retailer r is now setting a lower price, the optimal RRP for the supplier to set in order to maximize its profits from supplying the fringe decreases and therefore increasing the RRP further now leads to a greater reduction in these profits. This latter effect offsets the increased incentive to raise the RRP in order to increase profits from retailer r . The supplier therefore maximizes its profits by keeping the RRP unchanged following an increase in retailer bargaining power.

¹⁰The cost of allowing a slight increase in the wholesale price for the retailer is a reduced margin on a fixed quantity of output. Whereas, the supplier gains a slight increase in margin on this fixed quantity of sales to retailer r and its profits from supplying the fringe and unchanged.

Next, given the RRP set by the supplier, we can determine the wholesale price paid and then retail price charged by retailer r . Substituting (26) into (24) gives

$$w_r^{RRP} = \frac{(1 - \gamma)(1 - \alpha) + \gamma - c\gamma\alpha}{2} \quad (27)$$

Then, from (18), (26) and (27) the price charged by retailer r is

$$\hat{p} = \frac{2 + (1 - \gamma + \gamma c)(1 - \alpha)}{4} \quad (28)$$

It is clear from (28) that:

Corollary 2. *The price set by retailer r under RRP's (\hat{p}) is:*

- a) decreasing in retailer r 's bargaining power (α)*
- b) decreasing in the degree of intra-brand competition (γ)*
- c) increasing in the marginal production costs of the fringe (c).*

Corollary 2 shows that compared to under RPM both intra-brand competition and retailer bargaining power now have the opposite impact on prices. First, from (27) an increase in retailer r 's bargaining power results in a lower transfer price and this in turn results in retailer r setting a lower retail price (Corollary 2a). Second, the higher the degree of intra-brand competition the more an increase in the RRP allows retailer r to increase its price (see (18)). Consequently, as intra-brand competition becomes more intense, it is possible to increase w_r^{RRP} further following an increase in the RRP and still leave retailer r 's margin unchanged¹¹. In addition, from (27) we can see that for $\alpha > 0$ the wholesale price paid by retailer r is increasing in the degree of intra-brand competition. However, the direct effect of increased intra-brand competition is to reduce retail prices. Corollary 2b) demonstrates that it is the latter effect that dominates and retail r 's price and retail margin (see (25)) is decreasing in the degree of intra-brand competition. Finally, from (27) we can see that the wholesale prices paid by retailer r is decreasing in c . This is because an increase in c affects the supplier's bargaining position

¹¹On the other hand, when the two retail markets are completely independent ($\gamma = 0$) an increase in the RRP has no effect on retailer r and therefore w_r^{RRP} is independent of the RRP.

by reducing their disagreement profits. However, as explained earlier, an increase in c leads to an increase in the RRP and this then increases the price retailer r charges. Corollary 2c) shows that it is this latter effect that dominates.

We would typically expect the RRP to act as an upper bound on retail prices, for example in the UK book industry virtually all prices are below the RRP. We can therefore show the parameter values such that retailer r sets a price below the RRP. Comparing (26) and (28) retailer r sets $\hat{p} < RRP$ if and only if:

$$c > \frac{(1 - \gamma)(1 - \alpha)}{2 - \gamma(1 - \alpha)} \quad (29)$$

It is clear from (29) that a necessary condition for retailer r 's price to be below the RRP is that $c > 0$. For $c > 0$ this condition is satisfied for all c as either intra-brand competition becomes sufficiently intense ($\gamma \rightarrow 1$) or retailer r has sufficient bargaining power ($\alpha \rightarrow 1$). In addition, for example for $\gamma = 1/2$ and $\alpha = 1/2$ \hat{p} is less than the RRP as long as $c > 0.14$. Therefore, as will be illustrated graphically in the next section, retail prices are below the RRP for a wide range of the possible parameter values. Furthermore, this condition is consistent with the intense post NBA competition in the UK book market following the entry of supermarket and internet retailers with high bargaining power and cost advantages.

5 Comparison between RPM and RRP

Sections 3 and 4 have described the wholesale and retail outcomes when the supplier either sets retail prices under RPM or sets recommended retail prices. We can now compare these two alternative scenarios. Comparing (16) and (26) it can easily be shown that¹²:

¹²This follows from the intuition for Corollary 1 where under RPM the supplier typically sets a retail price below the price \bar{p} that maximizes the bilateral surplus created by the competitive fringe. On the other hand, as explained in the previous section, it is profitable for the supplier to set the RRP which would maximize its disagreement profits from supplying only the fringe and this will be a price of \bar{p} which is equal to (26).

Proposition 1. *The RRP set by the supplier exceeds the price it sets under RPM as long as $c(1 - \alpha) > 0$.*

This confirms that the supplier has an incentive to raise the RRP in order to soften retail market competitive and increase the wholesale price it can charge. Furthermore, it suggests that retail prices may increase if RPM is replaced by RRPs. Under RRPs, the competitive fringe charges a price equal to the recommended price. Therefore, it immediately follows from Proposition 1 that consumers buying from the fringe pay a higher price under RRPs than under RPM. However, the overall impact on retail prices of moving from RPM to RRPs will also depend upon the price paid by consumers buying from retailer r . Comparing (28) and (16) retailer r also charges a price above the price under RPM (i.e. $\hat{p} > p^{RPM}$) if:

$$c < \frac{(2 - \alpha + \gamma\alpha)(1 - \gamma)(1 - \alpha)}{2 + 2\alpha\gamma - \gamma(1 - \alpha)(2 - \alpha + \gamma\alpha)} \quad (30)$$

This condition is clearly satisfied for all c if $\alpha = 0$, therefore:

Proposition 2. *All consumers pay higher prices under RRPs than under RPM if the bargaining power of the supplier is sufficiently high (low α).*

Furthermore, comparing the conditions in (29) and (30) shows that:

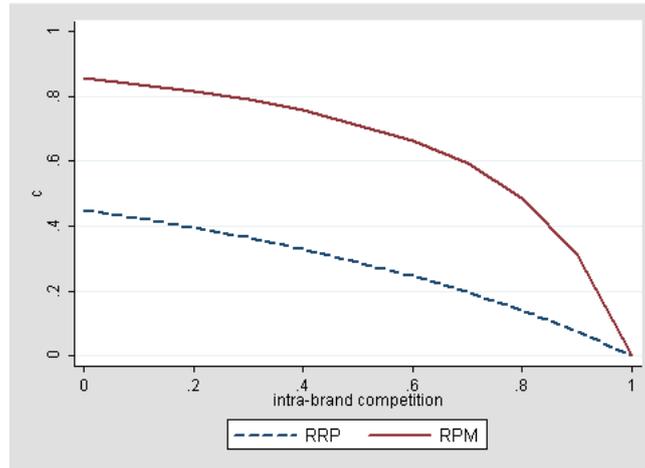
Corollary 3. *There exists a range of parameter values such that the price charged by retailer r under RRPs (\hat{p}) is: $p^{RPM} < \hat{p} < RRP$.*

Proof: First, note that from (29) $\hat{p} < RRP$ for all $c > 0$ as $\gamma \rightarrow 1$. Second, from (30) $\hat{p} > p^{RPM}$ for all levels of γ and c as $\alpha \rightarrow 0$. It therefore follows that the condition in the corollary will be satisfied as long as the bargaining power of retailer r (α) is sufficiently low and intra-brand competition is sufficiently intense (high γ). ■

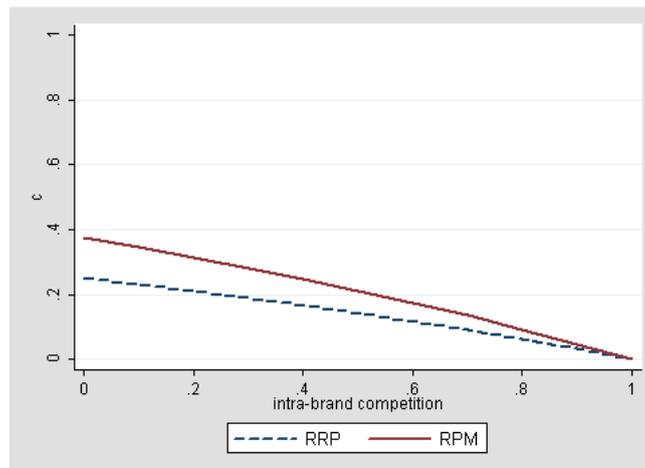
Corollary 3 confirms that it is possible that retailer r charges a price higher than it would under RPM despite offering a discount on the RRP set by the supplier. Therefore, for a given level of retailer bargaining power (α), Figure 1 shows the range of parameter values for which this is the case. Corollaries 1 and 2 show that \hat{p} will exceed p^{RPM} when γ is sufficient low

whereas (29) shows that it will be below the RRP when γ is sufficient high. Therefore, $\hat{p} > p^{RPM}$ in the area below the solid line and $\hat{p} < RRP$ above the dashed line.

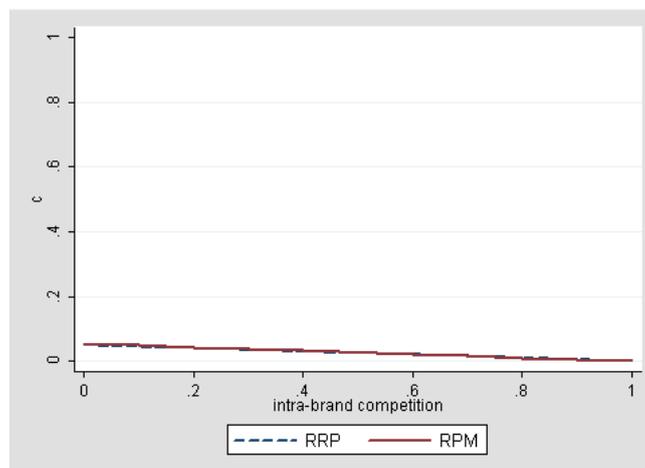
Figure 1: The range of parameter values such that retailer r prices below the RRP but above the price it would charge under RPM



(a) Retailer r **low** bargaining power ($\alpha = 0.1$)



(b) Retailer r **medium** bargaining power ($\alpha = 0.5$)



(c) Retailer r **high** bargaining power ($\alpha = 0.9$)

Comparing the three figures shows the important impact retailer bargaining power has on prices. When retailer r 's bargaining power is very high (Figure 1c) it almost always prices below the RRP and, as suggested by Corollaries 1 and 2, this price will also be lower than under RPM. On the other hand, Figures 1a) and b) show that when retailer bargaining power is sufficiently low there are a relatively wide range of parameter values such that retailer r prices below the RRP but above the price it would charge under RPM. This will be the case as intra-brand competition becomes less intense and the competitive fringe has a moderate cost disadvantage.

Corollary 3 underestimates the likelihood that a move from RPM to RRP results in higher retail prices because, even if $\hat{p} < p^{RPM}$, as long as $c > 0$ consumers buying from the fringe are still harmed. To illustrate this, Figure 2 compares the average price per unit under RPM and RRP when $\alpha = 0.5$ and $c = 0.3$.

Figure 2: Average price per unit under RPM and RRP ($\alpha = 0.5$ and $c = 0.3$)

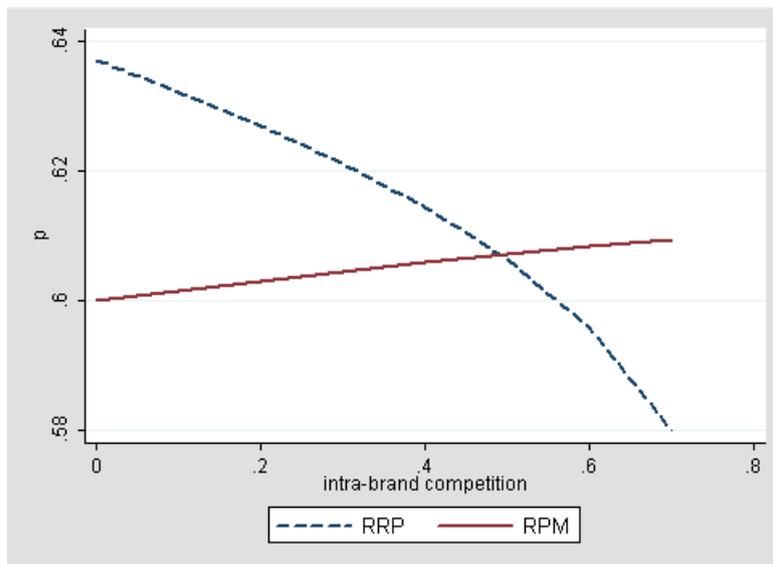


Figure 2 shows that in this case the average price per unit is higher under RRP until γ is equal to 0.5. On the other hand, from Figure 1b) we can see that for $c = 0.3$ retailer r 's price is lower under RRP than it would be under

RPM if $\gamma > 0$. Therefore, for $0.2 < \gamma < 0.5$ the benefits of ending RPM for consumers buying from retailer r are offset by the higher prices paid by consumers buying from the fringe. This therefore, considerably extends the result from Corollary 3.

Finally, we can also consider the impact replacing RPM with RRP has on the competitive fringe. It can be shown that:

Proposition 3. *Under RRP, the competitive fringe's output declines as the supplier increases the RRP.*

Proof: *see Appendix B.*

Proposition 3 confirms that the supplier raising the RRP to soften retail competition has a detrimental effect on the fringe. This is also consistent with the evidence from the UK following the abolition of the NBA where low cost internet and supermarket entrants with high bargaining power rapidly gained market share at the expense of the established bricks and mortar retailers (see OFT, 2008).

6 Conclusion

This paper has introduced RRP into a bargaining framework and evaluated the resulting impact on retail market competition. We have shown that the supplier has an incentive to set the RRP above the price it would charge under RPM. In addition, even if discounts on the RRP are offered, retail prices may still exceed those under RPM. This may therefore provide an explanation for the evidence, discussed in the introduction, suggesting that book prices in the UK rose following the ending of RPM.

However, the results of the model do not show that the RRP can be increased to compensate the supplier for increased retailer bargaining power. Furthermore, it has been shown that prices under RRP will exceed those under RPM only when retailer bargaining power is sufficiently low. This is because under RRP as retailer bargaining power increases lower wholesale prices can be negotiated and, if intra-brand competition is sufficiently intense, will be passed on to the consumer via lower retail prices. A similar

effect occurs in the Dobson and Waterson (2007) and therefore they demonstrate that RPM may be preferred to free-pricing if the latter would result in considerable double marginalisation due to high transfer prices and retail mark-ups. As explained in the introduction, this will also be the case if retailer bargaining power and intra-brand competition are sufficiently low. Our model has shown that the RRP may be raised in order to dampen competition. This therefore suggests that higher prices may be expected when free-pricing is accompanied by a RRP.

Whilst the model in this paper has been closely tailored to the book industry this competition dampening effect will apply to RRPs more generally. Therefore, our findings may well apply to the wide range of industries in which suppliers set recommended prices (see section 1). Furthermore, the results show that, even if RPM is prohibited, suppliers may be able to use RRPs as a less direct means of influencing competition in the retail market. This may therefore reduce the likelihood that removing RPM increases competition.

The model developed in this paper has demonstrated the significant impact RRPs can have on the bargaining process between suppliers and retailers. However, a related literature examines the possibility that RRPs act as a reference price and therefore impact on consumer demand. Reference price effects have been introduced into a model of consumer choice by Putler (1992) and more recently Zhou (2010) has demonstrated the impact such effects can have on competition. In addition, the experimental results in OFT (2010) suggest that reference prices can influence consumer search behaviour. Such demand-side effects could be introduced in to the model by allowing demand to not only depend on retail prices but also on the level of prices relative to the RRP. Increasing the RRP could then potentially raise the level of demand for the product. This would then potentially provide the supplier with an additional incentive to raise the RRP. Extending the model in this way would then also enable comparisons to be made with an alternative free-pricing scenario where in contrast the consumer has no reference price.

An additional natural extension would be the introduction of inter-brand

competition between suppliers. Under RPM, as Dobson and Waterson (2007) demonstrate, this results in lower retail prices. We would expect inter-brand competition to have a similar effect under RRPs and therefore, at least to some extent, counteract the retail competition dampening and possible demand-side incentives for the supplier to raise the RRP.

Appendices

A Proof of Corollary 1

From (16) the price set by the supplier under RPM is:

$$p^{RPM} = \frac{2 - \alpha + \gamma\alpha + c(1 + \alpha\gamma)}{2(2 - \alpha + \gamma\alpha)}$$

Denoting $X = 2 - \alpha + \gamma\alpha$

a)

$$\partial p^{RPM} / \partial \alpha = \frac{(-1 + \gamma + c\gamma)2X - 2(X + c(1 + \alpha\gamma))(-1 + \gamma)}{4X^2} \quad (\text{A.1})$$

Simplifying (A.1) gives

$$\partial p^{RPM} / \partial \alpha = \frac{2((X - 1 - \alpha\gamma)c\gamma + c(1 + \alpha\gamma))}{4X^2} \quad (\text{A.2})$$

Substituting in for X in the numerator of (A.2) and simplifying gives

$$\partial p^{RPM} / \partial \alpha = \frac{2((1 - \alpha)c\gamma + c(1 + \alpha\gamma))}{4X^2} > 0$$

b)

$$\partial p^{RPM} / \partial \gamma = \frac{\alpha(1 + c)2X - (X + c(1 + \alpha\gamma))2\alpha}{4X^2} \quad (\text{A.3})$$

Simplifying (A.3) gives

$$\partial p^{RPM} / \partial \gamma = \frac{X - 1 - \alpha\gamma(2\alpha c)}{4X^2} \quad (\text{A.4})$$

Substituting in for X in the numerator of (A.4) and simplifying gives

$$\partial p^{RPM} / \partial \gamma = \frac{(1 - \alpha)2\alpha c}{4X^2}$$

which is positive for all $0 < \alpha < 1$.

c)

$$\partial p^{RPM} / \partial c = \frac{1 + \alpha\gamma}{4X^2} > 0$$

■

B Proof of Proposition 3

From (21) the output of the competitive fringe under RRP is given by:

$$Q_f = \frac{2 - \gamma(1 + \gamma) - RRP(2 - \gamma^2) + \gamma w_r}{2(1 - \gamma^2)}$$

This shows that the direct effect of the RRP on Q_f is negative. However, Q_f is also increasing in the wholesale price of retailer r and from (24) this is increasing in the RRP. Substituting in for w_r^{RRP} from (24) and rearranging gives

$$Q_f = \frac{4 - 2\gamma(1 + \gamma) + \gamma(1 - \gamma)(1 - \alpha) - c\gamma^2(1 + \alpha) - 4(1 - \gamma^2) RRP}{4(1 - \gamma^2)}$$

This is clearly decreasing in the RRP, showing that it is the latter effect that dominates. ■

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