Vertical Practices Facilitating Exclusion*

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Abstract

Resale price maintenance (RPM), slotting fees, loyalty rebates and
other related vertical practices can allow an incumbent manufacturer
to transfer profits to retailers. If these retailers were to accommodate
entry, upstream competition could lead to lower industry profits and
the breakdown of these profit transfers. Thus, in equilibrium, retailers
can internalize the effect of accommodating entry on the incumbent's
profits. Consequently, if entry requires downstream accommodation,
entry can be deterred. We discuss policy implications of this aspect of
vertical contracting practices.

JEL Codes: K21, L42, L12, D42

1 Introduction

This paper considers the upstream exclusionary effect of vertical practices that create rents for downstream retailers without carrying a contractual obligation for exclusivity.[1] Examples of interest include allowing the manufacturer to set the price at which a retailer sells to consumers (RPM); periodic lump-sum payments to retailers (through slotting fees or loyalty rebates); and market division schemes (such as the allocation of clients to specific retailers or the use of exclusive territories).

We explore equilibria that can arise when an upstream incumbent uses a vertical practice of the sort outlined above to share industry profits with retailers. We show that if entry by another upstream manufacturer leads to competition that reduces industry profits sufficiently, and entry requires accommodation by retailers, then equilibria exist in which retailers do not accommodate the entrant. This results in exclusion. In essence, the vertical practice creates a quasi-rent that retailers, in equilibrium, have an incentive to protect.

Of the set of practices that we consider, resale price maintenance (RPM) is currently among the most controversial. For almost one hundred years in the U.S., following the Supreme Court's 1911 decision in *Dr. Miles*,[2] use of RPM was a *per se* violation of Section 1 of the Sherman Act, though statutory exemptions have existed at times (see Overstreet (1983) for a useful history and for data on the use of RPM under these exemptions).[3] The most cited concern about RPM is that it facilitates retailer and manufacturer collusion, by coordinating pricing and making monitoring easier (see Yamey (1954) and Telser (1960) for early examples, and Shaffer (1991), Jullien and Rey (2007), and Rey and Verge (2010) for formal treatments).

In 2007 the Supreme Court overturned the *per se* rule against RPM in the *Leegin* case, in favor of a "rule of reason" approach.[4] That is, courts are now required to balance the potential efficiency benefits of RPM against the

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[1]We are interested in contracting practices between upstream manufacturers and retailers that would *not* trigger breach if a retailer were to serve more than one firm. Thus, an exclusive dealing agreement would fall outside the scope of this paper.

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

[3]A *per se* violation means that the party bringing the case is not required to establish in evidence that harm to competition occurred; instead, it is presumed by the mere existence of the conduct. See Posner (2001, p.176ff).

[4]*Leegin Creative Leather Products, Inc. v. PSKS, Inc.*, 551 U.S. 877 (2007); the quote below is at p.894.

potential anti-competitive harm. In reaching this decision, the court relied heavily on the pro-competitive theories of RPM that have been developed in the economics literature.[5] That said, in the majority decision, the court noted a series of potential sources of competitive harm, including that:

> A manufacturer with market power, by comparison, might use resale price maintenance to give retailers an incentive not to sell the products of smaller rivals or new entrants.

This paper provides a formal equilibrium foundation for this statement.[6]

Other vertical practices have raised similar anticompetitive concerns. For instance, plaintiffs in the *Intel* case claimed that Intel used lump-sum rebates that were contingent on the loyalty of hardware manufactures to Intel, in the face of increased competitive pressure from AMD microprocessors.[7] They argued that these payments were, in effect, a 'bribe' to hardware manufacturers to help maintain Intel's dominant position, with the threat being that increased use of AMD microprocessors would result in the elimination of these loyalty payments. In our framework, this threat is credible in that, following entry, the equilibria we investigate are such that the upstream incumbent has no incentive to offer such payments, and so downstream firms would lose this rent stream following entry by another manufacturer. This gives them an incentive to not accommodate the entrant.[8] The *LePage's* case also involved a somewhat similar fact pattern.[9]

Many other vertical practices, such as slotting fees (discussed in Shaffer (1991)) and market division schemes such as the use of exclusive territories, can be understood in our framework. We discuss how these and other practices can lead to exclusionary outcomes.

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[5]Prominent examples include Telser (1960), Marvel and McCafferty (1984), Klein and Murphy (1988), Deneckere, Marvel, and Peck (1996, 1997), and Marvel (1994).

[6]For related literature in both law and economics, with examples, see Cassady (1939), Yamey (1954), Bowman (1955) and the online appendix.

[7]*State of New York v. Intel Corporation*, drawing from the November 2009 complaint of the New York Attorney General, available at `http://www.oag.state.ny.us/mediacenter/2009/nov/NYAGvIntelCOMPLAINTFINAL.pdf` downloaded 29 November 2011. See Gans (forthcoming) for an overview of the Intel litigation.

[8]De Graba and Simpson (2010) discuss the *Intel* case in depth and propose a similar (informal) theory of harm. Most of the other work on loyalty rebates does not consider exclusion (see, for instance, Greenlee et al. (2008)), although exceptions include Marx and Shaffer (2004), Ordover and Shaffer (2007), and Elhauge and Wickelgren (2012).

[9]See *LePage's v 3M*, 324 F.3d 141.

A related literature is that on naked exclusion arising from explicit exclusive dealing arrangements (See Whinston (2006), Rey and Tirole (2007), and Rey and Verge (2008) for useful overviews and earlier work by Rasmusen, Ramseyer and Wiley (1991), Segal and Whinston (2000) and Gans and King (2002)). A recent strand of this literature considers the effect of competition between retailers on upstream exclusion (in particular, Fumagalli and Motta (2006), Wright (2009), Abito and Wright (2008), Simpson and Wickelgren (2007) and Johnson (2011). In these papers, as in our paper, supplying a single retailer can be enough to allow the entrant to supply all of the consumer demand. The most important difference between the exclusive dealing literature and this paper is that we consider exclusion arising from an equilibrium understanding between an incumbent manufacturer and retailers, as opposed to an explicit exclusivity clause in an enforceable contract. That is, choosing to accommodate an entrant is not a breach of any contractual term in our setting. Therefore, issues that arise in the literature—such as the nature of damages in the event of contractual breach—are not relevant in our environment. Given this, it is unsurprising that the equilibrium prevalence of exclusion can be very different.

2 A baseline model

To model the exclusionary impact of vertical practices we begin with a general approach in which rents are transferred lump-sum (the baseline model) and then apply it to specific restraints. In the baseline model, two manufacturers produce competing goods. These manufacturers sell to consumers via retailers. There are $n \geq 2$ retailers in the market (n is fixed). Retailers are perfect substitutes for each other, and their only marginal costs are the wholesale prices that they pay to the manufacturers. One manufacturer is already active in the market (the incumbent), and another is a potential entrant (the entrant). There are infinitely many periods of competition. All firms discount future profits with discount factor δ. Manufacturer and retailer interactions, together with the timing of the game, are described below.

2.1 Timing

We consider an infinitely repeated game in which there are two types of period (states), which we denote M (incumbent monopolist), and C (post-

entry competition). The game begins in state M at $t = 1$. In this period, the incumbent is active, but the potential entrant has yet to decide whether or not to enter. The timing within a period begining in state M is as follows:

1. the incumbent sets a wholesale price, and gives a lump sum transfer $T_i \in [0, \infty)$ to each retailer;[10]

2. retailers compete in prices and all profits are realized;

3. the entrant offers a transfer, $T_e^r \in [0, \infty)$, to each retailer r, payable if entry is accommodated;[11,12]

4. retailers simultaneously choose to accept (accommodate entry) or reject the entrant's offer;

5. if no retailer accommodates the entrant, the state in the next period will continue to be M; if at least one retailer accommodates, then the entrant can choose either to pay the fixed cost, F_e, or not enter. F_e is such that that an entrant, faced with a market with competition (no exclusionary equilibria), will want to enter this market. The firm commits to pay F_e in the current period (that is, it becomes sunk), but the expense is incurred in the next.[13] If the fixed cost is sunk, the state then transitions to C, otherwise the state continues as M;

A period beginning in state C is simpler—the incumbent and entrant simultaneously set wholesale prices, and per-period lump-sum transfers[14] and then retailers compete in prices. C is an absorbing state.

The requirement that at least one retailer agree to carry the entrant's good for the entrant to become active (and for the state to switch from M

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[10]Allowing the incumbent to discriminate between retailers would merely add notation.

[11]Requiring the entrant to make non-discriminatory offers to retailers would ease the conditions for the existence of an exclusionary equilibrium since the entrant requires only one retailer for accommodation, yet would need to make costly offers to all.

[12]Although we allow the entrant to offer different transfers to different retailers, we do not allow these transfers to be contingent on the behavior of other retailers. Such offers would allow the entrant to enter for free—analogous to the problem of bribing voters considered in Dal Bo (2007): The entrant could make an offer along the lines of "I will pay $1 trillion if you are the only retailer to let me enter" and then retailers would have a weakly dominant strategy to accommodate entry. We thank a referee for this observation.

[13]This structure merely simplifies the discounting of cashflows.

[14]In principle, offers may differ between retailers; but, in equilibrium, they will not.

to C) is crucial. The effect of such an agreement, which is effectively an assurance of perpetual market access, is to guarantee competition between the two manufacturers in all periods post-entry; in particular, it is assumed that following entry, the incumbent remains in the market.[15]

The assumption of perpetual access is a reduced form for a number of mechanisms that may generate an ongoing presence. This may simply be the signing of an enforceable distribution contract.[16] Or, it may be that the retailer makes an un-modeled relationship specific investment, effectively locking the retailer into providing access.

3   Analysis

We focus on and characterize stationary Markov Perfect Nash equilibria of the game described in Section 2, where the state is the current market structure. That is, the state space is the finite set $\{M, C\}$.[17] We discuss the impact of using alternative equilibrium criteria in Section 4.3.

In each state, active manufacturers set wholesale prices. The $n \geq 2$ retailers then take these prices as their marginal costs and compete in the sale prices they charge to customers. Since retailers are perfect substitutes for each other, competition among retailers will resemble Bertrand competition with homogenous firms (and common, constant, marginal costs). This establishes the following lemma:

Lemma 1 *In every state, retailer profits (ignoring transfers) are zero.*

Standard assumptions on demand and costs and resulting properties of profit functions allow us to abstract away from the details of pricing in the stage game and work with manufacturer profits.[18] We denote the incumbent's period-profit in the monopoly state, not counting any transfers T_i, as π_i^M.

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[15]In state M the entrant remains as a potential threat (or gets replaced each period by another identical entrant). Interestingly, an entrant might find it easier to gain entry if it could credibly commit to disappear in the future if it is not accommodated today, as the ongoing threat of entry is necessary for retailers to obtain rents from the incumbent.

[16]If the contract's duration is limited, this will (if anything) make exclusion easier.

[17]Since this paper is not about 'standard' collusion, the specified state space rules out collusion between firms post-entry. It also removes the possibility of coordination via usual repeated game strategies between retailers pre-entry.

[18]Where we use first order conditions, we assume differentiability and quasi-concavity.

Equivalently, π_i^M denotes industry profits prior to entry. If the entrant is in the market, the incumbent's profit is $\pi_i^C < \pi_i^M$ and the entrant's is π_e^C.

Key to the mechanics of the model is the observation that, since C is an absorbing state, there is no reason for a manufacturer to give a lump-sum transfer to any retailer in the C state. Such transfers have no effect on the quantity purchased or on the evolution of the state, and so any such transfer would violate profit maximization on the part of the manufacturer. While unsurprising, this is sufficiently important that we state it as a lemma.

Lemma 2 *Transfers from manufacturers to retailers will not occur following entry (i.e. in the C state).*

Given this characterization of profits, and play in the C state, we can turn to characterizing the full game. Our interest is in characterizing when exclusion is possible in equilibrium. However, there are always equilibria with no exclusion. We illustrate an example of a no-exclusion equilibrium in Lemma 3 below.

Lemma 3 *There is always an equilibrium in which entry takes place and the entrant offers $T_e^r = 0$ to every retailer.*

Proof. Consider a period in which the state is M. Suppose that the entrant offers $T_e^r = 0$ to every retailer. Consider that part of the period in which retailers simultaneously decide whether to accept or reject the entrant's offers. If one retailer accepts the entrant's offer, then the best response set of all other retailers will also include acceptance. This is because acceptance by one retailer ensures that entry occurs. Thus, the state changes and the payoff to a retailer is the same regardless of whether it accepts or rejects. Hence, accept is in the best response set.

Given this set of strategies on the part of the retailers, $T_e^r = 0$ is optimal for the entrant. ∎

We now turn to the necessary and sufficient conditions for an exclusionary equilibrium to exist. By exclusionary, we mean an equilibrium in which the retailers never accommodate entry.

Proposition 1 *An exclusionary equilibrium (one in which the entrant does not enter) exists if and only if*

$$\frac{\pi_i^M - \pi_i^C}{n\left(1 - \delta\right)} \geq \frac{\pi_e^C}{1 - \delta} - F_e \tag{1}$$

Proof. Given that all other retailers choose not to accommodate, retailer r will not accommodate if the return to accommodation is weakly less than the return from refusing. That is, following Lemmas 1 and 2, if

$$\frac{\delta T_i}{1 - \delta} \geq T_e^r$$

The rest of the proof proceeds by examining the maximal values of T_i and T_e^r, denoted $\overline{T}_i$ and $\overline{T}_e$, respectively, that are individually rational for the incumbent and entrant at stage 1 and stage 3 in state M, respectively. If the discounted value of the flow of $\overline{T}_i$ is greater than $\overline{T}_e$, then an exclusionary equilibrium must exist. If not, then for every per-period transfer T_i, the entrant can offer some T_e^r to retailer r, that will induce that retailer to accommodate entry (and offer no transfers to any other retailer so as to minimize expenditure).

An entrant gets zero profit if it does not enter. Hence, $\overline{T}_e$ is such that the entrant's ex ante profits from entering the market is zero. That is,

$$\overline{T}_e = \frac{\delta \pi_e^C}{1 - \delta} - \delta F_e \tag{2}$$

The incumbent will be willing to set T_i such that profits without entry less total per-period transfers, are at least as large as what would be gained from simply allowing entry. That is,

$$\pi_i^M - n T_i \geq \pi_i^C \tag{3}$$

Given this, the maximal per-period transfer to an individual retailer is

$$\overline{T}_i = \frac{\pi_i^M - \pi_i^C}{n} \tag{4}$$

Setting $\overline{T}_i / (1 - \delta) \geq \overline{T}_e$ demonstrates that the condition is necessary. To observe that it is also sufficient, note that the entrant could offer $\overline{T}_e$ to one of the retailers (and nothing to any of the others). ∎

The condition for the existence of an exclusionary equilibrium, Condition (1), is similar to the standard condition for sustainable price collusion (among retailers) using grim trigger strategies; the left-hand-side is analogous to the firm's pay-off from cooperating in a cartel, and the right-hand-side is analogous to the deviation payoff (where the punishment payoff is zero). In this

sense, the per-period transfer T_i from the incumbent to the retailers creates an incentive to coordinate on market structure, in that accommodating an entrant (deviating from the 'cartel') carries with it a punishment in terms of the lost share of industry profits (the transfer T_i).

Note that Proposition 1 allows for both product differentiation and cost heterogeneity at the manufacturer level; however, retailers are assumed to be perfect substitutes for expositional ease.

If the fixed cost of entry is equal to zero, then Condition (1) reduces to

$$\frac{\pi_i^M - \pi_i^C}{n} \geq \pi_e^C \tag{5}$$

implying that, in the absence of fixed costs, the discount rate is not important in determining whether exclusionary equilibria are possible in this model.

Following Lemma 3 and Proposition 1, it is immediate that if Condition (1) holds then both an exclusionary equilibrium and an accommodating equilibrium can coexist. However, there is a sense in which the exclusionary equilibrium is more appealing: in the accommodating equilibrium of Lemma 3 no retailer earns profits and the incumbent is worse off with the presence of the entrant as a competitive threat; by comparison, in the equilibrium of Proposition 1, retailers earn profits and the incumbent is better off.

4 Applications to specific vertical practices

In this section we discuss the application of the baseline model to specific vertical practices. Lump-sum schemes (like loyalty payments and slotting fees) are captured directly by the baseline model. Hence, we turn our attention to schemes based on pricing restraints (using resale price maintenance as an example), and market division schemes (such as exclusive sales territories). While we retain our focus on the case of upstream exclusion, we note that the same mechanisms could arise from dominant downstream firm sharing rents with upstream suppliers to exclude a downstream rival.[19]

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[19]This point mirrors the discussion of *Interstate Circuit, Inc. v. United States*, 306 U.S. 208 (1939) in Krattenmaker and Salop (1986). The *Leegin* decision also raises the issue.

4.1 Resale price maintenance

The application of the baseline model to RPM requires more detailed exposition. The issue is that, because RPM is a pricing restraint, pricing needs to be modeled explicitly. For expositional ease, we restrict the model so that the entrant and the incumbent sell identical products. We let marginal costs be constant, with c_i and c_e being the incumbent's and entrant's costs, respectively, and $c_i \geq c_e$. We suppose that $q(p)$ denotes industry demand at price p. Lastly, we set the fixed cost of entry equal to zero.[20,21]

Rather than offering a lump-sum transfer each period, the incumbent sets a wholesale price and a retail price.[22] The retail margin that this creates generates the rent transfer that is captured by T_i in the baseline model. Thus, the retailers enjoy a rent transfer equal to their margin (created by shutting down competition between them) multiplied by their share of the market.[23] This is the central observation that allows the insight in the baseline model to be transferred to the RPM case.

Formally, we adapt the model so as to preclude the incumbent and the entrant in state C from offering lump-sum transfers but instead allow them to dictate the retail price, in addition to setting the wholesale price.[24] We say that a manufacturer imposes RPM if the retail price is different from the one that retailers would adopt if they were to face only the wholesale price.

Consider the C state:

Lemma 4 *Retailers and the incumbent make zero profits following entry (i.e., in the C state). The entrant's period profit is given by $\pi_e^C = (c_i - c_e)q(c_e)$.*

Proof. Much like Lemma 1, this lemma follows from the observation that manufacturer and retailer choices mirror Bertrand price competition with

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[20]For variations on this RPM model with non-zero fixed costs and product differentiation see Asker and Bar-Isaac (2010). Note that varying upstream or downstream differentiation affects all of π_i^M, π_i^C and π_e^C, so a non-monotonic effect can occur.

[21]Note that RPM can arise through the combination of other restraints: see Johnson's (2012) example combining agency and MFN clauses.

[22]Since retailers compete via Bertrand, this need only be a minimum retail price.

[23]Given that retailers are perfect substitutes, we adopt the standard assumption and let them split the market equally if they are selling at the same price.

[24]We re-express point 1. in the timing of state M and state C, and leave the rest unaltered: 1. becomes, 'the incumbent sets a wholesale price and a retail price.'; and. state C. becomes, 'the incumbent and entrant set a wholesale price and retail price each; then retailers compete in prices.'

homogenous goods. That $\pi_e^C = (c_i - c_e)q(c_e)$ follows from the usual argument for Bertrand with asymmetric costs. ∎

Following the logic in the baseline case, the fact that $\pi_e^C = (c_i - c_e)q(c_e)$ implies the maximal transfer, $\overline{T_e}$, is such that $\overline{T_e} = (c_i - c_e)q(c_e)/(1 - \delta)$. Further, since $\pi_i^C = 0$, the incumbent will be indifferent between transferring all the rents from excluding the entrant to retailers and allowing entry to occur. Thus, if RPM is being used to transfer rents, the maximal rent transfer can be implemented by setting the wholesale price equal to the incumbent's marginal cost and the retail price equal to the monopoly price. We assume that, with equal retail prices, retailers split the market equally, so $\overline{T_i} = \pi_i^M/n$.

Hence, having calculated $\overline{T_i}$ and $\overline{T_e}$, the condition for the existence of an exclusionary equilibrium (analogous to equation 1) in this simplified RPM setting is:[25]

$$\frac{\pi_i^M}{n} \geq (c_i - c_e)q(c_e), \tag{6}$$

indicating that it is possible for an incumbent to use RPM to exclude a lower cost rival from a market. Note that in this case $\pi_i^C = 0$ and $\pi_e^C = (c_i - c_e)q(c_e)$ so that Equation (6) is identical to Equation (1). As before, if the inequality is strong, it is possible for the incumbent to earn positive profits while having the entrant excluded. Thus, this RPM example is an application of the baseline model.

4.2 Exclusive sales territories and quantity restrictions

Manufacturers may also limit competition between retailers by such methods as limiting the quantity that retailers can sell or by defining exclusive sales territories for retailers. Vertical practices of this form can also diminish competition between retailers and so create rents that give retailers an incentive not to accommodate entry.

Consider the case of exclusive territories that each of two retailers can serve equally easily.[26] If the incumbent manufacturer granted (equally-sized)

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[25]Due to the absence of a fixed cost, the $1/(1 - \delta)$ term cancels out.

[26]The game's timing is adjusted such that 1. in state M and state C become, respectively, 'the incumbent sets a wholesale price and (if desired) exclusive sales territories; otherwise,'; and. 'the incumbent and entrant set a wholesale price and and (if desired) exclusive sales territories each, then retailers compete in prices.'

exclusive territories to the two retailers and priced at his (constant) marginal cost, then each retailer would set a price equal to the monopoly price, so that the maximum that the incumbent can transfer to each retailer per-period would be π_i^M/n where $n = 2$.

Following entry, suppose the incumbent maintains the exclusive territories. The entrant would prefer to have both retailers serving both territories and have the retailers undercut the retail price of the incumbent's retailer. As a result, the familiar Bertrand style arguments lead to the exclusive territories dissolving in the post-entry equilibrium and, if the manufacturers sell homogeneous goods, Lemma 4 applies, and Condition (6) again is a necessary and sufficient condition for the existence of an exclusionary equilibrium.

4.3 Alternative post-entry equilibria

The Markov Perfect solution concept, together with the definition of the state space, selects a particular equilibrium in the C-state: that equilibrium resembling the static Nash solution. It may be that, in certain instances, some other form of equilibrium is more compelling (most likely resembling some form of coordinated effects, or repeated game, equilibrium). This would change the post-entry payoffs π_e^C and π_i^C in Proposition 1. It is easy to show that the basic intuitions are preserved with different forms of post-entry conduct, although, depending on the post-entry equilibrium of interest, the algebra can become cumbersome. More interestingly, even if the manufacturers could collude post-entry, the incumbent (and the retail sector) may still be better off in an exclusionary equilibrium as the entrant, by virtue of having a cost advantage, may need to capture most of the cartel profits to make collusion sustainable. The online appendix works through several alternative post-entry equilibria.

5 Policy implications

At the heart of this paper is a familiar intuition: Each vertical practice we consider allows retailers to capture a portion of the industry rents that the market power of the incumbent generates. Indeed, it is precisely these quasi-rents (and the threat of losing them) that have been used to provide a pro-competitive theory of vertical practices: Klein and Murphy (1988) argue that manufacturers can use these quasi-rents to entice retailers to provide

the desired level of service. However, here, we highlight a more harmful implication of such quasi-rents.[27] If an entrant cannot establish itself without some retailer support, then retailers may be hesitant to accommodate an entrant since more competition upstream will reduce industry rents, and, hence, the quasi-rents enjoyed by retailers.[28] In effect, the service that the retailers provide is the exclusion of a potential entrant. Therefore, according to this theory, *both* the retail sector *and* the incumbent manufacturer can gain from these exclusionary practices.[29]

The harm caused by the exclusionary behavior is easiest seen in the context of the homogenous good model used to discuss RPM (section 4.1). Exclusion decreases consumer welfare, creating the standard lost gains from trade due to monopoly, and also can deprive the economy of a lower cost producer leading to productive inefficiency. Where, as in the baseline model, goods can be differentiated, we may also see inefficiency arising from distortions to consumers' choice sets.

This potential harm is of more than theoretical interest. The U.S. Supreme Court raised concerns about foreclosure arising from RPM in the *Leegin* case, as discussed in the introduction, and the E.U. Guidelines on Vertical Restraints also address this issue.[30,31] Moreover, these concerns have been noted in earlier literature (notably Cassady, 1939; Yamey, 1954 and 1966; Bowman, 1955 and others discussed in the online appendix). One well-documented case where alternative theories (for example, service provision, or coordinating collusion) are difficult to support is the American Sugar Trust (see Zerbe, 1969, Marvel and McCafferty, 1985, and Genesove and Mullin, 2006) which operated in the 1890s. In this case a homogenous good (sugar) was supplied by a monopolist to wholesale grocers who then sold it to retailers.

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[27]See also Shaffer (1991), in the context of restraints facilitating retailer collusion.

[28]Comanor and Rey (2001) make a related point in the context of exclusive dealing. Similarly, Krattenmaker and Salop (1986) make references to a closely related mechanism in their discussion of the "Cartel Ringmaster" (pp. 238-240 and in footnote 71).

[29]Consistent with this observation, Overstreet (1983, p.145ff) describes lobbying by both manufacturers and retailers for the 'Fair-Trade' statutes that created exemptions from liability for RPM in the middle of the last century.

[30]"[R]esale price maintenance may be implemented by a manufacturer with market power to foreclose smaller rivals" (E.U. Vertical Guidelines p.64, paragraph 224).

[31]While vertical agreements are often considered under Section 1 of the Sherman Act (Article 101 for the E.U.), the model here is one of monopolization, suggesting possible Section 2 (Article 102) liability. See Hemphill and Wu (2012) for a related discussion of liability in the context of joint action by a group of manufacturers.

The Wholesale Grocers Association suggested an RPM arrangement to the Sugar Trust, which was framed as a profit sharing arrangement to ensure the exclusion of a rival manufacturer. This set of facts provides a challenge to service arguments, in that it is difficult to see what consumer service a product like sugar requires and the RPM program did not appear to be designed to facilitate collusion. We provide further examples in the online appendix.

Our theory makes three broad contributions to policy: first, by giving rigorous foundation to ill-defined foreclosure concerns; second, by providing guidance as to screens or criteria to assess the effect of vertical restraints; and third, by providing a structured way to assess the liability of, and damages caused by, a firm engaged in exclusion. We discuss each in turn.

First, providing a rigorous foundation for exclusionary concerns gives a common framework for addressing policy debates across different vertical practices and provides some justification for increasing attention on the issue.

Despite early historical accounts of the exclusionary effects of various vertical practices, policy discussion of exclusion has been somewhat foreclosed by concerns about coordination on prices. For example, the OFT's submission to the OECD (2008) roundtable on RPM does not address exclusion as a cause of harm in outlining economic theories (pp. 204-207); nor does the United States' submission in its review of theories of anti-competitive uses (pp.218-9), and, more generally, there is no mention of exclusion in the 300-page OECD report.

Meanwhile, the development of a common framework may assist in the development of judicial approaches to exclusion and vertical restraints. Judicial reasoning has tended to focus on restraints on a piecemeal basis rather than adopting a unified approach. In the U.S. this is perhaps most apparent in the pre-*Leegin* period following the *Sylvania* decision.[32] During this period, cases regarding non-price restraints were evaluated under the 'rule of reason', while RPM cases continued to be treated as 'per se violations.[33] Even now, the judicial approach to evaluating the harm arising from these different restraints is, at best, unclear. The framework developed in this paper suggests that, at least as far as concerns about exclusion are concerned, a more consolidated approach is both feasible and supported by economic theory.[34]

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[32] *Continental T.V. Inc. v. GTE Sylvania Inc.* 433 U.S. 36 (1977).

[33] Albeit tempered by the exceptions arising from *U.S. v. Colgate* 250 U.S. 200 (1919).

[34] Krattenmaker and Salop (1986) offered a unified approach to the evaluation of explicitly exclusive agreements (such as exclusive dealing).

Second, the framework developed in this paper suggests a series of screens for determining whether an agreement gives rise to an exclusionary equilibrium. First, it must be necessary that effective entry requires the accommodation of at least one retailer. That is, it should be prohibitively difficult for an entrant to compete meaningfully with an incumbent without the services of a retailer that enjoys quasi-rents. This would be violated if, for instance, an entrant could be vertically integrated or, equivalently, there were free entry of retailers. Second, if entry were to occur, industry profit should be diminished by competition. (The most obvious condition for this to be true is that the incumbent would continue to exert competitive pressure in the market for at least some significant time following entry.) Third, it must be that the quasi-rents enjoyed by the retailers would diminish in the event of entry. Finally, an immediate implication of the model is that, all things being equal, adding an extra retailer makes exclusion harder. This last observation also suggests a complementarity between upstream and downstream exclusion: An upstream monopolist hoping to prevent a rival's entry can gain from downstream exclusion insofar as this reduces the number of firms that he has to pay off to ensure upstream exclusion.[35]

These screens ignore which party initially suggests the restraint. This is most relevant in current discussion surrounding RPM. In the framework presented in this paper both the incumbent manufacturer and retailers stand to gain from RPM, and either side might initiate RPM for the purpose of exclusion. Bowman (1955), in particular, provides examples of both upstream and downstream firms initiating RPM. This contrasts with suggestions from policy makers and commentators who have suggested that antitrust authorities should distinguish between manufacturer- and retailer-initiated RPM. For example, the *Leegin* ruling (p.898), citing Posner (2001), states:

> It makes all the difference whether minimum retail prices are imposed by the manufacturers in order to evoke point-of-sale services or by the dealers in order to obtain monopoly profits.

Our framework suggests that using the identity of the initiating party is not informative, at least as far as any exclusionary concern is concerned.[36]

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[35]These screens can be recast as comparative statics of the baseline model. The primitives of that model are the profits and the number of retailers. Adding structure appropriate to the empirical setting (e.g articulating how a marginal cost shock or new product introduction affects the profits), would allow for testing of these comparative statics.

[36]If parties can make side-payments to each other, the screen is uninformative in every

A persistent challenge in determining liability in cases involving vertical restraints is how to reconcile the pro-competitive benefits of service provision with the anti-competitive effects of exclusion (setting aside any collusive impact). This challenge is compounded by the observation that the service provision by retailers may be the very thing that makes the monopoly profits large enough to make exclusion feasible: service shifts demand outward, increasing industry profits and, thereby, increasing retailers' quasi-rents in an exclusionary equilibrium.

Our framework suggests a potential path through this quagmire. For exclusion to occur in our framework, competition post-entry should diminish the quasi-rents enjoyed by retailers. Hence, if the restraint can credibly be claimed to disappear in the event of entry, this might suggest that the restraint is exclusionary.

At this point, to the extent that the elimination of the restraint is associated with lower service, there remains a trade-off similar to the familiar Williamson (1968) trade-off applied to mergers. Restricting ourselves to a homogenous good environment with constant marginal costs the trade-off is as follows. First, the restraint introduces a productive inefficiency caused by excluding a more efficient producer. Second, if the monopoly quantity is less than the post-entry quantity sold, then there is a welfare gain on the infra-marginal units for which service has been increased by the restraint, and a loss on the marginal units that would have been supplied post-entry. If the monopoly quantity is greater than that sold post entry, then there is only a welfare gain, from more goods being sold and an increase in service provision. The relative size of these effects determines the desirability of exclusion from a total welfare point of view, analogous to the analysis conducted by Wiliamson. Importantly, and in contrast to Williamson, a criterion focused on consumer welfare does not appear to lend itself to a sufficient statistic approach (in Williamson's framework a price rise is sufficient for consumer harm). When considering vertical restraints and exclusion, a drop in price may still signal a consumer welfare loss if the service provision is sufficiently valuable.

Given this, at the very least, a defendant should bear a significant burden in raising a defense based on service . As has been argued with regard to efficiencies in merger analysis (e.g. Williamson (1968) and Turner (1965)),

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context: a manufacturer may suggest a restraint to retailers to aid cartel coordination, in return for a cut of cartel profits. We attribute this observation to Joe Farrell.

the firm is in the best position to produce evidence on this point, and, if it is important, one would presume the consideration of service formed part of the analysis accompanying the establishment of the restraint.

Third, once the screens are satisfied and the potential for an exclusionary effect appears to deserve serious consideration, the framework gives a basis for the evaluation of the trade-offs outlined above, and the assessment of damages. The model we present is sufficiently simple to be capable of estimation using structural econometric tools now standard in the empirical I.O. literature (see Davis (2009) for a treatment focused on antitrust applications).

A final issue in evaluating the impact of a vertical restraint is its role in the presence of other restraints. A particular issue, with respect to the framework presented in this paper, is how it should be viewed when explicit exclusivity provisions exist in an enforceable contract. In practice, one might consider exclusivity provisions as giving explicit form to the agreement and, possibly, helping to coordinate the equilibrium, while the practices we consider may implicitly reinforce the explicit terms, especially in the face of uncertain enforceability of an exclusivity provision. To this extent, one might view RPM (or any other practice we consider) and exclusive dealing as being, in some instances, complementary exclusionary devices. This suggests that behavioral remedies prohibiting exclusive dealing contracts, but not addressing the implicit form provided by other practices, may have limited effectiveness.

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