

# A Simple Price-Theory Model of Anticompetitive Exclusive Dealing

Joseph Farrell

University of California, Berkeley

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## 1 Introduction

Why would a buyer agree to an exclusive dealing arrangement that is anti-buyer? This “Chicago Question” sounds devastating to theories of anticompetitive exclusive dealing; but it isn’t. The economics literature has given various answers, and in this paper I discuss a simple one that deconstructs the Question’s conflation of the non-exclusive *benchmark* (better for buyers) and the non-exclusive *alternative* (rejected by the buyer).

Sellers often either “insist on” exclusivity or offer a price discount for it. These seem best modeled as a choice between one product price,  $p$ , with exclusive dealing and another (perhaps prohibitive),  $p_0$ , without. Then generally neither  $p$  nor  $p_0$  will be the ordinary monopoly price  $p^m$ , and often  $p_0 > p^m$ . Thus the alternative ( $p_0$ ) is worse than the benchmark ( $p^m$ ), which (I will show) makes harmful exclusive dealing possible even with a single buyer, although it raises price commitment issues discussed below. This departs, I believe defensibly or even compellingly, from what seems to have become the standard set-up for analyzing exclusive dealing.

In my simple price-theory model, an incumbent M has a temporary monopoly. M may set out to induce the buyer B to agree to exclusivity that will perpetuate its monopoly; if so, it will optimally refuse to deal if B rejects exclusivity, or at least charge him more than the ordinary monopoly price. Thus the *alternative* is worse for the buyer than the *benchmark* of temporary monopoly followed by competition—as is also true for different reasons in the multi-buyer models of Ramseyer et al. (1991) and Segal and Whinston (2000a).

## 2 A Model

A buyer, B, wants to buy a good in each of two periods. In the first period, only a monopoly, M, can supply the good. In the second period, there is competition, unless B agreed to exclusive dealing in the first period. In the first period, M sets a simple linear price  $p$  at which it is willing to sell in both periods if B agrees to exclusivity, and another price  $p_0$  at which it will sell in the first period if B does not.<sup>1</sup> Then B decides which offer to take, and chooses quantity. In the second period, if B agreed to exclusivity then B again faces price  $p$  and chooses quantity; if not then M and one or more entrants compete.

I will look for sufficient conditions for exclusive dealing to be (a) *profitable* for M, (b) rationally *accepted* by B (that is, better than the available *alternative*), yet (c) *harmful* to B relative to the *benchmark* in which M does not offer exclusivity. (The benchmark is a ban on exclusive dealing, or a choice by M not to offer it; it is not B's rejection of an offered exclusive deal.) If all three of these hold, exclusivity is profitable for M but harms B by excluding second-period competition; I will thus say exclusive dealing *is a problem*.<sup>2</sup>

Let  $S(p)$  be B's per-period buyer surplus at price  $p$ , and let  $\Pi(p)$  be M's per-period profit when B chooses quantity at  $p$ . Let  $\delta$  be the discount factor.<sup>3</sup> M offers B the choice of (a) an exclusive contract at price  $p$  forever, and (b) a first-period price  $p_0$  with no contract, followed by the (common) expectation of a (more or less) competitive outcome in which B pays price  $p^c$  and M gets profits  $\lambda\Pi(p^c)$ .<sup>4</sup> Then exclusive dealing *is a problem* if and

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<sup>1</sup>One could allow for M to set separate prices for the two periods. This would presumably make exclusivity if anything more likely to happen in equilibrium and more profitable for M. Note also that RRW-SW study only a single period—because of their timing assumptions, a first trading period in which no entry could occur would be a “wash” involving  $p^m$  with or without exclusive dealing.

<sup>2</sup>This is therefore a consumer-welfare standard. I believe that the results will extend, though not immediately, to show that efficiency harm can result. But that remains to be checked. Note the contrast with a single-buyer version of e.g. Bernheim and Whinston (1998), since they assume privately efficient negotiations.

<sup>3</sup>This reflects both ordinary discounting for the effluxion of time, and also uncertainty about whether/when entry will happen if there is no exclusive deal. If the ordinary interest rate is  $r$  and the probability of arrival of competition by date  $t$  is  $F(t)$  then

$$\delta = \int \exp[-rt]dF(t).$$

<sup>4</sup>If there are constant returns then  $\lambda$  is M's market share after competitive entry. If

only if three conditions simultaneously hold:<sup>5</sup>

HARM:

$$S(p) < (1 - \delta)S(p^m) + \delta S(p^c)$$

PROFITABILITY:

$$\Pi(p) \geq (1 - \delta)\Pi(p^m) + \delta\lambda\Pi(p^c).$$

ACCEPTANCE:

$$S(p) \geq (1 - \delta)S(p_0) + \delta S(p^c)$$

Note first that  $p_0$  appears only in ACCEPTANCE. Thus, for the purpose of investigating whether these three conditions can simultaneously hold, we can assume that  $p_0$  is a choke price at which  $S = 0$ , so ACCEPTANCE reduces to:

$$S(p) \geq \delta S(p^c).$$

For  $\delta \leq S(p^m)/S(p^c)$ , ACCEPTANCE holds even at  $p = p^m$ , and it is immediate that this is both profitable and harmful. Thus we have:

**Proposition 1** *For  $\delta \leq S(p^m)/S(p^c)$ , if  $M$  can credibly threaten to refuse to deal (or charge a very high price) in the first period without exclusive dealing,  $B$  will agree to exclusive dealing with no price cap. This is always profitable for  $M$ , relative to the benchmark and relative to any other relevant contract. The harm to  $B$  is  $\delta[S(p^c) - S(p^m)]$ , or  $B$ 's expected gains from competition.*

**Remark 2** *The condition on  $\delta$  implies that the harm is no greater than  $(1 - \delta)S(p^m)$ , or  $B$ 's surplus from trade in the monopoly period (or else  $B$  would not accept).*

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there are economies of scale then  $\lambda$  will be less than that share. If a more efficient entrant fully displaces  $M$  (a common assumption in the literature), then of course  $\lambda\Pi = 0$ .

<sup>5</sup>I express payoffs here and below in time-averaged form (that is, equivalent constant payoffs). For technical reasons I will make HARM a strict inequality and the other two weak. It doesn't really matter.

**Remark 3** *With linear demand the condition is that  $\delta \leq \frac{1}{4}$ , though other demand curves will give different results.*

From here on we will assume that  $\delta > S(p^m)/S(p^c)$ , so ACCEPTANCE fails at  $p = p^m$ . I explore two approaches. The first predicts  $p$  based on Acceptance; the second analyzes deals at the average benchmark price  $\hat{p} = (1 - \delta)p^m + \delta p^c$ . In the current state of the analysis the approaches are complementary: the first lets us quantify harm to B if exclusive dealing will occur in equilibrium, while the second helps us establish whether it will.

## 2.1 Using Acceptance to predict $p$

With  $\delta > S(p^m)/S(p^c)$ , ACCEPTANCE constrains  $p$  and (I conjecture—seems obvious?) will hold with equality if M maximizes profits by offering an exclusive deal that B will accept. Thus price  $p$  is defined by  $S(p) = \delta S(p^c)$ . Clearly if exclusive dealing at this price is profitable then it is a problem and the harm to B is equal to its benchmark first-period surplus,  $(1 - \delta)S(p^m)$ .

## 2.2 Agreements at average benchmark price

Condition (HARM) holds if  $p$  is "high enough". It always holds at  $p = \hat{p}$ , because  $S$  is convex in  $p$ . (More precisely, it holds at least weakly, and holds strictly unless demand is totally inelastic in the price range.)

Condition (PROFITABILITY) holds if  $p$  is close enough to  $p^m$  (assuming single-peaked profits  $\Pi$ ); it too holds (even if  $\lambda = 1$ ) at  $p = \hat{p}$  provided that monopoly profits  $\Pi$  are concave in  $p$ . If  $\lambda < 1$  then PROFITABILITY is all the easier to satisfy. (Profits are especially likely to be concave in  $p$  near  $p^m$ . But they won't be concave all the way down to  $p^c$  if M has variable costs above  $p^c$ , as is often assumed in models of exclusive dealing. Thus a fuller analysis of the model would show, unsurprisingly, that ex post productive efficiency gains from allowing entry discourage exclusive dealing.)

Thus a **sufficient condition** for exclusivity to be a problem is that B would ACCEPT an offer of  $\hat{p}$  forever, compared to the *alternative* of the choke price  $p_0$  in the first period and then  $p^c$ :

$$S(\hat{p}) \geq \delta S(p^c).$$

With linear demand, say  $S(p) = \frac{1}{2}(2-p)^2$ , we get  $p^m = 1$  and so  $S(\hat{p}) = \frac{1}{2}(1 + \delta - \delta p^c)^2$ , and B accepts the contract if and only if this exceeds  $\frac{1}{2}\delta(2 - p^c)^2$ .

Since  $p^c \leq 1$ , we can take roots of each side (after canceling the factors  $\frac{1}{2}$ ) so acceptance is equivalent to  $1 + \delta - \delta p^c \geq \sqrt{\delta}(2 - p^c)$ ; but this can be re-written as  $p^c[\sqrt{\delta} - \delta] \geq -(1 - \sqrt{\delta})^2$ , which always holds since  $0 \leq \delta \leq 1$ . Thus with linear demand, it appears that (in the sense above) exclusivity is always a problem.

**Proposition 4** *With  $\delta > S(p^m)/S(p^c)$ , the threat of refusal to deal will not induce  $B$  to agree to exclusivity without a price cap, but it can at least sometimes (with linear demand, always) induce him to agree to exclusivity with a price cap high enough that he is harmed and  $M$  gains relative to the no-exclusivity benchmark.*

**Remark 5** *One might ask whether there could be non-benchmark alternatives that are better for both. I believe not: the gains would come from levelizing the price, and assuming a single-peaked profit function the most profitable levelized price for  $M$  (below  $p^m$ ) is the highest acceptable one, at which  $B$  loses relative to the benchmark.*

[[**Discuss what the model says** about when such exclusivity is most to be feared—high or low  $\delta$ , low  $\lambda$ , etc.]]

### 3 Discussion

What happened to the Chicago intuition that a single buyer would reject anticompetitive exclusive dealing? That logic works if the acceptance condition were ACCEPTANCE':  $S(p) > (1 - \delta)S(p^m) + \delta S(p^c)$ , which necessarily fails at  $p = \hat{p}$ , because  $S$  is convex. This is the relevant acceptance condition if  $M$  would charge  $p^m$  in the first period following rejection of its exclusive dealing offer, as many exclusive dealing models in the literature assume. It is thus simply the negation of the HARM condition, so that ACCEPTANCE' and HARM cannot both hold. In my model, ACCEPTANCE (the deal beats the alternative) is *not* the negation of HARM (the benchmark beats the deal). Rather,  $M$  can “threaten” an above-monopoly price  $p_0$  (possibly amounting to refusal to deal) to first-period refuseniks. And  $M$  *will* do so if it (then) expects the exclusive dealing offer to be accepted.<sup>6</sup>

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<sup>6</sup>Moving somewhat away from the single-buyer model, setting  $p_0 > p^m$  is costly to  $M$  if many  $B$ s are apt to refuse the equilibrium offer (or, with a single  $B$ , if  $M$  assesses a high

### 3.1 Credibility

How credible is such a threat? If B irrevocably refuses exclusive dealing, M has an *ex post* incentive to cut its first-period price to  $p^m$ . This might suggest that in a truly single-buyer market, the threat of  $p_0 > p^m$  is not credible.<sup>7</sup> But it is unclear why B can seize the bargaining power by irrevocably refusing exclusive dealing. Why can't M seize the bargaining power by irrevocably setting  $p_0$ ? Certainly sellers sometimes "insist on" exclusivity, and as far as I know they have not been plagued with buyers seizing the bargaining power (consider Dentsply for instance). And if buyers could thus seize the bargaining power, perhaps they could also simply refuse to pay monopoly prices, casting doubt on basic monopoly theory (including that used in the Chicago argument that M can't profitably bribe B to accept anticompetitive exclusivity).

The Chicago Question has most force if things proceed as follows. M offers an exclusive contract to B, with some *lump-sum* "inducement" to accept; the buyer accepts or rejects; and only then does the seller set a product price (the ordinary monopoly price, if competition is not present). It's not clear that this is the most realistic available simple setup.

In that set-up, if there is a single buyer, the alternative *is* the benchmark: each consists of ordinary monopoly until entry occurs and competition thereafter. When there are multiple buyers, Ramseyer, Rasmusen, and Wiley (1991), extended by Segal and Whinston (2000), show how an incumbent can exploit collective-action problems so that no buyer perceives a competitive *alternative*, even though competition is the right *benchmark*. In their models, there is a negative externality on non-signing buyers; Segal (1999) shows that this is closely linked with inefficient outcomes.<sup>8</sup>

But (and this leads towards current model) M may not best pay B in a lump sum. If M sets a linear price and B unilaterally chooses quantity, M can affect B's payoff with less impact on its own by varying the price than by making lump-sum transfers. The model shows that by using such "cheap

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probability of rejection). (The model shows how, *given full information*, M can craft an offer that should be accepted.) But note that  $p_0 > p^m$  is only second-order costly to M, so that even if most Bs will refuse, one would expect  $p_0 > p^m$  to some degree.

<sup>7</sup>This is the same observation as the fact that making  $p_0 > p^m$  is costly to M if there is a substantial chance of B refusing ED (or, with many Bs, if a substantial number of them will do so).

<sup>8</sup>When exclusive dealing is inefficient, non-signing buyers play both the role of non-traders (relevant for public offers) and of efficient traders (relevant for private offers).

money, M can indeed often afford to pay B to sign anticompetitive exclusive deals. Of course, this doesn't consider opportunity cost of the cheap money: could M use it for something else? But if cheap money generically gets used, this would tell us that standard monopoly theory is way off.

This also raises another question: is exclusivity more likely to be sought than a lump sum? I don't have an answer, but it seems possible that  $S(p^c) - S(p^m)$  is better correlated with  $S(p^m)$  than is an easily chosen lump-sum demand. If so, exclusivity could even be a form of price discrimination, though with different welfare properties.

### 3.2 Price commitments and relative discounts

Another pattern for M's marketing of exclusive dealing would feature a presumably binding discount from "regular" prices, in which case reducing the price to those who refuse exclusive dealing would involve reducing the price to those who accept, which would be costly as long as  $p < p^m$ .<sup>9</sup> Here I am drawing on an intuition about multiple buyers, but the argument still eschews the RRW-SW focus on collective-action problems among buyers.

Long-term contracts that state prices in absolute levels are obviously costly. Exclusive dealing with some but not all buyers, with exclusivity rewarded by a binding percentage discount, might solve that problem for M. It turns out that small discounts are, to a good first-order approximation, paid for by non-discount buyers. It is almost costless for a seller to reward some buyers and punish others by giving selective discounts. This is a refined version of "cheap money."<sup>10</sup>

### 3.3 Policy

Is  $p_0 > p^m$  illegal? One might argue that the only reason (in this model!) for "sacrificing" profits from non-signers is to eliminate competition, which

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<sup>9</sup>I am thinking here of a story in which commitment to specific prices is costly, perhaps because of cost uncertainty, but M can and does commit to a (perhaps percentage) discount for exclusivity. Discounts and the way they increase pre-discount prices have been discussed in credit cards and in antitrust settlements (Schwartz and Vincent 2002, Borenstein 1996),

<sup>10</sup>In the *Microsoft* case, cheap money to pay for exclusivity took a different form not present in this simple model: it came from the monopoly power in Windows. That is, OEMs were encouraged to confer exclusivity on Internet Explorer (at the time far from a monopoly product) through threats and/or promises in the operating system market.

might dump it into a standard bucket for illegality. But if the model included efficiency reasons for exclusivity, M might use above-monopoly prices to encourage exclusivity there too. Anyway it's questionable whether one could often diagnose an above-monopoly price with great confidence (unless perhaps it's a flat refusal to deal). And many monopoly discount schemes are apt to lead to *some* prices above  $p^m$ . Indeed, with multiple customers and prices it is not altogether clear what that symbol means. Or, to put it another way, evaluating the profitability of a particular price in a multi-price marketing strategy would seem to require assessing the cross-impact on demand for other options, in which case the high price might pass muster. So I wouldn't hold out too much hope of attacking the problem in practice by saying that exclusive dealing is permitted but that M can't "penalize" non-signers with  $p_0 > p^m$ . The model pushed us toward thinking of  $p_0$  as a choke price, tantamount to refusal to deal, but that wouldn't have to be true—it was just a convenient mathematical technique for seeing whether or not some exclusive dealing menu is a problem. If some exclusive dealing is a problem then by continuity the same is true if M is constrained to set  $p_0$  such that demand is strictly positive.

Should we regard M's exclusive dealing profits as its just reward for early entry? This would be akin to saying that consumers have no antitrust right to first-period surplus. Probably a sensible competition-policy view is that M is entitled to what it can extract in the first period (here  $\Pi(p^m)$ ) but not to extension of this into the indefinite future by foreclosing competition. If the initial monopoly is due to a patent, the strategy could be called "patent extension," which is illegal for reasons (good or bad) that analyses such as Gilbert and Shapiro (19xx) do not help economists to understand.<sup>11</sup>

Bernheim and Whinston (1998) warn that, even if exclusive dealing is harmful, banning it (without controlling substitute strategies) might be unwise, for instance because M might respond to a ban on explicit exclusivity by requiring B to buy so much from M that B has no demand left for an entrant. Of course, large quantities (and/or low marginal prices) may ameliorate the monopoly problem.

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<sup>11</sup>Gilbert and Shapiro show that efficiency may be served by very long patents that permit only a slight elevation of price (though see also Klemperer 19xx). One might think that if M and B bargain their way to something like that, starting from the default of  $p^m$  followed by  $p^c$ , it would be good for them; this model suggests a possible reason why not.

### 3.4 Joint payoffs and efficiency

Much recent work on the economics of exclusive dealing (and of other vertical restraints) assumes that each set of firms that actively negotiates—and in particular M and B jointly in a single-buyer context—can maximize private joint value: see for instance Aghion and Bolton (1987), RRW, SW, Bernheim and Whinston (1998, 2000), Gilbert (2000). This paper is not in that tradition, but instead hews to standard monopoly theory in which M unilaterally commits to a limited set of instruments such as linear prices and (here) exclusivity.

Just as standard monopoly pricing theory assumes that B cannot pay M to set a marginal price equal to marginal cost (which would maximize joint value by eliminating conventional deadweight loss), here I assume that B cannot pay M to refrain from imposing exclusive dealing. In effect, here, exclusive dealing is a way for M to appropriate part of the first-period buyer surplus  $S(p^m)$  that B would collect under linear pricing without exclusive dealing. The motive for exclusive dealing would thus (I think) go away if M had fully effective other means to grab that surplus, or if M and B could flexibly negotiate over exclusive dealing in such a way that they maximize their joint payoff. However, in reality M can seldom grab all first-period surplus using other instruments, so this strikes me as a helpful analytical insight more than a real objection to the model. Possibly interesting is the fact that this model shows M *imposing* exclusivity in a real sense, whereas the joint-negotiation literature sees it as (privately) mutually beneficial.

### 3.5 Buyers who compete downstream

Contrary both to the discussion above and to RRW-SW, buyers very often are not final users but are themselves competitors (with one another) downstream. Farrell (2001) and Fumagalli and Motta (2003) note that this can make exclusivity less of a threat, since even a single holdout may be able to profitably defeat exclusion by expanding (with its lower input costs) to large enough scale to warrant entry.<sup>12</sup> On the other hand, Farrell (2001, 2004) notes that if downstream competition is strong, direct buyers don't much care if exclusive dealing succeeds, provided their rivals sign also (final consumers

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<sup>12</sup>However, if in equilibrium buyers offer similar products with capacity constraints that are not binding in equilibrium but that would prevent dramatic expansion, the Fumagalli-Motta results will not hold.

downstream bear much of the burden), so resistance might be less. Chen and Riordan (2003) stress this point in arguing that exclusive dealing and vertical integration can interact to anticompetitive effect. In the language of Bernheim and Whinston (2000) the driving force for these concerns is an externality on downstream buyers. In terms of deconstructing the Chicago Question, it is partly a shift in meaning of the word “buyer.”

### 3.6 Efficiencies

Focusing on exclusive dealing’s anticompetitive potential isn’t meant to deny that there can be efficiency reasons for long-term contracts including exclusive dealing: see for instance Segal and Whinston (2000b) and Gilbert (2000). The model here rules out productive and investment efficiency explanations by assumption, and I argued above that when there is a profitable, acceptable harmful exclusive deal, M gains more from that deal than from other possible deals that make both M and B better off than the benchmark price path  $(p^m, p^c)$ . I have not yet examined whether the anti-buyer deals predicted by the model also reduce *joint* surplus.

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## 5 Appendix [really archive—don’t try to read]

Let

$$A(\delta) \equiv S(\delta p^c + [1 - \delta]p^m) - \delta S(p^c) > 0.^{13}$$

Notice that  $A(1) = 0$  and  $A(0) = S(p^m) \geq 0$ . Also,

$$A'(\delta) = S'(\hat{p})[p^c - p^m] - S(p^c) = [p^m - p^c][-S'(\hat{p})] - S(p^c).$$

Because demand slopes down ( $S$  is convex),  $-S'(p^c) \geq -S'(\hat{p}) \geq -S'(p^m)$ , and so  $A'(\delta) \leq [p^m - p^c][-S'(p^c)] - S(p^c)$ .

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<sup>13</sup>This does not imply that the seller will set  $p = \hat{p}$ ; it’s just a mathematically convenient way of finding a sufficient (not necessary) condition for ED to be a problem.