Discussion paper

Resale Price Maintenance and Restrictions on Dominant Firm and Industry-Wide Adoption

BY
ØYSTEIN FOROS, HANS JARLE KIND, AND GREG SHAFFER

This series consists of papers with limited circulation, intended to stimulate discussion.

Resale Price Maintenance and Restrictions on Dominant Firm and Industry-Wide Adoption

Øystein Foros

Norwegian School of Economics and Business Administration

oystein.foros@nhh.no

Hans Jarle Kind

Norwegian School of Economics and Business Administration and CESifo

hans.kind@nhh.no

Greg Shaffer

Simon School of Business, University of Rochester

shaffer@simon.rochester.edu

Abstract: This paper examines the use of market-share thresholds (safe harbors) in evaluating whether a given vertical practice should be challenged. Such thresholds are typically found in vertical restraints guidelines (e.g., the 2000 Guidelines for the European Commission and the 1985 Guidelines for the U.S. Department of Justice). We consider a model of resale price maintenance (RPM) in which firms employ RPM to dampen downstream price competition. In this model, we find that restrictions on the use of RPM by a dominant firm can be welfare improving, but restrictions on the extent of the market that can be covered by RPM (i.e., the pervasiveness of the practice among firms in the industry) may lead to lower welfare and higher consumer prices than under a laissez-faire policy. Our results thus call into question the indiscriminate use of market-share thresholds in vertical cases.

...the court has steadily backed away from a categorical view of antitrust liability and is highly likely to ... [do] ... the same for resale price maintenance.

New York Times (7 December, 2006) on the U.S. Supreme Court's decision to examine the nearly one-hundred year old per se ban on RPM.

1   Introduction

The U.S. Supreme Court recently agreed to revisit the nearly one-hundred year old *per se* ban on resale price maintenance (a practice in which control over retail prices is given to the manufacturer). Unlike many other vertical restraints, resale price maintenance (RPM) is considered *per se* illegal in the United States (and in many other countries), but the definition of what constitutes RPM has been narrowing and no longer encompasses the use of vertical price ceilings.[1] Vertical price floors, and cases in which manufacturers fix retail prices, however, continue to be banned, and the question before the Court is whether a small firm's use of such restraints, and the likely economic effects of these restraints, warrants such harsh treatment.

The majority of non-price vertical restraints are judged under a rule-of-reason standard,[2] and many, perhaps most, economists believe that RPM should be treated similarly. In addition to concerns about the use of RPM to facilitate cartels and dampen competition, it is well-known that RPM can also have efficiency benefits (see, for example, Telser, 1960; Marvel and McCafferty, 1984; Mathewson and Winter, 1984; Winter, 1993; and Perry and Besanko, 1991). For a broad overview of the two sides, see Overstreet (1983).

A full-blown rule-of-reason approach would seek to assess and compare the efficiency and anticompetitive considerations (both in magnitude and in likelihood) on a case-by-case basis. This is potentially very costly in terms of time and resources, however, and so in practice, in evaluating whether or not a particular vertical re-

---

[1]See, for example, Dr. Miles v. Park & Sons, 1911, and the subsequent narrowing of the scope of RPM in Monsanto v. Spray Rite, 1984, Business Electronics v. Sharp Electronics, 1988, and State Oil v. Khan, 1997. In the latter case, the Court lifted the *per se* ban on price ceilings.

[2]See, for example, the Court's decision in Continental TV v. GTE Sylvania, 1977.

1

straint should be challenged, the courts and the competition authorities typically use a more structured rule-of-reason approach in which individual firm and industry 'safe harbors' are established. If adoption of the practice by a firm is found to fall within these safe harbors, the practice at hand is not challenged, whereas if adoption is found to fall outside these safe harbors, the practice receives greater scrutiny.

One such safe harbor typically concerns the market share of the firm that is adopting a given practice, and another typically looks at the pervasiveness of the practice in the relevant market. See, for example, the vertical-restraints guidelines that influenced the U.S. Department of Justice's thinking for many years.[3] According to these guidelines, the practice would not be challenged if, among other things, industry-wide adoption of the practice accounted for less than 60% of the relevant market and the firm employing the restraint had a market share of 10% or less.[4]

The guidelines used today in Europe have a similar flavor. In particular, the European Commission's vertical-restraints guidelines offer a block exemption for vertical restraints used by firms with a market-share below 30%, but, at the same time, it states (para 80) that "Article 8 of the Block Exemption Regulation enables the Commission to exclude from the scope of the Block Exemption Regulation, by means of regulation, parallel networks of similar vertical restraints where these cover more than 50% of the relevant market." Beyond these safe harbors, a rule-of-reason approach is applied to determine whether a given restraint should be challenged.

The main approach used within both the EU and (at least tacitly) in the United States is thus that vertical restraints only raise concerns when they are adopted by firms that enjoy sufficient market power or where the practice is pervasive in the relevant market. Not surprisingly, therefore, in the instant case where the Supreme

---

[3]The DOJ's vertical-restraints guidelines were issued in 1985 in order to reduce the business uncertainty associated with antitrust enforcement in this area. However, they immediately met opposition from Congress, which felt that they were a thinly veiled attempt to treat price and non-price restraints alike, and were rescinded in 1993 because of the administration's perception that they were to quick to "... discount the anti-competitive potential of vertical intrabrand restraints and so easily to assume their efficiency-enhancing potential as to predetermine the conclusion against enforcement action in almost every case (www.usdoj.gov/atr/public/speeches/0867.htm)."

[4]Taken from the DOJ's 1985 vertical-restraints guidelines, section 4.1.

Court examines the *per se* ban on RPM, it is alleged that the manufacturer is small, has no market power, and operates in an environment in which RPM is not pervasive and in which the market is competitive. Furthermore, it is alleged that conditions are such that the manufacturer is well within traditionally recognized safe harbors.

In this paper, we examine the use of safe harbors (and in particular the market-share thresholds that are behind them) when evaluating whether or not a given vertical practice should be challenged. We do so in a model in which firms unilaterally choose whether to employ RPM as a possible strategy to dampen price competition, *a la* Shaffer (1991). We solve for the equilibrium outcome of the model with respect to welfare and consumer prices in the absence of any restrictions on the use of RPM and compare it to the equilibrium outcome that would arise in a world in which the courts and the competition authorities impose safe harbors. We consider two types of safe harbors. The first concerns restrictions on the adoption of RPM by dominant firms. The second concerns restrictions on industry-wide adoption.

We find that restrictions on the use of RPM by a dominant firm can be welfare improving. With such restrictions, policy makers can choose among multiple equilibria to induce more favorable outcomes (lower prices for consumers). Surprisingly, however, even though there are no efficiency gains from the use of RPM, restrictions on the extent to which RPM may be adopted industry-wide may lead to lower welfare and higher consumer prices than a laissez-faire policy. Using the thresholds on industry-wide adoption established in both the U.S. and EC's guidelines, for example, we find that welfare would be unambiguously lower under the guidelines. Our results thus call into question the indiscriminate use of such share-based thresholds.

In the model, RPM allows each retailer-manufacturer pair to be a Stackelberg leader relative to all retailer-manufacturer pairs that do not adopt RPM. This results in an equilibrium in which all or all but one of the firms will agree to an RPM contract, as each attempts to be a leader. With restrictions on the use of RPM by a dominant firm, policy makers are able to ensure that the dominant firm is a follower – not a leader – and this results in lower prices to consumers. On the other hand, restrictions on the number of firms that are allowed to adopt RPM do not fare as well. With approximately half the firms as leaders, and the other half

as followers, price increases to consumers are magnified, resulting in overall higher prices to consumers than there would have been in the absence of any constraints.

The model focuses on anticompetitive motives for adopting RPM, but allowing for efficiencies only strengthens our qualitative conclusions. If firms are adopting RPM for efficiency reasons, then any restrictions on the usage of RPM may lower welfare. Hence, whether RPM is used for efficiency reasons, or for the anticompetitive reasons we model, strict enforcement of safe harbor provisions on industry-wide adoption of RPM may result in lower welfare and higher prices to consumers.

The rest of the paper proceeds as follows. In Section 2, we describe the model and solve for the equilibrium outcomes without restrictions on the adoption of RPM. In Section 3, we analyze the welfare and price effects of limiting industry-wide adoption of RPM. In Section 4, we examine the welfare and price effects of prohibiting the adoption of RPM by dominant firms. In Section 5, we offer concluding remarks.

2 The Model

We consider a market structure in which $n \geq 2$ differentiated retailers buy a homogenous input from a manufacturing sector that is perfectly competitive. The upstream firms' marginal costs are equal to $c \geq 0$, and one unit of input is needed to produce one unit of output. For simplicity, we set the retailers' marginal costs to zero. We assume consumers have heterogeneous preferences over where to shop.

The game has the following structure: wholesale contracts are determined in stage 1 and retail prices are chosen in stage 2. We assume that in stage 1 a large number of identical manufacturers non-cooperatively offer to sell their inputs under one of two types of contracts: a contract that specifies a unit wholesale price only, or a contract that specifies a unit wholesale price and an end-user price (RPM). In stage 2 retailers who have not entered into an RPM contract compete in setting prices, while the remaining retailers choose the RPM prices determined in stage 1.[5]

---

[5]At this point, it is helpful to think of the RPM prices as fixed. In equilibrium, it will become apparent that price floors work equally well. We abstract for simplicity from contract enforcement issues (i.e, if a retailer ignores the RPM price specified in its first-stage contract, it is subject to a

4

This set-up is similar to that in Shaffer (1991), except that here we consider a retail oligopoly instead of a retail duopoly (i.e., we allow for $n > 2$). As in his model, the key insight that drives the results is that retailers who choose an RPM contract in stage one become price leaders (l), while the remaining retailers become price followers (f).[6] We assume players have perfect knowledge of how their actions affect actions in all succeeding stages, and all information is common knowledge.

Let retailers 1 through m be the leaders and retailers $m + 1$ through n be the followers. In any equilibrium with m leaders, neither the leaders nor the followers have incentives to deviate. We use subgame perfection as our solution concept.

The demand curve faced by downstream firm $i = 1, ..., n$ is given by $D^i(\mathbf{p})$, where $\mathbf{p}$ is the vector of prices charged by the n downstream firms. The demand function $D^i(\mathbf{p})$ is assumed to satisfy the usual properties in partial equilibrium analysis:

$$D_i^i < 0, \quad D_j^i > 0, \quad D_{ij}^i \geq 0 \quad D_i^j < -D_i^i \quad i, j = 1, ... n., \ i \neq j \qquad (1)$$

Superscripts above the demand functions indicate the retailer, while subscripts indicate partial derivatives with respect to retail prices. Condition (1) implies that the products are imperfect substitutes and that the marginal demand effect of a price change by firm i is (weakly) increasing in the price of firm j. Thus, condition (1) ensures that prices are strategic complements, as defined in Bulow et al (1985).

The profit level of retailer i is

$$\pi_i = (p_i - w_i)D^i(\mathbf{p}), \qquad (2)$$

where p_i is retailer i's retail price, and w_i is the unit wholesale price of the manufacturer serving retailer i. The profit level of the corresponding manufacturer is

$$\pi_i^M = (w_i - c)D^i(\mathbf{p}). \qquad (3)$$

---

prohibitively large penalty payable to the manufacturer). We also implicitly assume that contracts signed in stage one cannot be renegotiated in stage two, after rivals' contract choices are observed.

[6]This idea is based on the strategic delegation literature, where the seminal paper is Fershtman and Judd (1987). Shaffer (1991) compares slotting allowances and RPM and shows that both may be used to dampen competition if it is the retailers - not the suppliers - who have the bargaining power. Gal-Or (1991), Bonanno and Vickers (1988) and Rey and Stiglitz (1988, 1995) build on the same framework, but they assume that the bargaining power is in the hands of the suppliers. See also Jansen (2003), Corts and Neher (2003), Moner-Colonques et al. (2004), and Innes (2006).

In solving the game, it is useful to make two preliminary observations. First, competition among the manufacturers to gain retail access implies that the manufacturers' participation constraints will be binding ($\pi_i^M = 0$) for both types of contracts (see Shaffer, 1991). Thus, it follows that $w_i = c_i$ in any equilibrium.[7] Second, competition among the manufacturers also implies that, in any equilibrium in which retailer i has an RPM contract, retailer i's price maximizes its profit given the other leaders' prices and knowing the effects of the leaders' prices on the prices to be set by the followers. Thus, in any equilibrium, retailer i's RPM price solves

$$\arg \max_{p_i} \ (p_i - w_i) D^i(p_1^l, ..., p_i...., p_m^l, p_{m+1}^f, ..., p_n^f),$$

where the superscript l denotes a leader's price and f denotes a follower's price.

Regarding the choice of contracts, we prove the following result in the Appendix:

Proposition 1: *There are n subgame-perfect equilibria with $m^* = n - 1$ leaders, and one subgame-perfect equilibrium with $m^* = n$ leaders.*

To see the intuition for Proposition 1, and why there are no other subgame-perfect Nash equilibria, suppose that the number of leaders is equal to

• zero ($m = 0$). In this case we have a pure Bertrand game. If one firm deviates and chooses an RPM contract ($m = 1$), she will *de facto* become a Stackelberg leader. It is well known that the profit level of a Stackelberg leader is higher than the profit level of a firm in a simultaneous Bertrand game with differentiated products. The reason for this is that she as a Stackelberg leader can pick the profit-maximizing retail price given the rivals' reaction functions (while she has no reaction functions to utilize in a pure Bertrand game). Therefore $m = 0$ cannot be an equilibrium.

• $m < n - 1$ (so that there are $n - m$ followers). The prices of the m firms that have signed an RPM contract are essentially exogenous at stage two. Given the RPM prices of these m firms, would one of the followers have an incentive to deviate and sign an RPM contract instead? The answer is yes, for the same reason as

---

[7]If negative fixed fees (i.e., slotting allowances) are feasible, then, as in Shaffer (1991), we would have $w_i > c$ in some equilibria. However, if wholesale prices are unobservable, so that they cannot be used to dampen competition, then $w_i = c$ in all equilibria whether or not fixed fees are feasible.

above: as a Stackelberg leader she can pick the optimal retail price on the $n-m-1$ followers' reaction functions.[8] Consequently, $m < n-1$ cannot be an equilibrium.

- $m = n-1$. In this case there is only one price follower, while the rest of the retailers are price leaders. The follower will therefore have nothing to gain by becoming a leader herself, since there does not exist any other follower (and thus no reaction function to exploit). Also, none of the leaders have anything to gain by becoming a follower because each would then lose the opportunity to affect the other follower's reaction function. Thus, $m = n-1$ is an equilibrium.

- $m = n$. No retailer can gain by becoming a follower when all the other firms are leaders with predetermined prices. It follows that $m = n$ is an equilibrium.

We thus have multiple equilibria: there are n subgame-perfect equilibria with $n-1$ leaders (where the equilibria are distinguished by which firm is the follower), and one subgame-perfect equilibrium in which all firms are (or try to be) leaders. Note that the case of $m = n$ means that all firms have committed in stage 1 to an RPM contract that effectively fixes their retail prices in stage 2. When this happens, all firms are *de facto* choosing prices simultaneously (albeit in stage one instead of in stage two), and hence, the equilibrium in which all firms are leaders ($m^* = n$) leads to the same prices and profits that would arise in an n-firm Bertrand pricing game in which all firms are followers ($m = 0$). This observation will prove useful in what follows because although the case of $m = 0$ does not arise in a free-market equilibrium, it would arise, for example, if there were a general ban towards RPM.

Note also that prices and profits are higher in a Stackelberg game with leaders and followers than in a Bertrand game in which n firms simultaneously choose prices, and that this holds for all n equilibria with $n-1$ leaders. Thus, we have that all retailers (the leaders as well as the follower) will have higher prices and profits in all equilibria with $m^* = n-1$ leaders compared to the equilibrium where $m^* = n$. As a consequence, the deadweight loss will be lower when $m^* = n$.

Let welfare (W) be the sum of consumer surplus and profits. Let $W_{m=0}$ denote welfare in the subgame in which no firm has RPM, $W_{m=n}$ denote welfare in the

---

[8]By the same logic, none of the price leaders would prefer to become a price follower.

subgame in which all n firms have RPM, and $W_{m=j}$ denote welfare in the remaining subgames in which j firms have RPM, $j \in \{1, ..., n-1\}$. Then, our results imply:

Proposition 2: *Welfare is highest in the equilibrium in which $m^* = n$. More generally, we have $W_{m=0} = W_{m=n} > W_{m=j}$, for all $j \in \{1, ..., n-1\}$.*

The negative welfare effect from reaching an equilibrium where $m^* = n - 1$ rather than $m^* = n$ is significant if the number of the firms in the industry is low (the equilibrium $m^* = n - 1$ results in a welfare minimum if $n = 2$, as shown by Shaffer, 1991). However, the difference in welfare between $m^* = n$ and $m^* = n - 1$ is smaller the larger is the number of retailers. This relationship will be analyzed more below, where we also discuss how the welfare effects of RPM - and of a policy which restricts its use - depend on how close horizontal substitutes the retailers are.

3   Restrictions on Industry-Wide Adoption

The guidelines mentioned in the introduction consider safe harbors when evaluating the likely welfare effects of a given vertical practice. These safe harbors are meant to provide policy makers with a short-cut to better decision making. One such safe harbor concerns the pervasiveness of the practice in the relevant market, and it is typically specified in percentage terms, e.g., the use of RPM by a firm will be scrutinized if more than 50% of the market is already covered. Unfortunately, when retailers differ in size, a cap on the percentage share of sales in a given market that can be covered by RPM does not easily translate into a prescription of how many firms can adopt the practice before it receives scrutiny. To simplify, we therefore specialize now to the case in which all n retailers are ex-ante symmetric.

When retailers are ex-ante symmetric, the number of firms that can safely adopt RPM without scrutiny is approximately n times the market-share threshold used in the guidelines.[9] Let k denote the largest integer which is less than or equal to this number. Two polar cases are worth noting. Under a policy of laissez faire, all firms

---

[9] It is approximate because the prices of the leaders will in general be higher than the prices of the followers, thus causing each leader's share to be somewhat smaller than each follower's share.

are allowed to adopt RPM, and the market-share threshold is effectively 100%. In this case, $k = n$. On the other hand, if all instances of RPM are subject to scrutiny, then $k = 0$, and the threshold is 0%. This corresponds to a per-se prohibition if it effectively implies that no firm can adopt RPM. For all other cases, $k \in \{1, ..., n-1\}$.

We make the following additional assumption. Given that RPM has no efficiency justification in our model, we assume that if it is subjected to scrutiny (so that all the pros and cons are considered), a firm's adoption of RPM will be challenged. Hence, it follows that k is the upper bound on the number of firms in the market that may adopt RPM. Using Proposition 1, we then have the following result:

Proposition 3: *Under a safe harbor threshold of k, the number of leaders in any subgame-perfect Nash equilibrium is $m^* = k$ for all $k \in \{0, ..., n - 1\}$. For the unconstrained case, $k = n$, the set of equilibria is the same as in Proposition 1.*

To see this, note that by assumption the number of leaders in equilibrium cannot exceed k, and the number of leaders cannot be less than k, when $k < n - 1$, as per the proof of Proposition 1. Hence, k effectively provides both an upper and lower bound on the equilibrium number of firms that may adopt RPM when $k < n - 1$.

Two results immediately follow from Propositions 2 and 3:

Corollary 1:
(1) Welfare is maximized when $k = 0$ (or, equivalently, when RPM is per se illegal). (2) There exists an equilibrium under laissez faire ($k = n$) that yields strictly higher welfare than in any subgame-perfect Nash equilibrium with $0 < k < n$ leaders.

The results in (1) and (2) are seemingly contradictory. The fact that welfare is maximized when $k = 0$, or, equivalently, when RPM is prohibited *per se*, is not surprising because our model does not allow for efficiencies. But, given that RPM is used to dampen competition, it would seem that a policy of limiting the scope of coverage, while not first best, would still be better than doing nothing. As Corollary 1 implies, however, this need not be true. Welfare under a laissez faire policy may be strictly higher than welfare under even the most judiciously chosen safe harbor.

The intuition is that even though RPM is anticompetitive in the sense that each firm is seeking to dampen competition, competitive forces alone may suffice to minimize the overall impact, and in the case of $m^* = n$, render it harmless. By imposing safe harbors in these circumstances, authorities may risk interfering with these forces.

Of course, depending on how $W_{m=k}$ compares to $W_{m=n-1}$, it is also possible that the imposition of safe harbors may improve welfare. To consider this possibility, it is necessary to impose additional structure by specifying a functional form of demand. We use the following Shubik-Levitan (1980) utility function:

$$U(q_1.., q_i, .., q_n) = v \sum_{i=1}^{n} q_i - \frac{n}{2} \left[(1-b) \sum_{i=1}^{n} q_i^2 + \frac{b}{n} \left(\sum_{i=1}^{n} q_i \right)^2 \right]. \tag{4}$$

The parameter $v > 0$ in this utility function is a measure of the market potential, $q_i \geq 0$ is the quantity from retailer i, and $n \geq 2$ is the number of retailers. The parameter $b \in [0, 1]$ is a measure of how differentiated the retailers are; they are completely independent and have monopoly power if $b = 0$, while the consumers perceive them to be identical if $b = 1$. More generally, the retailers are closer substitutes from the consumers' point of view the higher is b. The merit of using this particular utility function is that the size of the market does not vary with b or n.[10]

Solving $\partial U / \partial q_i - p_i = 0$ for $i = 1, ..., n$, we find

$$q_i = \frac{1}{n} \left(v - \frac{p_i}{1-b} + \frac{b}{1-b} \bar{p} \right), \tag{5}$$

where $\bar{p} = \frac{1}{n} \sum_{j=1}^{n} p_j$. The demand function facing retailer i is thus a linear combination of his own price p_i and the average price, $\bar{p}$. Total demand equals $Q = \sum_{i=1}^{n} q_i = v - \bar{p}$.

As before we assume that m retailers are leaders, while $n - m$ retailers are followers. For the sake of simplicity, we let $c = 0$. In stage 2 any followers set p_i^f.

---

[10]Others using the Shubik-Levitan framework include Motta (2004), who applies the Shubik-Levitan utility function in several models in order to analyze vertical restraints and other competition policy issues; Shaffer (1991), who uses a similar framework in his welfare analysis of slotting allowances and RPM under a retail duopoly; and Deneckere and Davidson (1985), who use the Shubik-Levitan demand system when they analyze the merger incentives of price-setting firms.

Solving $\partial \pi_i^f / \partial p_i^f = 0$ and then imposing symmetry, we find:

$$\widehat{p}^f = \frac{v(1-b)n}{n(2-b) + b(m-1)} + \frac{b}{n(2-b) + b(m-1)} \sum_{j=1}^{m} p_j^l. \tag{6}$$

Since the manufacturers' participation constraints are binding, they will effectively maximize the leaders' profits when they choose the RPM prices at stage 1. Solving the first-order conditions for the leaders $(\partial \pi_i^l / \partial p_i^l = 0)$, subject to the followers' reaction functions from equation (6), and then imposing symmetry, we find:

$$p^l = \frac{vn(2n-b)(1-b)}{b^2(1+m) + 2[n^2(2-b) - 2bn]}. \tag{7}$$

An explicit expression for the price charged by the followers can be found by inserting (7) into (6). It is then easily verified that we get the standard result that the leaders charge higher prices than the followers $(p^l > p^f)$ for all $b \in (0,1)$. It can further be verified that there is a humped-shaped relationship between the average consumer price $\bar{p}$ and m. The intuition for this is clear; for low values of m we have $d\bar{p}/dm > 0$, since we then move away from the pure Bertrand equilibrium. However, as $m \to n$ we again approach the pure Bertrand equilibrium, so that $d\bar{p}/dm < 0$.

Above we defined welfare as the sum of consumer surplus and profits, where $CS = U - \sum_i^n p_i q_i$ and $\sum \pi_i = \sum_{i=1}^{n}(p_i - c)q_i$. Since we have set marginal costs equal to zero, welfare is simply equal to consumer surplus net of payment; $W = U$. It is now convenient to express welfare in terms of b and the prices to consumers:

$$W = \phi_1 + \frac{1-b}{2}\phi_2, \tag{8}$$

where

$$\phi_1 = \frac{1}{2}\left(v^2 - \bar{p}^2\right),$$

and

$$\phi_2 = (v - \bar{p})^2 - \left[\frac{m}{n}\left((v - \bar{p}) - \frac{p^l - \bar{p}}{1-b}\right)^2 + \frac{n-m}{n}\left((v - \bar{p}) - \frac{p^f - \bar{p}}{1-b}\right)^2\right].$$

The first term on the right-hand side of equation (8) measures how welfare depends on the average price, $\bar{p}$, while the second term measures how welfare is affected

by the price variations among the retailers. Other things equal, consumers prefer a lower average price (higher ϕ_1) and they prefer that all retailers charge the same price (higher ϕ_2). It is straightforward to show that ϕ_2 is maximized at $\phi_2 = 0$ when $p^l = p^f$. Otherwise, $\phi_2 < 0$. In the Appendix, we further prove the following:

Proposition 4: *Welfare is U-shaped in the number of leaders. Moreover, for all $b \in (0,1)$, there exists $\hat{m}(b) \le n/2$ such that welfare is minimized at $m = \hat{m}(b)$.*

The intuition for this is as follows. The average price to consumers is first increasing and then decreasing in m, as was established earlier. This effect alone implies that welfare is first decreasing and then increasing in the number of leaders. In addition, the gap between p^l and p^f is decreasing in m, as would be expected given that the leaders are becoming less concentrated and the followers are becoming more concentrated. This effect alone implies that welfare is always increasing in m. Thus, for large enough m, both effects go in the same direction and welfare is strictly increasing. The proposition follows on noting that the average price to consumers is already decreasing at $m = n/2$. This result has implications for public policy:

Corollary 2: *A public policy that reduces the number of firms with RPM below the laissez-faire equilibrium reduces welfare if the safe harbor threshold is at or above $n/2$. In this interval, $W_{m=k} < W_{m=k'} < W_{m=n-1} < W_{m=n}$ for feasible k, k', $k' > k$.*

We know from Proposition 3 that under a safe-harbor threshold of $k \le n-1$, the number of leaders in any subgame-perfect Nash equilibrium is $m^* = k$. Moreover, we know from Proposition 4 that welfare is increasing in m for all $m \ge n/2$. Hence, it follows that for all $k \in [n/2, n-1]$, welfare is increasing in k. Consequently, a government policy that has a safe-harbor threshold close to $k = n-1$ does well, and as we shall see, for large n, it does almost as well as a policy with $k = 0$ or $k = n$.

How would conventional guidelines fare? In the case of the 1985 U.S. vertical-restraints guidelines, the safe-harbor threshold for industry-wide adoption is 60%. In the case of the EC's vertical restraints guidelines, the safe-harbor threshold for industry-wide adoption is 50% (see the discussion in the introduction). Thus, by Corollary 2, the U.S. guidelines would fare somewhat better at inducing higher

welfare in this industry (by allowing for a wider RPM coverage in the relevant market). However, in both cases the safe-harbor thresholds, and the restrictions they imply for industry-wide adoption, would fall well short of maximizing welfare.

In Figure 1 below we provide a numerical example of a safe-harbor restriction that prevents more than 50% of the firms from using RPM; i.e. $m \leq n/2$. From the analysis above we know that the restriction will be binding, such that $m = n/2$. Let us define $WL \equiv (W_{m=n} - W_{m=n/2})$ as the welfare loss (WL) from imposing this restriction relative to the pure Bertrand pricing game ($m = n$ or $m = 0$). Figure 1 shows that the welfare loss reaches a maximum when b is approximately 0.7.[11] Figure 1 also makes it clear that the welfare loss from imposing a restriction on industry-wide adoption of RPM is higher the lower the number of retailers.
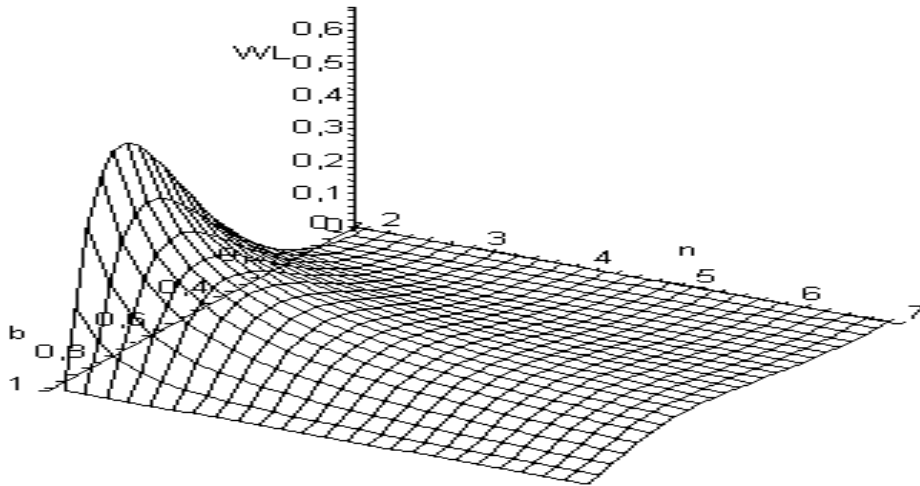

Figure 1: *Welfare loss (WL) when $m = n/2$.*

4 Restrictions on Dominant-Firm Adoption

Proposition 1 stated that under a laissez-faire policy there exist n equilibria where the number of leaders equals $m^* = (n-1)$ and one where $m^* = n$. As discussed above, profits will be lower in the latter equilibrium, since we then have pure

---

[11]In Figure 1 we have assumed that $c = 0$ and $v = 10$.

Bertrand competition. We may therefore expect the firms to coordinate on the equilibria where $m^* = (n-1)$. This is true whether the retailers are intrinsically symmetric or not. Still, it is not immaterial which firm is the follower if the retailers differ in their market potential. From a welfare point of view it may be particularly worrisome if the firm with the greatest market potential (the "dominant firm") is a leader. The reason is that a firm's incentives to set a high price tends to be larger the greater its output (q_k); in our case the marginal profit of a small price increase is simply $d\pi_k/dp_k = q_k + p_k dq_k/dp_k$. As a leader, the dominant firm's relatively high price induces the follower to charge a relatively high price too. This suggests that the average price may be higher if the dominant firm is a leader than if it is a follower. To see this formally, let us modify the utility function in (4) to

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

The larger is v_i, the greater is the market potential of retailer i. We order the retailers such that $v_1 \geq v_2 \geq ... \geq v_n$. Solving $\partial U/\partial q_i - p_i = 0$ for $i = 1, ..., n$ we have

$$q_i = \frac{1}{n(1-b)} \left[v_i - p_i + b(\bar{p} - \bar{v}) \right], \tag{9}$$

where $\bar{p} = \frac{1}{n} \sum_{j=1}^{n} p_j$ (as above) and $\bar{v} = \frac{1}{n} \sum_{j=1}^{n} v_j$.

Suppose first that the firm with the largest market potential, retailer 1, is the follower. Then retailer 1's first-order condition is $\partial \pi_1/\partial p_1 = q_1 + p_1 \partial q_1/\partial p_1 = 0$. Inserting for q_1 from equation (9) this yields retailer 1's profit-maximizing price

$$p_1 = \frac{v_1 + b(\bar{p} - \bar{v})}{2n - b}. \tag{10}$$

In contrast, the first-order condition for retailer j, $j \neq 1$, is

$$\frac{d\pi_j}{dp_j} = q_j + p_j \frac{dq_j}{dp_j} = 0, \tag{11}$$

where

$$\frac{dq_j}{dp_j} = \left(\frac{\partial q_j}{\partial p_j} + \frac{\partial q_j}{\partial p_1} \frac{dp_1}{dp_j} \right). \tag{12}$$

The first term in the bracket on the right-hand side of (12) measures the direct quantity effect for retailer j of increasing her price, which from (9) is $\frac{\partial q_j}{\partial p_j} = -\frac{n-b}{n^2(1-b)} < 0$.

However, there is also an indirect effect; a price increase from retailer j induces the follower to charge a higher price, thus reducing (but not eliminating) the negative quantity effect for retailer j. Using (9) and (10) we find that $\frac{\partial q_j}{\partial p_1} = \frac{b}{n^2(1-b)}$ and $\frac{dp_1}{dp_j} = \frac{b}{2(n-b)}$, respectively. Simplifying, we can thus rewrite the derivative in (12) as

$$\frac{dq_j}{dp_j} = -\frac{2(n-b)^2 - b^2}{2n^2(1-b)(n-b)}p_j. \tag{13}$$

Combining (9), (11) and (13) we can now express the first-order condition for retailer j as

$$v_j - \frac{2n(2n-3b) + b^2}{2n(n-b)}p_j + b(\bar{p} - \bar{v}) = 0. \tag{14}$$

Summing (14) over all leaders, $j = 2, ..., n$, using that $\sum_{j=2}^{n} v_j = n\bar{v} - v_1$ and $\sum_{j=2}^{n} p_j = n\bar{p} - p_1$, and inserting for p_1 from (10) we can write the average price $\bar{p}^{1F}$ (with superscript $1F$ to indicate that retailer 1 is the follower) as

$$\bar{p}^{1F} = \frac{[2n(1-b)(n-b)(2n-b) + b^3]\bar{v} - b^2 v_1}{2(n-b)[2n(2-b) - b(4-b)]n}. \tag{15}$$

If instead retailer d, where $d \neq 1$ is the follower, then the average price is

$$\bar{p}^{dF} = \frac{[2n(1-b)(n-b)(2n-b) + b^3]\bar{v} - b^2 v_d}{2(n-b)[2n(2-b) - b(4-b)]n}. \tag{16}$$

Subtracting (16) from (15) we find that

$$\bar{p}^{1F} - \bar{p}^{dF} = -\frac{b^2}{2(n-b)[2n(2-b) - b(4-b)]n}(v_1 - v_d),$$

which is strictly negative if $v_1 > v_d$. It follows that the average price is lowest if the firm with the greatest market potential is the follower. More generally, we can show that the average price in the market is lower if retailer i is the follower than if retailer d is the follower if and only if $v_i > v_d$. By the same token, it is straightforward to show that the price variation among retailers is increasing in the average price. Thus the price variation is lower if retailer i is the follower than if retailer d is the follower if and only if $v_i > v_d$. In the present case – where $m^* = n - 1$ – welfare is therefore higher when the lone follower has a greater market potential.

Above we have defined welfare in the equilibrium with all firms as leaders, $m^* = n$, as $W_{m^*=n}$. We now define W_{iF}, where $i = 1, ..., n$, as welfare in the equilibrium where $m^* = n - 1$ and retailer i is the follower. Then we have the following result:

Proposition 5: *Suppose retailers differ in their market potential, and order them such that $v_1 \geq v_2 \geq ... \geq v_n$. Then, we have $W_{m^*=n} > W_{1F} \geq W_{2F} \geq ... \geq W_{nF}$, where $W_{iF} > W_{jF}$ if and only if $v_i > v_j$.*

This result has implications for public policy:

Corollary 3: *A public policy that prohibits the dominant firm from using RPM ensures a higher welfare than in any of the other equilibria with $m = n - 1$ leaders.*

It is well known that all firms make a higher profit in a Stackelberg game than in a pure Bertrand game, but that followers are better off than leaders in price games with intrinsically symmetric firms. However, this does not necessarily hold when retailers differ in their market potential. On the contrary, it can be shown that the dominant firm makes higher profits as a leader than as a follower if its market potential is sufficiently larger than those of the other firms. The explanation is precisely that she is best able to ensure high market prices by becoming a leader. One might therefore expect a dominant firm to emerge as the leader in a free market equilibrium. The policy implication is that this may lead to the worst outcome among all equilibria with $m^* = n - 1$ leaders, and thus it may be wise to prohibit this from happening even if there are no restrictions on industry-wide adoption (for instance due to efficiency reasons). However, it should be born in mind that such a prohibition also prevents the equilibrium with $m^* = n$ leaders from being reached.

5 Concluding Remarks

There has been a call from economists, legal scholars, and policy makers in recent years to apply a rule of reason approach toward resale price maintenance (RPM), similar to what is applied for other types of vertical practices. Assuming the Supreme Court agrees, this naturally raises the question of how a rule-of-reason approach should be structured. One possibility is for policy makers to rely on already drafted vertical restraints guidelines in the U.S. and the EU, which establish market-share thresholds (or safe harbors) to indicate when adoption of RPM by a firm might raise concerns.

For the most part, the underlying assumption in these guidelines is that the vertical practice at hand may be used to facilitate tacit collusion. Hence, by limiting the pervasiveness of the practice, and taking it out of the hands of the largest firms, the presumption is that welfare can be improved upon and certainly not worsened.

However, as is well known, tacit collusion is only one possible motivation behind the use of RPM, and in the present paper we analyze its unilateral use to dampen competition. Our main result is that a public policy which prohibits dominant firms from adopting RPM can improve welfare, but a policy that reduces the number of retailers with RPM below the outcome in an unregulated market economy may lower welfare, unless RPM is completely prohibited. To maximize welfare, therefore, either all firms must adopt RPM or no firm can be allowed to use the restraint.

The case at hand is in particular relevant due to the Supreme Court's recent decision (Leegin) to reconsider the *per se* ban on RPM from Dr. Miles (1911). Leegin makes leather products, and in 1997 the firm started to sell their products only to retailers who used Leegin's suggested retail prices. When it was discovered that a retailer sold at a lower price, Leegin stopped the shipments. Thereby Leegin allegedly violated the *per se* ban on RPM. However, on December 6, 2006, the Supreme Court agreed to reconsider the *per se* ban on RPM in the Leegin case. Leegin's advocates emphasize that the case is a perfect vehicle to revisit the general ban on RPM, since Leegin is a manufacturer with no market power and operates in an environment of intensive competition. As a consequence, Leegin's advocates argue that there is no reason to fear that RPM can have anti-competitive effects in this case (Los Angeles Times, 2006). The model in the present paper in fact assumes a perfectly competitive manufacturing industry, but we allow for different levels of competition at the retail level. We show that restrictions on industry-wide adoptions of RPM may have negative welfare effects, unless RPM is completely prohibited.

Our model is highly stylized and does not consider the possibility of efficiencies. Nevertheless, it suggests that indiscriminate use of market-share thresholds as a guide in evaluating vertical cases is unwise. Future research could examine other motivations for RPM and assess the desirability of restrictions on dominant firm and industry-wide adoption. We view our paper as a first step in this research program.

Appendix

Proof of Proposition 1:

First, we will show that equilibria with $m^* = n$ and $m^* = n - 1$ *leaders* exist. Then, we will show that no other equilibria exist.

Consider the case with $m^* = n$ leaders. In order for this to be an equilibrium, no firm can increase its profits by becoming a follower. Since this case has no followers the game becomes a simple Bertrand pricing game. If a firm becomes a follower, its best response will be to charge its Bertrand price and receive the same profits. Therefore, $m^* = n$ leaders is an equilibrium.∎

Now consider the case with $n - 1$ leaders. Again, in order to be an equilibrium, no firm can benefit from changing its strategy. Consider firm m, a leader. She will not want to become a follower. Her first-order conditions as a leader are:

$$(p_m - c)D_m^m(\mathbf{p}) + D^m(\mathbf{p}) + D_n^m(p_m - c) = 0 \tag{17}$$

If a leader became a follower, she would be adding a restriction to her profit maximization problem. As a leader, she could have chosen the price forced by a followers reaction function. Looking at her decision another way, by becoming a follower she would no longer be able to exploit the follower's reaction function.

The first-order conditions as a follower are:

$$(p_m - c)D_m^m(\mathbf{p}) + D^m(\mathbf{p}) = 0 \tag{18}$$

Assume that p_m^f and p_m^l are retailer m's price as a follower and leader, respectively. By evaluating the leader's FOC (17) at p_m^f it follows from the follower's FOC (18) that the first two terms are zero. The last term in (17) is positive, and it therefore profitable to raise the price to p_m^l. Retailer m will remain as a leader.

The follower's (retailer n) first-order conditions as a follower are:

$$(p_n - c)D_n^n(\mathbf{p}) + D^n(\mathbf{p}) = 0 \tag{19}$$

Both prices and profits are independent of the choice of strategy, and retailer n will therefore have no incentive to switch strategy. In other words, the follower

is already charging its best response to the leaders' prices, and the price it would choose if it became a leader would be this same best response price. Since both situations would yield the same outcome, the follower is indifferent between staying a follower and becoming a leader. Therefore $m^* = n - 1$ leaders is an equilibrium.∎

Finally, we show by contradiction that there exists no equilibrium with $m < n-1$. Assume that there exists an equilibrium where $m < n - 1$. The retailer $m + 1$'s first-order conditions as follower and leader are, respectively:

$$(p_{m+1} - c)D_{m+1}^{m+1}(\mathbf{p}) + D^{m+1}(\mathbf{p}) = 0 \qquad (20)$$

$$(p_{m+1} - c)D_{m+1}^{m+1}(\mathbf{p}) + D^{m+1}(\mathbf{p}) + \sum_{i=m+2}^{n} (p_{m+1} - c)D_i^{m+1}(\mathbf{p}) = 0 \qquad (21)$$

Assume that p_{m+1}^f and p_{m+1}^l are retailer $m + 1$'s price as a follower and leader, respectively. Analogously to above we have that $\pi_{m+1}^f(p_{m+1}^f) = \pi_{m+1}^l(p_{m+1}^f)$. By evaluating (21) at p_{m+1}^f, the two first terms are zero, while the third term is positive. Retailer $m + 1$ will thus increase its profit by increasing price to p_{m+1}^l, and retailer $m + 1$ will consequently want to switch from being a follower to being a leader, i.e. $\pi_{m+1}^l(p_{m+1}^l) > \pi_{m+1}^f(p_{m+1}^f) = \pi_{m+1}^l(p_{m+1}^f)$. Thus, $m < n - 1$ cannot be an equilibrium. If there is more than one follower, one of them would benefit from becoming a leader. The firm can only be better off, since it can always choose the same price it was charging as a follower. Since the other leaders' prices are fixed, becoming a leader would allow the firm to exploit the other followers' reaction functions, and raise their prices. Thus, there do not exist equilibria with $m < n - 1$ leaders. ∎

Proof of Proposition 4

For convenience we repeat the welfare function

$$W = \frac{1}{2}\left(v^2 - \overline{p}^2\right) + \frac{1-b}{2}\phi_2,$$

where the first and second term measures how welfare depends on the average price and price variations, respectively. Differentiating the two terms with respect to m it

turns out that we get $f(b) = b^2(1-b)$ as a common factor, and it is useful to define $W_1 \equiv \frac{1}{2}\left(v^2 - \overline{p}^2\right)/f(b)$ and $W_2 = \frac{1-b}{2}\phi_2/f(b)$ in order to find the relative strength of the two terms in the welfare function when m increases. We then have

$$\frac{dW}{dm} = f(b)\left(\frac{dW_1}{dm} + \frac{dW_2}{dm}\right).$$

We now find that $\left.\frac{dW_1}{dm}\right|_{b=0} = \frac{v^2}{8n^3}\left(m - \frac{n}{2}\right)$ and $\left.\frac{dW_2}{dm}\right|_{b=0} = 0$. In the neighborhood of $b = 0$ we thus have $sign\frac{dW}{dm} = sign\left.\frac{dW_1}{dm}\right|_{b=0} = sign\left(m - \frac{n}{2}\right)$. In this area, welfare will in other words increase with the number of RPM retailers if $m \geq n/2$.

We further have $\left.\frac{dW_1}{dm}\right|_{b=1} = 0$ and $\left.\frac{dW_2}{dm}\right|_{b=1} = \frac{(n-m)^2 v^2 N}{2(1+m+2n^2-4n)^3(n+m-1)^3}$, where $N = (-5n^2 - 27mn^2 + n + 20mn - 3nm^2 - 4m - 2n^4 + 10mn^3 + 6n^3 + 4m^2n^2)$. In the neighborhood of $b = 1$ we thus have $sign\frac{dW}{dm} = sign\left.\frac{dW_2}{dm}\right|_{b=1} = signN$. This implies that $\frac{dW}{dm} > 0$ around $b = 1$ if

$$m > \frac{\sqrt{1281n^4 - 1236n^3 + 628n^2 - 660n^5 - 160n + 16 + 132n^6} + 27n^2 - 20n + 4 - 10n^3}{2n\left(4n - 3\right)}.$$

The reason why $\frac{dW_2}{dm}$ dominates over $\frac{dW_1}{dm}$ for high values of b and vice versa, is that when b is high, the followers have strong incentives to undercut the leader in order to steal business. Therefore p^l will be relatively high compared to p^f. For low values of b, on the other hand, the retailers are such poor substitutes that the undercutting incentives of the followers are small. The difference in the price charges by the leaders and the followers are thus strictly increasing in b :

$$\frac{\partial\left(p^l/p^f\right)}{\partial b} = \frac{2\left(n - m\right)\left((4 - b)n - b + b\left(m - 1\right)\right)nb}{\left(b^2 + 2\left(n^2\left(2 - b\right) - 2bn\right) + 2bmn\right)^2} > 0.$$

Moreover, as explained in the main text, the term $\frac{dW_1}{dm}$ is relatively small for high values of b, since both the market power of the firms and the industry's ability to charge a high average price are low when the retailers are close substitutes.

We now show that $m \geq n/2$ is a sufficient condition for $dW/dm > 0$. The proof consists of two parts. We first show that the price variation is decreasing in the number of leaders. To this end we note that

$$\frac{d\left(p^l - p^f\right)}{dm} = \frac{vnb^2\left(1 - b\right)\Psi_1}{D^2},$$

20

where $D \equiv \left(b^2 \left(1 + m\right) + 2\left(n^2 \left(2 - b\right) - 2bn\right)\right)\left(n(2 - b) + b(m - 1)\right)$ and $\Psi_1 \equiv$

$$\left[b\left(12 - 4b + b^2\right) - 4\left(2 - b\right)n\right] n^2 - \left[\left(2m - 1\right)b^3 + 6b^2\right]n + \left(1 + m^2\right)b^3.$$

We thus have $sign\frac{d\left(p^l - p^f\right)}{dm} = sign\Psi_1$. Since

$$\frac{d\Psi_1}{dm} = -2b^3\left(n - m\right) \tag{22}$$

it follows that if $\Psi_1 < 0$ for $m = 0$, then $\Psi_1 < 0$ for all possible values of $m < n$. We also have

$$\frac{d\Psi_1}{dn} = -\left[12\left(2 - b\right)n - \left(2b^3 + 24b - 8b^2\right)\right]n - 2b^3m + b^3 - 6b^2 \tag{23}$$

A sufficient condition to ensure that $\frac{d\Psi_1}{dn} < 0$ is that the terms in the square bracket of (23) is negative, which is always true if $n \geq 3/2$. It is further straightforward to show that $\Psi\left(m = 0, n = 3/2\right) < 0$. From (22) and (23) it thus follows that Ψ is negative in the relevant area ($n \geq 2$ and $m \geq 0$). This proves that the variation in prices is decreasing in m.

The second part of the proof consists of showing that the average price is decreasing in m for $m \geq n/2$. To this end we note that

$$\frac{\partial \bar{p}}{\partial m} = -\frac{v\left(1 - b\right)b^2\left(2n - b\right)\Psi_2}{D^2},$$

where $\Psi_2 \equiv 2\left(m - n/2\right)b^2 + 2mn\left[b\left(m - 2n\right) + 4\left(n - b\right)\right] - 2n^3\left(2 - b\right) + 4n^2b$. We immediately see that Ψ_2 is increasing in m, and at $m = n/2$ we have $\Psi_2 = \frac{1}{2}n^3b > 0$. This proves that a sufficient condition for $\frac{\partial \bar{p}}{\partial m} < 0$ is that $m \geq n/2$. $\blacksquare$

References

Bonanno, G. and J. Vickers. 1988. Vertical Separation, *Journal of Industrial Economics*, 36, 257-265.

Bulow, J., Geanakoplos, J. and P. Klemperer. 1985. Multimarket Oligopoly: Strategic Substitutes and Complements, *Journal of Political Economy*, 93, 488-511.

Corts, K. and D. Neher. 2003. Credible Delegation, *European Economic Review*, 47, 395-407.

Deneckere, R.J. and C. Davidson. 1985. Incentives to Form Coalitions with Bertrand Competition, *Rand Journal of Economics*, 16(4), 473–86.

Dr. Miles Medical Co. v. John D. Park and Sons, 220 U.S. 373 (1911).

European Commission. 2000. Commission's Vertical Guidelines. O.J. (C291/01).

Fershtman, C. and K.L. Judd. 1987. Equilibrium Incentives in Oligopoly, *American Economic Review*, 77, 927-940.

Gal-Or, E. 1991. Duopolistic Vertical Restraints, *European Economic Review*, 35, 12371253.

Innes, R. 2006. Entry Deterrence by Non-Horizontal Merger, *Journal of Industrial Economics*, 54, 369-395.

Jansen, J. 2003. Coexistence of Strategic Vertical Separation and Integration, *International Journal of Industrial Organization*, 21, 699-716.

Leegin Creative Leather Products, Inc v. PSKS, Inc. No. 06-480 (2006).

Los Angeles Times. 2006. High Court to Weigh Ban on Price Fixing. 8th Dec. 2006.

Marvel, H.P. and S. McCafferty. 1984. Resale Price Maintenance and Quality Certification, *Rand Journal of Economics*, 15, 346-359.

Mathewson, G.F. and R. Winter. 1984. An Economic Theory of Vertical Restraints, *Rand Journal of Economics*, 15, 27-38.

Moner-Colonques, R., Sempere-Monerris, J., and A. Urbano. 2004. Strategic Delegation with Multiproduct Firms, *Journal of Economics and Management Strategy*, 13, 405-427.

Motta, M. 2004. Competition Policy: Theory and Practice, Cambridge University Press.

The New York Times. 2006. Antitrust Policy Ambiguity To Be on Justices' Docket. 7th Dec. 2006.

Overstreet, T. 1983. Resale Price Maintenance: Economic Theories and Empirical Evidence. Bureau of Economics Staff Report to the Federal Trade Commission.

Perry, M.K. and D. Besanko. 1991. Resale Price Maintenance and Manufacturer Competition for Exclusive Dealerships, *Journal of Industrial Economics*, 39, 517-544.

Rey, P. and J. Stiglitz. 1988. Vertical Restraints and Producers' Competition, *European Economic Review*, 32, 561-658.

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

Shaffer, G. 1991. Slotting Allowances and Resale Price Maintenance: A Comparison of Facilitating Practices. *Rand Journal of Economics*, 22(1), 120-135.

Shubik, M. and R. Levitan. 1980. Market Structure and Behavior. Cambridge, MA: Harvard University Press.

State Oil Co v. Khan, 522 U.S. 3 (1997).

Telser, L.G. 1960. Why Should Manufacturers Want Fair Trade?, *Journal of Law and Economics*, 3, 86-105.

U.S. Department of Justice. 1985. Vertical Restraints Guidelines.

Winter, R. 1993. Vertical Control and Price Versus Non-Price Competition, *Quarterly Journal of Economics*, 108, 61-76.