Naked Exclusion By a Dominant Supplier: Exclusive Contracting and Loyalty Discounts

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May 2008
Current Version October 22, 2010

Recent literature has shown that an incumbent can use exclusive contracts to maintain

1. Introduction

Why do exclusive arrangements in which a dominant input supplier pays downstream firms not to use a small rival's input cause such great antitrust concern? Intuitively there is a sense that a "large" supplier has both an incentive and an ability to use its size to prevent small sellers from making sales to the detriment of both consumer and overall welfare. I formalize this intuition by modeling dominance explicitly and showing that a supplier must be sufficiently large to exclude smaller rivals using exclusive contracts.

The recent literature regarding competitive harm from exclusive contracts looks at an incumbent monopolist offering downstream buyers exclusive contracts to prevent the entry of a rival who has not yet entered the market, rather than considering competition between two different size suppliers who both operate in the market.[1] While showing that equilibrium exclusive contracts can be harmful, these models have important practical limitations. First, they cannot shed light on important relationships such as the relationship between the dominant firm's market share and its ability and incentives to exclude a rival and lower welfare. Second, they only generate competitive harm when the rival cannot enter the market and can't offer its product to buyers. Thus, these models cannot explain how there can be competitive harm when a small rival actively sells its products in the market. Thus, they cannot explain (among other things) competitive harm from market share discounts with shares of less than 100%.

These problems stem from two artificial assumptions: First, only the incumbent can offer exclusive contracts. Second, the small rival is an entrant that can be prevented from sinking a fixed cost and entering.

My model eliminates these practical limitations by eliminating the two artificial assumptions. I replace them with a formal model of dominance of an input supplier based on

this result to the case of the dominant supplier offering market share discounts, which are payments made to a producer in exchange for the producer using the supplier's input in a specified share of its final goods. This limits the size of the market in which the rival's input may be used, which establishes the dominant supplier as a monopolist over the remainder of the market allowing him to sell at supra-competitive prices.[2] Thus, competitive harm occurs even though the small rival makes positive sales to each producer.

Markets in which exclusionary behavior occurs when a small rival is already in and will continue to be in the market constitute an important set of cases. Many private antitrust actions that challenge exclusive dealing or loyalty discounting are brought by a smaller rival that is already in the market and making sales.[3] Similarly, there are government suits that assail the use of exclusive dealing or loyalty discounts by a dominant supplier when competing with a smaller rival.[4]

In a recently settled civil action the FTC clearly believed that exclusionary contracts used by Intel were harmful even though AMD was in the market and making positive sales when it wrote:

> "These practices [use of exclusive contracts] severely limited the number of instances in which OEMs [original equipment manufacturers]selling non-Intel-based PCs competed directly against OEMs selling Intel-based PCs, especially in servers and in commercial desktops and notebooks. *When an OEM selling Intel-based PCs competed against OEMs selling AMD-based PCs, Intel often had to*

[2] If a small set of end users will pay more for the rival's input than others who prefer it, it may be more cost effective to allow producers to serve them with the rival's input rather than paying them for using a less preferred input. The share restriction constrains producers to serve *only these* end users with the rival's input.

[3] See e.g. Concord Boat Corp. v**.** Brunswick Corp.,207 F.3d 1039 (8th. Cir. 2000) in which several boat makers sued stern drive engine manufacturer Brunswick for using market share discounts when selling engines, excluding other engine manufacturers. In AMD v Intel, AMD sued Intel for use of exclusive arrangements with Original Equipment Manufacturers (OEMs). See "Settlement agreement between Advanced Micro Devices and Intel Corporation," (2009). See also Masimo Corp. v. Tyco Health Care Group, L.P., No. CV-02-4770 MRP, 2004 U.S. Dist. LEXIS 26916 (C.D. Cal. June 10, 2004) in which Masimo Corp challenged Tyco's use of bundled discounts, which Masimo alleged foreclosed a significant

sell CPUs at competitive prices. When such competition was eliminated, Intel could sell CPUs at supra-competitive prices. Consequently, it [Intel] was able sim

Briefly, the contributions of this paper include: i) formally modeling dominance of an input supplier competing against a smaller rival and selling to downstream competitors, thus eliminating the "incumbent/entrant paradigm" ii) showing market share discounts with threshold levels of less than 100%, which allow the small rival to make strictly positive sales, lower welfare, iii) showing that the incentive to exclude includes savings from reducing competition in segments in which the small rival would not make sales, but would exert competitive pressure, iv) showing that exclusivity payments need not result in below cost effective prices to lower welfare, v) providing conditions that help determine if increased downstream product differentiation will make exclusion easier or harder, and vi) providing a model in which all pertinent calculations can be shown on a single graph.

Aghion and Bolton (1987) an incumbent and an end user customer sign a contract that commits the customer to pay the incumbent a penalty if she buys from the entrant. Therefore, the entrant must compensate the customer for this payment if it enters. If the entrant is only somewhat more efficient than the incumbent, then the entrant is unable to under-price profitably the incumbent and compensate the customer, and so is excluded to the detriment of welfare.

In (RRW-SW) the entrant must sell to *n* end user customers to recover its fixed entry cost. If the incumbent signs at least all but *n*-2 customers to exclusive contracts, then the entrant does not sink the fixed cost, allowing the incumbent to charge a monopoly price.

Fumagalli and Motta (2006) replace the end user customers in (RRW-SW) with competing firms. They argue that if the firms are very differentiated then they behave very similarly to end users in (RRW-SW) and a coordination failure can prevent entry by limiting the size of the market to which the entrant can sell. However, they argue that when downstream firms are homogenous Bertrand competitors a single buyer can give the entrant access to the entire market so the coordination failure is eliminated and exclusion is impossible.[10]

Simpson and Wickelgren (2007) largely replace end users in Aghion and Bolton (1987) with competing downstream retailers who are required to pay expectation damages to the incumbent equal to the incumbent's full lost monopoly rents if they buy from the entrant. This paper is the first to emphasize that competition among homogeneous downstream firms can limit the value downstream firms obtain from buying a low priced input from the entrant, because downstream competition will pass most of this savings on to end users in the form of lower prices.

exclusives were prohibited. Since in my model no quasi-rents are generated in the non-exclusion equilibrium, the mechanism in MW cannot be related to the results in my paper.

The practical effect of this is that MW is not appropriate for evaluating the effects of exclusive contracts by an input supplier who sells to downstream producers among which there is significant competition. Thus, MW would have little to say about the use of exclusivity in the Intel case, or Concord Boat, where the price of the input played an important role in the ability of

customers and the capital constrained seller cannot match this offer. In the second period the

Each producer states a price, p_{ji}, for his final good (i denoting the input used). The end user observes which input each producer uses, and purchases one unit of the final good from the producer that offers the highest surplus. In case of ties among identical offers the end user chooses one of the producers at random. If two offers provide identical surplus, but only one producer earns a strictly positive profit, the end user buys from that producer.[14] If both producers earn zero profits, but only one purchases from a supplier that earns a positive profit, then she purchases from that producer. The producer that is ultimately chosen by the end user pays his t_{ij} to the supplier.

This structure can be used to construct the following three stage game:

In stage 1, suppliers simultaneously announce their t_{ij}'s to each of the producers. In stage 2 the producers observe the prices and announce their p_{ji}'s. In stage 3 the end user observes prices and the input each producer uses and chooses from which producer to purchase. All offers, decisions, prices and input choices are common knowledge.

The payoff to the end user is her consumer surplus. The payoff to each producer is his sales revenue less his input cost. The payoff to each supplier is the sales revenue from the sale of his input. Equilibria are subgame perfect.

Observation 1. In equilibrium D sets $t_{dj} = 0$ and R sets $t_{rj} = \$1$. At least one producer sets a price for the r-based unit of \$1. The other producer can either set a d-based unit price of \$0 or an r-based unit for a price of \$1. The end user purchases an r-based unit.

Outline of proof of existence:[15]

The end user can not gain by deviating. At the prices stated the end user is indifferent between a d-based unit and an r-based unit and so chooses an r-based unit.

No producer could gain by deviating. At the given prices both producers earn a 0 payoff. Any producer of the r-based unit cannot gain by increasing his price because the end user would

[14] The reason is that if an end user would choose the seller making zero profit, the seller that would make a positive profit would have an incentive to make a slightly lower priced offer to ensure the sale.
[15] The proof of Observation 3 implies uniqueness so the uniqueness proof is omitted to save space.

switch to the other producer. Any producer of a *d*-based unit could not gain by raising his price because he would still not make a sale. If either producer lowered his price he would make a sale, but earn a negative payoff. No producer could gain by changing the product he offered.

No supplier could gain by changing his prices. *D* could only make a sale by offering a negative price. Any increase in *R*'s price would result in him losing the sale to *D* and earning 0. Lowering t_{rj} decrease *R*'s sales revenue. *QED*

This equilibrium yields the results one would expect from a Bertrand equilibrium with no demand elasticity. The end user receives a surplus of $9, which is her willingness to pay, less the producer's marginal cost. *R* earns $1, which is his incremental value to the end user relative to *D*. Producers earn 0 since they provide no scarce resource. *D* earns 0 because he makes no sale.

I now assume there is a stage 0 in which only *D* can offer each producer a payment in exchange for exclusivity. Having received offers, producers announce if they will accept exclusivity. *D* and *R* observe acceptance decisions and make price offers to each producer. Producers observe these prices and then announce if they intend to honor their exclusivity commitment. If any producer breaches then the suppliers can make another lower price offer to any producer(s).[16] Producers then make offers to the end user who purchases one unit. Any producer who does not purchase from *R* receives the exclusivity payment offered by *D*.

***Observation 2*.** In equilibrium *D* offers each producer $1 to be exclusive. Each producer accepts. *R* sets $t_{rj} = 0$ and *D* sets $t_{dj} = \$9$. Neither producer breaches. Both producers set $p_{jd} = \$9$, and earn a payoff of $1. If at least one producer were to breach, *D* would set the price of *d* equal to 0. *D* earns a payoff of $7.

[16] Alternatively we could assume that *D*

Outline of proof of existence:[17]

which in this example is $1. So the most that *R* can profitably offer a producer (by setting a price of 0 for *r*) to breach exclusivity is $1. Thus, *D* need only pay each of the producers $1 to make each one indifferent between staying exclusive and being the only producer to breach exclusivity.

Since there are two producers, it only costs *D* $2 to exclude *R*, become the input monopolist, and extract the $9 monopoly rents. So *D* gets the downstream producers to establish himself as the input monopolist, and then shares part of the monopoly profits with the producers in exchange.

This model has several interesting features. First, suppliers can change their prices if a producer breaches is critical.[18] In equilibrium the price of *r* is 0 while the price of *d* is $9. The reason a producer does not breach is that if he does, *D* will reduce the price of *d* from $9 to 0 to the exclusive producer, and the breaching producer would be able to only earn 1, the incremental value of *r* over *d*. This captures the intuition in Simpson and Wickelgren (2007a) and Abito and Wright (2008) that lower input prices are passed on to end users in competition and don't benefit the producers when competition is intense.

Second, this example does not employ the assumption that *R* must sink some fixed cost to enter as does much of the previous literature. In this example the small rival is already in the market and sets a price equal to marginal cost in equilibrium. Exclusion does not keep him from entering. It simply keeps him from making any sales.

This means the exclusivity payment must reflect the fact that at the time the producers set prices, they could still choose to purchase inputs from the rival at marginal cost. Thus, the exclusivity payment must equal the most a single producer could earn by breaching exclusivity, which is the incremental value of the rival's input over the dominant supplier's input.

This equilibrium is not the result of a coordination failure as it is in Rasmusen *et al*. This means there is no equilibrium in which *R* is not excluded. Further producers are not worse off as a result of exclusion as they are in Rasmusen *et al*. Nor does the uniqueness require that the

[18] This assumption simply recognizes that,0rh009-1l4kl8.4(inant 112 2aum)8.6(.)7s.0018-7.r This ehe Tw[(a rpi5um)11.2(gand s6

There is a continuum of end users of mass q_c, called the contestable segment, who will pay w_{cr} for an *r*-based unit and w_d " w_{cr} for a *d*-based unit.[20] There is a second continuum of end users of mass $q_n > q_c$, called the non-contestable segment, who will pay w_d for a *d*-based unit and $w_{nr} < w_d$ for an *r*-based unit, with w_{nr} "significantly less" than w_d

non-contestable segment. This can be accomplished for example by assuming *D* has a good sense of which end users have a high willingness to pay for an *r*-type unit.[23] *D* then announces a "list price" for all units and a rebate that is paid for units sold in competition with an *r*-based unit for such a customer, where the size of the rebate reflects the level of competition between *r* and *d* based units.[24] This interpretation is more consistent with end users being large customers that purchase through say a bidding or RFQ process rather than retail customers for which one price applies to a large group of end users.[25]

I assume customer segment is non-contractible, which means that the parties could never prove to a judge the willingness to pay of a given end user. Thus, they could not write a contract that based ex post payments on the identities of the customer to whom units are sold (i.e., exclusivity payments) however customer specific rebates can be made at the time of a sale to a customer if both *D* and the producer recognize that they will lose a sale if they don't offer the customer a final good price based on a low input price.

There are *f* producers all of whom can use *d* to produce a final good. *m* " *f* of these producers can also use *r* to produce the final good. Each producer's marginal cost is equal to the price he pays for the input. He can thus have different marginal costs depending on which end users he serves and which inputs he uses. Producers can price discriminate between segments. Let p_{jsi} be producer *j*'s price for a good to customers in segment *s* using input *i*.

Given this structure I construct the following formal game:

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[23] This process is described in detail in "State of New York …" (2009) paragraphs 120-125. This also assumes arbitrage is not possible. *D* might do this by limiting the number of units on which he offers the low price, or he might not honor warranties on arbitraged units. Arbitrage might be naturally prevented if the contestable and non contestable markets are geographically separate, and transport is costly, or if contestable customers market require different attributes in the input than non-contestable customers.

[24] Institutionally when a downstream producer bids on an RFP they will often collaborate with key suppliers to produce a competitive bid. In such a situation the supplier can price on an end user by end user basis. Also suppliers of major components can often tell when a major end user has purchased a product using a competitors input. The supplier can then offer an end user specific discount to win back the business.

[25] This assumption only affects *D*'s behavior off the equilibrium path.

In stage 1 the suppliers simultaneously offer payments, P_{ij}, to each producer in exchange for exclusivity. Producers announce which exclusive offers (if any) they will accept.

In stage 2 suppliers observe who has accepted exclusive contracts and set input prices, t_{ijs}.

In stage 3 producers observe prices, and if they accepted an exclusive offer, announce if they intend to breach.

In stage 4 both suppliers observe if any producers announce they will breach. If a producer breaches, suppliers can offer lower prices, t_{ijs},

max of $^{-j'i'n}$. For any set of transfer prices only the producer(s) for which $_{ijn}$ is a maximum of can make sales in equilibrium using the input *i* for which $_{ijn}$ is the max of This is because $_{ijn}$ is the maximum surplus producer *j* can offer a customer using input *i* without pricing below cost. The subgame perfect $p_{jni} = w_{in} - {}_{ijn}^{-i'j'n}*$. Suppose there were some equilibrium price $p_{jni}' > w_{in} - {}_{ijn}^{-i'j'n}*$. Then the producer with the offer associated with $_{ijn}^{-i'j'n}*$ could profitably offer a price that offered customers marginally more surplus than p_{jni}' and sell all the units.

Similarly, if $p_{jni}' < w_{in} - {}_{ijn}^{-i'j'n}*$ then the producer could marginally raise his price and offer customers more surplus than $_{ijn}*^{-}$ which no other producer could match if this producer were the only producer receiving a transfer price yielding $_{ijn}*$. If more than one producer had a transfer price that yielded $_{ijn}*$ then $p_{jni}' < w_{in} - {}_{ijn}^{-i'j'n}*$ implies $p_{jni}' < w_{in} - {}_{ijn}*$ which implies a price below marginal cost and a negative payoff.

In any equilibrium continuation *R* sells no units. Consider any price configuration in which *R* sold positive units to a producer. *D* could always set a price to that producer marginally above *R*'s price and that producer would be better off purchasing from *D*. Thus *R* must earn 0 in this segment.

In any equilibrium continuation prices must be such that if *R* offered 0 to all producers, he would sell no units. If there were prices such that *R* could sell positive units at a price of 0 then there is some arbitrarily small positive pri In any equilibrium.8962 0 TD0 Tc0 Tw(R)T0er.0007 TT9 1 Tu

Observation 3 just says that if no exclusives agreements are reached, then each segment would have the expected Bertrand equilibrium input and final good prices. This equilibrium maximizes social surplus.

Lemma 1. If $(w_d - w_{nr})q_n > (w_{cr}q_c + w_{nr}q_n)/f$ then in every subgame perfect continuation in which R offers payments for exclusivity where the sum of the payments is not greater than $(w_{cr}q_c + w_{nr}q_n)$, (which is the maximum monopoly profit R could generate) not all producers are exclusive to R.

Proof:

R cannot profitably pay more than a total of $w_{cr}q_c + w_{nr}q_n$ to the f producers for exclusivity since his monopoly profits are capped at $w_{cr}q_c + w_{nr}q_n$. Dividing this among f producers means that (at least) one producer must receive no more than $(w_{cr}q_c + w_{nr}q_n)/f$ for being exclusive to R. If all producers were to accept exclusivity to R then D would earn 0. D could always offer one producer, j', receiving no more than $(w_{cr}q_c + w_{nr}q_n)/f$ a transfer price $t_{dj'n}$ such that $[w_d - w_{nr} - t_{dj'n}]q_n = (w_{cr}q_c + w_{nr}q_n)/f$, and $t_{dj'c} = 0$ and offer a price to no other producer. *tPoducer O*

the producer could earn more profits selling in the non-contestable segment than the payment that the small rival offered for exclusivity.[30]

Lemma 2 now presents the important implication of lemma 1, which is analogous to the result of Observation 1 in the previous section.

***Lemma* 2.** *r*-based units cannot generate rents in excess of $(w_{cr} - w_d)q_c$ if *D* competes in the *c* segment.

Proof:

Suppose that *D* sets $t_{djc} = 0$ for at least one producer. Then, *R*'s best response is to set $t_{rjc} = w_{cr} - w_d$, and *D*'s best response to that is $t_{djc} = 0$. The equilibrium of this subgame is for producers to set $p_{jcd} = 0$ and $p_{jcr} = w_{cr} - w_d$ resulting in total segment sales of $(w_{cr} - w_d)q_c$.

There is no equilibrium in which *R* sells positive units at any $t_{rjc} > w_{cr} - w_d$ for all *j*. If *R* set $t_{rjc}' > w_{cr} - w_d$ for all *j*, then *D* could set $t_{djc} > 0$ by an arbitrarily small amount and make positive profits while *R* earned 0 in the *c* segment. If *R* set $t_{rjc} > w_{cr} - w_d$ for some producers and $t_{rjc} = w_{cr} - w_d$ for the rest, then only those producers receiving $t_{rjc} = w_{cr} - w_d$ would make sales in equilibrium. *QED*

Lemma 2 says that the highest rent *R* could generate is the difference between the value of his input and the value of the dominant supplier's input in the contestable segment, if *D* competes in this segment. That is, in the absence of exclusivity to *R*, there will be competition in the contestable segment, which will drive *R*'s rents down to *r*'s incremental value relative to *d* to *c* segment end users. Without exclusives, the prices in the *c* segment collapse to the Bertrand prices.

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The two lemmas together say that even though he has an opportunity to offer exclusive contracts, *R* cannot monopolize the market by signing up all producers to exclusives. Thus, he is relegated to fending off *D*'s attempts to monopolize the market, but he has only the difference between his input's value and the dominant supplier's input's value in the contestable segment with which to work. Proposition 1 now states the conditions under which this is not enough.

Proposition 1. If

If one producer deviated by simply refusing to accept an exclusive offer, then the only continuation would be for R to set $t_{rjc} = w_{cr}-w_d$ to the non-exclusive producer and for D to set $t_{djc} = 0$ for any unit sold by a D-exclusive producer to the contestable segment. In the continuation equilibrium the producer would earn a payoff of 0, which is less than the $(w_{cr}-w_d)q_c$ he would earn accepting exclusivity.

D could not profitably deviate by offering any producer a P_{dj} less than $(w_{cr}-w_d)q_c$ for exclusivity. If he did, R would offer a transfer price to that producer that would allow him to earn more profit than the exclusivity payment. The producer would accept and D would earn zero from the competitive segment.

Finally Lemmas 1 and 2 imply that R could not benefit by deviating and offering any set of producers a positive payment for exclusivity. *QED*

Proposition 1 shows conditions under which exclusion can occur. Corollary 1 shows that under the conditions of proposition 1, exclusion is the unique equilibrium outcome.

Corollary 1. If $w_dq_c + w_{nr}q_n > m(w_{cr}-w_d)q_c$ then there does not exist an equilibrium in which D does not offer exclusive contracts and R sells positive quantities in the contestable segment.

Proof:

D would earn zero profit from the contestable segment and only $(w_d-w_{nr})q_n$ in the non-contestable segment in an equilibrium in which no exclusives were offered and R sold positive quantities. If D were to deviate and adopted the strategy in proposition 1 above, it would be individually rational for each producer to accept exclusivity and not breach, and D would earn the profits outlined in proposition 1, which exceed $(w_d-w_{nr})q_n$. *QED*

The main intuition behind proposition 1 is the same as in the previous section. If there is competition for the contestable segment, then D earns 0 and R generates only the difference between the value of his input and D's input. If the monopoly profits from the contestable

segment plus the increased revenue from reduced competition in the non-contestable segment is sufficiently large, *D* pays each producer for exclusivity, making *D* a monopolist in the market.

R cannot induce all of the producers to be exclusive to himself because *D*

Two rather intuitive comparative statics are that (holding all other parameters constant) reducing $w_{cr} - w_d$, or reducing q_c reduces the dominant supplier's cost of excluding the rival. When $w_{cr} = w_d$, *D* can exclude *R* by offering a payment of 0 since *R* has no rents to offer a producer for breaching exclusivity. Note the exclusivity would still make end users uniformly worse off relative to the benchmark in which only linear prices are allowed. This same result would hold of course if $w_{cr} < w_d$. This would be the case in which the dominant supplier was more efficient than the rival at serving all customers. Here customers would be worse off from the use of exclusives to exclude a less efficient rival.

Lowering *m* also reduces the cost of excluding the rival. *m* close to 1 can be interpreted as there being very few firms that provide complementary products for a small rival and the dominant supplier can exclude the rival by "poisoning the ecosystem" i.e., buying off the few firms that provide complements to the rival.

Interestingly, increasing w_{nr} increases the dominant supplier's incentive to exclude the small rival when the second condition of proposition 2 is not binding, because a higher w_{nr} means more competition in the non-contestable segment, which means lower profits for the dominant supplier if *R* is not excluded.[33]

This model depends a good deal on *D*'s ability to price discriminate across segments. This allows him to compete away the benefits of lower prices in the contestable segment if producers were to breach exclusivity while maintaining high prices in the non contestable segment. This ability to lower its input price when an end user was considering purchasing a final good with a rival's input, while maintaining higher input prices when end users were not, was precisely the (can ..5(prisupt)5.t5(price 0 -TwToTj/T3 Trecisely)-7were.-18 m)8.5prisuptre.FTC.0004 Teustoreng

I have exogenously fixed *f* and *m* in this model. Because I have assumed homogeneous Bertrand competition and 0 fixed costs, something in the model must prevent infinitely many producers from entering the market in response to the dominant supplier's payments. Fixing *f* and *m* exogenously would be consistent with a number of potential market characteristics including i) that there are only finitely many entrepreneurs with the ability to produce the final good, ii) it takes several years of successful production to develop a reputation that allows a producer to make a significant volume of sales, iii) there is a long lead time for a new firm to gather the resources and expertise to begin production or iv) the existence of the current producers is a product of a sunk cost in the past that was paid for at a time when the industry was not so homogeneous. Thus, these "legacy" producers remain in the market, but no new producers have an incentive to enter.

These characteristics indicate that homogeneity in the product does not imply homogeneity across the universe of possible downstream producers. The theory requires that there be a sufficiently small number of producers that can be "bought off" for exclusives to cause

units sold by a downstream firm as a result of that exclusive agreement.[35] The exercise is to divide the payment by the incremental units to obtain an effective discount for these units, and then subtract this imputed discount from the observed price of the units. The payment can only be considered potentially anticompetitive[36] if the effective price of the incremental units is less than the incremental cost of producing these units after this attribution. In this model one condition that leads to anticompetitive exclusion, $w_d q_c > m(w_{cr}-w_d)q_c$ implies $w_d q_c/m > (w_{cr}-w_d)q_c$, which says the payment for exclusivity is less than the revenue from the sale of the incremental units, q_c/m. In figure 2 this condition is equivalent to $B > mA$. Thus, the effective price as calculated based on prices that would be observed in the exclusion equilibrium would not be below marginal cost, and so would not be considered to be potentially anticompetitive even

to compensate producer’s stockholders to breech exclusivity as an independent producer, it would not be enough to induce them to cede ownership

This is the effect that dominates in the Simpson and Wickelgren, and Abito and Wright papers. A second effect is that differentiation limits the size of the market a producer could serve limiting the potential profits he could earn by breaching exclusivity, which lowers the payment the dominant supplier must make to induce exclusivity. The extension outlined above has only this second effect and so reduces *D*'s cost of inducing exclusivity.

The lack of demand elasticity or the discontinuous nature of willingness to pay for *r*-based units has no substantive effect on the results. The advantages of these assumptions are that the demand system is simple so as not to obscure the main results of the paper and to make it clear that allowing two part tariffs in the benchmark model would not change the results.

For example, if we were to replace the willingness to pay for the *r*-based good with a linear function between the points $(0, w_{cr})$ and $(q_n + q_c, w_{nr})$ and allow the suppliers to make end-user by end-user price reductions, one would get a benchmark model in which each supplier extracted his incremental value from each customer. This price discrimination is more consistent with end users being large enough to have their own individual bidding process for the final good and the suppliers offering customer specific input prices. When exclusives are allowed, the dominant supplier is able to exclude the rival and charge the monopoly input price.

The fact that the small rival can be inefficiently excluded without being forced to exit the market, suggests this model could be expanded toTD[(m-a forcees0F and shdel wouel ww)2(e06 Twend uss5.5t s)]T(

all customers preferred *r*-based units. Assume there is no arbitrage between these markets.

Proposition 2. If $m(w_{zr} - w_d) > w_d$ and $w_d(q_c - q_z) + w_{nr}q_n > m(w_{cr}\text{-}w_d)(q_c - q_z)$ then there exists an equilibrium in which the dominant supplier offers each of the *m* producer a payment if his purchases of *r* as a fraction of total input purchases do not exceed $(q_z/m)/(q_z/m + (q_c\text{-}q_z)/$

(*q*

References

Abito, Jose-Miguel, and Julian Wright. (2008), "Exclusive Dealing with Imperfect Downstream Competition." *International Journal of Industrial Organization*, 26(1): 227-46.

Aghion, Phillippe and Patrick Bolton (1987)**,** "Contracts as a Barrier to Entry," *American Economic Review* 77, pp. 388-. 401

"Antitrust: Commission imposes fine of €1.06 bn on Intel for abuse of dominant position; orders

O'Brien Daniel and Greg Shaffer, (1997) "Nonlinear Supply Contracts, Exclusive Dealing, and Equilibrium Market Foreclosure," *Journal of Economics and Management Strategy*, 6(4): 755–785.

Ordover, Janusz and Greg Shaffer, (2007) "Exclusionary Discounts," working paper

Rasmusen Eric B., J. Mark Ramseyer, and John S. Wiley, Jr. (1991), "Naked Exclusion." *American Economic Review*, 81(5): 1137-45.

Segal, Ilya R., and Michael D. Whinston. (2000), "Naked Exclusion: Comment." *American Economic Review*, 90(1): 296–309.

Settlement agreement between Advanced Micro Devices Inc. and Intel Corporation, November 11, 2009, http://download.intel.com/pressroom/legal/AMD_settlement_agreement.pdf .