

# New Models of Foreclosure: Should Antitrust Authorities be Concerned?\*

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## Abstract

Recent models which claim to provide examples of profitable foreclosure—when a firm weakens competition by reducing its access to customers or inputs—have led to calls for more aggressive antitrust activity by courts and regulators. However, we show that the alleged anticompetitive behavior of these models is either typical of competition, or simply implausible. In addition, even if foreclosure occurs, it is almost always confined to the short run, and its efficiency consequences are commonly ambiguous. As a result, the new literature on foreclosure provides little impetus for intervention by poorly informed regulators.

In most of the models examined, the “foreclosing” firm earns profits equal to its cost advantage as is typical of Bertrand competition, or makes profits because it was an early investor/innovator. Such profits can hardly be considered anticompetitive, and in any case can rarely be maintained beyond the short run. In addition, in many of these models vertical coordination increases efficiency, so even if foreclosure occurs, overall efficiency could improve. In the remaining models foreclosure obtains because the incumbent, but not entrants, can coordinate buyers. Only allowing incumbents this privilege is implausible, except perhaps in the short term.

JEL classifications: L41, L42, K21

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## New Models of Foreclosure: Should Antitrust Authorities be Concerned?

This paper considers the plausibility and regulatory implications of recent models which claim to provide circumstances under which foreclosure is profitable.

Foreclosure is a form of anti-competitive behavior which reduces competition so as to raise the foreclosing firm's profits at the expense of overall efficiency (consumer plus producer surplus).<sup>1</sup> Foreclosure is typically imagined as a firm using its power in one market to reduce competition and increase its profits in another.<sup>2</sup> The foreclosing firm *extends* its market power and hence profits beyond what it could earn by simply pricing to collect monopoly rents. For example, a dominant incumbent provider of local telephone access (call origination and/or termination) may find that it cannot set as high a price as it would like for local telephone access to customers which also have mobile telephone service supplied by a competitor. Foreclosure would occur if the incumbent, after buying an important purchaser of its inputs, e.g. a supplier of long distance service, refused to originate or terminate calls by all other long distance suppliers to or from customers with a mobile phone. The foreclosed long distance suppliers would be forced to purchase access to these customers from the mobile company increasing the mobile supplier's market power (it is now a monopoly supplier to the long distance companies not supplied by the fixed access firm). The mobile company would then raise its own price for call origination and termination, and this would increase the equilibrium long distance price for customers with mobile service—thus raising the foreclosing firm's downstream market power and hence its overall profits. It may even turn out that some long distance suppliers are driven out of business by this conduct, further reducing downstream competition, and increasing the incumbent's downstream market power.

This kind of scenario has historically been granted credence in a number regulatory, legal, and legislative proceedings.<sup>3</sup> However, by the mid-1970s the prevailing view in the economic literature, closely associated with the Chicago school, considered vertical integration for the purposes of

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<sup>1</sup> Foreclosure does not include efficiency-increasing moves which raise a firm's profits at the expense of other firms, e.g. a vertical integration to take advantage of economies of scope.

<sup>2</sup> A more direct form of foreclosure (discussed below) is presented in Eric B. Rasmusen, J. Mark Ramseyer, & John S. Wiley Jr, *Naked exclusion*, 81 AM. ECON. REV. 1137-45 (1991). Foreclosure made possible by regulation is not discussed here, but see Timothy J. Brennan, *Is the theory behind U.S v. AT&T applicable today?*, 40 ANTITRUST BULL., 455-82 (1995), especially 460 ff.

<sup>3</sup> For evidence of this in the U.S. see David Reiffen & Michael Vita, *Comment: Is there new thinking on vertical mergers?* 63 ANTITRUST L. J., 917 (1995), and Michael H. Riordan & Steven C. Salop, *Evaluating vertical mergers: A post-Chicago approach*, 63 ANTITRUST L. J., 513 (1995).

foreclosure to be highly unlikely. By the mid-1980s this was widely accepted by policy makers.<sup>4</sup>

The Chicago view is that foreclosure is not a strategy a firm can credibly commit to. A foreclosing firm refuses or restricts its dealings with some firms in an effort to raise price in one of its markets. To do this, it must refuse potential sales or suppliers. But this is not credible. In the example above, if the mobile phone company raised its access price the local fixed network incumbent would wish to undercut this price, since the mobile price will be well above the fixed network marginal cost. With a slightly lower price than that of the mobile carrier, the incumbent could increase its market share substantially (remembering that prior to engaging in foreclosure the incumbent had a larger share of upstream sales) and thereby dramatically raise its profits. Put another way, if the foreclosing firm has enough power to refuse to deal with vertically related firms, it could directly raise price without engaging in foreclosure. But if it does not have this power, the foreclosure option is not available to it. It can no more hold its price up after foreclosure than it could before.

Seemingly exclusionary vertical relationships, however, are often observed. Surely this is foreclosure? The Chicago argument is that it cannot be, since such behavior cannot increase profits.<sup>5</sup> Instead, if behavior that looks like foreclosure is sometimes observed—e.g. exclusive dealing and (constructive) refusals to deal—this is only because such actions generate efficiencies. Without efficiency gains, there is no source from which increased profits can be drawn.<sup>6</sup>

In contrast to the Chicago tradition, more recent papers claim to show examples of profitable vertical

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<sup>4</sup> David Reiffen & Michael Vita, *supra* note 3, at 917-8; Michael Riordan & Steven C. Salop, *supra* note 3, at 514.

<sup>5</sup> However, the firm or its managers might have secondary goals, such as increasing the company's size (which may be positively related to prestige, or even managers' salaries) which will be pursued so long as they do not reduce profit—see Roger G. Noll, *The role of antitrust in telecommunications*, ANTITRUST BULL., 515 (1995). An arguable example of foreclosure from the early history of telecommunications, the success of which was guaranteed by regulatory intervention, is documented in David Gabel & David I. Rosenbaum, *Prices, costs, externalities, and entrepreneurial capital: lessons from Wisconsin*, 40 ANTITRUST BULL., 581-608 (1995).

<sup>6</sup> For an early statement of the “vertical integration is efficient otherwise it is not profitable” argument see A. Director & E. H. Levi, *Law and the future: Trade regulation*, 51 NORTHWESTERN UNIVERSITY LAW REVIEW, 281-96 (1956), cited by Eric B. Rasmusen, J. Mark Ramseyer, & John S. Wiley Jr, *supra* note 2, at 1137). The classic statements are RICHARD POSNER, ANTITRUST LAW (1976), and ROBERT H. BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF (1978). For a good plain english summary see David J. Gerber, *Rethinking the monopolist's duty to deal: A legal and economic critique of the doctrine of “essential facilities*, 74 VIRGINIA LAW REVIEW, 1069-113 (1988).

foreclosure.<sup>7</sup> This paper examines the extent to which this new literature's findings are robust. It begins by analyzing a simple model in which foreclosure by vertical integration is profitable; then considers refinements on that model; and finally examines a model in which the foreclosure occurs through long-term contracts.

#### *Variant 1 of Hart and Tirole*

Variant 1 of Hart and Tirole<sup>8</sup> provides a useful starting point because it is very general, encompassing or anticipating the model used in a number of other papers (Figure 1). In Variant 1, the motivation for foreclosure is to gain market power lost because the firm cannot credibly commit to a high input price. Rey and Tirole<sup>9</sup> provide a simple summary of this variant by focussing on the simplest case of an upstream monopolist which deals with undifferentiated downstream producers. This is readily generalized to the case when there is limited competition upstream.

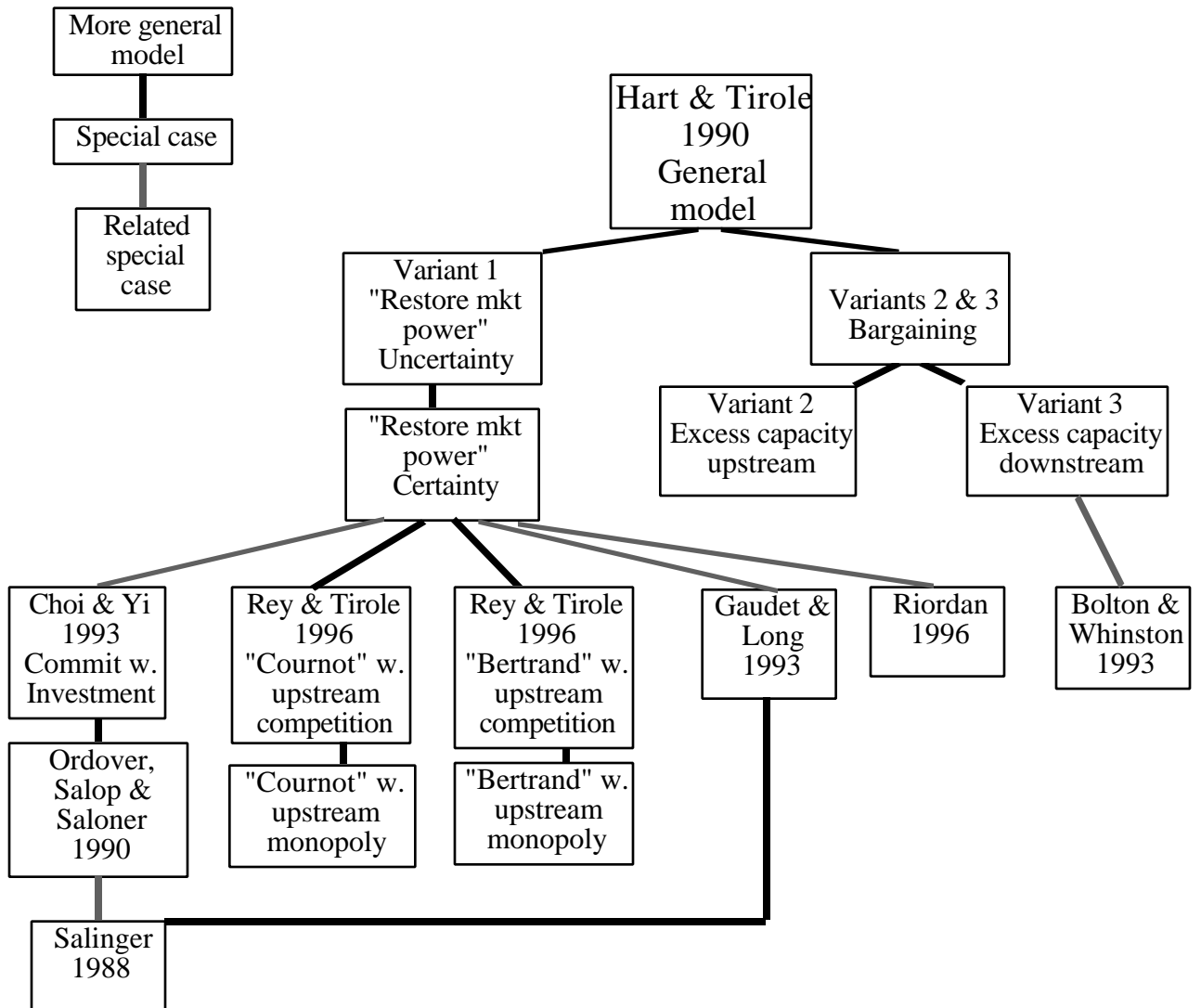
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<sup>7</sup> See P. Aghion & Patrick Bolton, *Contracts as a barrier to entry*, 77 AM. ECON. REV., 388-401 (1987); Michael A. Salinger, *Vertical mergers and market foreclosure*, 103 QUARTERLY JOURNAL OF ECONOMICS, 335-56 (1988); Janusz A. Ordover, Garth Saloner & Steven C. Salop, *Equilibrium vertical foreclosure*, 80 AM. ECON. REV. 127-42 (1990); Oliver D. Hart & Jean Tirole, *Vertical integration and market foreclosure*, 205 BROOKINGS PAPERS ON ECONOMIC ACTIVITY (1990); Eric B. Rasmusen, J. Mark Ramseyer, & John S. Wiley Jr *supra* note 2; Patrick Bolton & Michael D. Whinston, *Incomplete contracts, vertical integration and supply assurance*, 60 REVIEW OF ECONOMIC STUDIES, 121-148 (1993); Jay Pil Choi & Sang-Seung Yi, *Equilibrium vertical foreclosure with investment*, mimeo available from present author on request (1996); Gérard Gaudet & Ngo Van Long, *Vertical integration, foreclosure and profits in the presence of double marginalization*, UQAM DISCUSSION PAPER 9308 (L'École de Printemps D'Économie Internationale et D'Économie Industrielle, 1993); Patrick Rey & Jean Tirole, *A primer on foreclosure*, mimeo (1996) available from present authors on request; and Michael H. Riordan, *Anti-competitive vertical integration by a dominant firm*, paper presented to the FCC, (April 1997), available on request. This flurry of papers has led to increased concern about the possibility of foreclosure in policy making circles—see Michael Riordan & Steven C. Salop, *supra* note 3, at 514; Michael W. Klass & Michael Salinger, *Do new theories of vertical foreclosure provide sound guidance for consent agreements in vertical mergers cases?* 40 ANTITRUST BULL., 667-98 (1995). On the likelihood and policy implications of anti-competitive boycotts see Timothy J. Brennan, *Refusing to cooperate with competitors: A theory of boycotts*, JOURNAL OF LAW AND ECON., 247-64 (1992), especially his conclusion (261-3) which contains many of the present authors' concerns in regard to foreclosure.

<sup>8</sup> *Id.*

<sup>9</sup> Patrick Rey & Jean Tirole, *supra* note 7.

Figure 1



Ideally the monopolist would like to set a nonlinear tariff which claims monopoly rents from all downstream firms.<sup>10</sup> This is possible so long as the monopolist can commit to such a tariff, e.g. if its tariffs are public and cannot be privately renegotiated.<sup>11</sup> In such a case, foreclosure is unnecessary—the monopolist in any case gains all of the downstream monopoly rents.<sup>12</sup>

However, if the monopolist can secretly deal with individual firms, or privately renegotiate its contracts, it is unable to sustain the profit-maximizing monopoly tariff. In effect, once one firm signs such a contract, it is no longer profit maximizing to offer the same contract to other firms (alternatively even if all firms sign the contract, it becomes profit maximizing to renegotiate those contracts one-by-one). If output can be expanded by setting lower prices after the first firm has signed (and similarly for the second, the third and so on) the upstream firm's profits will be increased by doing so. However, such "chiseling" would place the first firms to sign with the monopolist at a possibly fatal disadvantage as compared with firms securing the subsequent lower prices.

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<sup>10</sup> Under a nonlinear tariff the unit price paid varies with the amount purchased. While such sophisticated pricing schemes are widely practiced, Hart and Tirole assume the monopolist is unrealistically well-informed about its purchasers and can prevent resale among them. This removes an important real world benefit of vertical integration, the elimination of double-marginalization (see below), so biases Hart and Tirole's results in favor of finding (welfare-reducing) foreclosure. It also has the advantage of analytical tractability. When a firm is as powerful as Hart and Tirole assume, it claims all the surplus available in the market up to the difference between its and its nearest rival's costs. A corollary of this is that it sets price optimally. Welfare is maximized, but as much to the benefit of the firm's shareholders, rather than consumers, as the presence of a potential upstream rival allows.

When firms are not this sharp their prices typically are inefficient. This reduces their profit and consumer welfare (though the firm still makes more than it would if it faced competition). In a vertical market, this leads to an important cause of inefficiency—the "double mark-up". Both the up- and downstream firms set their prices above marginal cost, but the downstream firm costs include the already marked-up input price. Thus the pricing decision of the downstream firm is "doubly" inefficient. It compounds the inefficiencies already contained in the upstream price. Vertical integration eliminates double marginalization increasing profits (and often also consumer welfare). The integrated entity maximizes profits for the joint operation. Its retail price is marked-up only "once". See Daniel Graham, & John Vernon, *Profitability of monopolization by vertical integration*, JOURNAL OF POLITICAL ECONOMY, 79, 924 (1971).

<sup>11</sup> The issue of commitment is also discussed in R. Preston McAfee & Marius Schwartz, *Opportunism in multilateral vertical contracting: Nondiscrimination, exclusivity and uniformity*, 84 AM. ECON. REV. (1994).

<sup>12</sup> For example, in Daniel P. O'Brien & Greg Shaffer, *Vertical controls with bilateral contracts*, 23 RAND JOURNAL OF ECONOMICS, 299-308 (1992), non-foreclosing equilibria guarantee each firm at least as high profits as under any foreclosing equilibria. That is, foreclosure only occurs as a Pareto-dominated equilibrium, which is unlikely, and is as much the result of a coordination failure as of anticompetitive intent. However, foreclosure can arise when only linear pricing is possible—see *id.* 775-7 and G. Frank Matheson & Ralph A. Winter, *The competitive effects of vertical agreements: Comment*, 77 AM. ECON. REV. (1987).

In this light, well-informed firms will not wish to sign a contract with price set at the monopoly level. In effect, to sign means that subsequent signers, or a renegotiating firm, will get a better deal. In order to convince firms to purchase from it, the monopolist must therefore offer a lower price than it could were pre-commitment feasible.

Put another way, the upstream firm's problem is how to credibly commit to the monopoly price. The insight of the model is that one way to do this is to contract to deal exclusively with a single downstream firm. This is much like a patent holder which sells the exclusive rights to its patent, thereby ruling out the option of further resale which—were it feasible—would reduce the asking price. Other ways to hold price up include engaging in retail price maintenance, and even imposition of a price ceiling.<sup>13</sup> If these methods are illegal or otherwise unenforceable, vertical integration provides a credible way to commit to maintaining the input price at monopoly levels. Any sales to a downstream competitor at a lower price would reduce the profits of the vertically integrated firm's downstream arm. As a result, the firm will not cut price—to do so undermines its over all profit.

In short, the motive for foreclosure in Variant 1 of Hart and Tirole's paper is to enable commitment to a monopoly price in circumstances where the upstream firm could not otherwise do so.

However, this result only holds so long as the upstream firm has initial power as a result of some kind of cost advantage. In the discussion so far it has been implicitly assumed that the firm's upstream competitors have costs which exceed the incumbent's profit-maximizing price. If upstream competitors' costs are lower than the monopoly price but still lie above the incumbent's costs, then the commitment power granted by vertical integration is weakened and the monopoly price cannot in general be sustained. If firms know each other's costs, then the integrating firm must hold price to just below the cost of its closest potential upstream competitor(s) if upstream competitors are to be kept inactive.

When firms have the same costs and know this, vertical integration for the purpose of foreclosure cannot be profitable. As a result the "equal cost" papers of Ordober, Salop, and Saloner,<sup>14</sup> and Salinger<sup>15</sup> essentially *assume* the ability to commit, and do not provide robust models which result in

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<sup>13</sup> See Patrick Rey & Jean Tirole, *supra* note 7, at 20.

<sup>14</sup> *Supra* note 7.

<sup>15</sup> *Supra* note 7.

equilibrium foreclosure.<sup>16</sup> However, vertical integration can be profitable when industry players are uncertain about their rivals' costs.<sup>17</sup>

#### *Variations on Variant 1 of Hart and Tirole*

Choi and Yi provide a model in which “foreclosure” can occur because an integrating firm does not invest in upstream cost-reducing technology.<sup>18</sup> Their model develops that of Ordover, Salop and Saloner,<sup>19</sup> but does not require the ability to commit to a high price. Instead, the decision not to invest keeps the integrating firm's upstream costs high, forcing a high price in the upstream market. The firm's alternative is to invest in cost reduction. While this improves the firm's competitiveness raising profits, it also forces it to lower the price of its input lowering profits. In some circumstances, not investing leads to higher profits for the integrated firm, all at the expense of consumer and social welfare. When this occurs, Choi and Yi's version of foreclosure takes place.

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<sup>16</sup> See Oliver Hart & Jean Tirole, *supra* note 7, at 256 ff; David Reiffen, *Equilibrium vertical foreclosure: Comment*, 82 AM. ECON. REV. 694-7 (1992). The reply (Janusz A. Ordover, Garth Saloner & Steven C. Salop, *Equilibrium vertical foreclosure: Reply*, 82 AM. ECON. REV. 698 (1992)) is not entirely satisfactory, e.g. see David Reiffen & Michael Vita *supra* note 2, 924 ff, and Jay Pil Choi & Sang-Seung Yi, *supra* note 7, their footnote 4. Michael H. Riordan & Steven C. Salop, *Evaluating vertical mergers: Reply to Reiffen and Vita comment*, 63 ANTITRUST L. J. at 533-4 (1995) similarly only reiterate the belief that firms in concentrated markets can coordinate to avoid engaging in competitive behavior—i.e. foreclosure is assumed not explained.

<sup>17</sup> In Hart and Tirole's first variant, the incentive for an upstream firm to exit due to vertical integration is reduced, because both upstream firms have some chance of being the least cost producer. This is good news for consumers, since efficiency, though not profit, is lowered with exit. However, even without exit some efficiency losses can be incurred (Oliver D. Hart and Jean Tirole, *supra* note 7, 225 ff). In P. Aghion and Patrick Bolton, *supra* note 7, foreclosure hinges on the costs of a potential entrant being unknown. This enables an incumbent to sign long term contracts which preclude efficient entry unless the entrant's realized costs are sufficiently low. In a dynamic setting, this implies delayed rather than perpetual exclusion, with short run profits accruing to early innovators.

<sup>18</sup> Jay Pil Choi & Sang-Seung Yi, *supra* note 7. In contrast, “foreclosure” in Oliver D. Hart & Jean Tirole, *supra* note 7, encourages cost-reducing investment, since prices may be set at the costs of the investing firm's nearest rival, rather than at cost.

<sup>19</sup> Janusz A. Ordover, Garth Saloner & Steven C. Salop, *supra* note 7. The Choi and Yi model allows upstream firms to invest in cost-reducing technology, and assumes some minimal market power upstream. The foreclosure results of Choi and Yi are more robust than those of Ordover, Saloner, and Salop, applying when competition downstream is Cournot (firms choose output levels—discussed in the text below) as well as Bertrand (firms choose price), and when upstream price differentiation is allowed or not.



In Choi and Yi, then, the foreclosing inefficiency is due to a failure to invest, and is not a pricing problem *per se*. The difficulty with Choi and Yi is whether a decision not to invest can be credible, except in the very short run. Choi and Yi accept that the competitive urge makes price commitments difficult. By regressing the firm's strategic choices to investment decisions, which precede price decisions, they construct an example in which credible price commitments can be made. But rivalry in investment is as real as price competition—indeed, in many imperfectly competitive industries, competition in new investment will be the primary form of rivalry. Moreover, as models of arms races show, no firm can afford to hold back on innovation in the long run, even if doing so might seem profitable in the short run. Sooner or later a competitor will develop an innovation which will leave behind the vertically integrated stick-in-the-mud. In addition, industry structure changes with investment opportunities. If it becomes profitable for the non-integrated side of the market to merge, the impact of the previous foreclosure is eliminated.<sup>20</sup> For both these reasons, foreclosing vertical integration will only occur if its costs (assumed to be zero in Choi and Yi) are outweighed by the short term gains the resulting foreclosure enables.

The model set out by Gaudet and Long<sup>21</sup> is very similar to that presented by Salinger,<sup>22</sup> but allows vertically integrated firms to buy from other upstream suppliers as well as to sell to downstream producers.<sup>23</sup> Welfare-reducing foreclosure arises only in a very particular market structure.<sup>24</sup> This

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<sup>20</sup> In the models discussed so far, the choice to vertically integrate is endogenous. Typically, if more than one pair of firms finds vertical integration profitable foreclosure fails. Instead normal competitive forces increase social and consumer welfare, usually at the expense of industry profits (industry profits can increase if the efficiency gains from vertical integration are large enough). See e.g. Choi and Yi, §3; Gérard Gaudet & Ngo Van Long, *supra* note 7 analyze this at length, but also see Michael A. Salinger, *supra* note 7.

<sup>21</sup> Gérard Gaudet & Ngo Van Long, *supra* note 7.

<sup>22</sup> Michael A. Salinger, *supra* note 7.

<sup>23</sup> When vertically integrated firms are not allowed to purchase from upstream suppliers Gaudet and Long's results are identical to those of Michael A. Salinger, *supra* note 7. This exogenously imposed constraint gives the vertically integrating firm additional price commitment power. As a result, the profits of a vertically integrated firm in Salinger's model are higher than in the more general version of Gaudet and Long's (see especially Gérard Gaudet & Ngo Van Long, *supra* note 7, at 9-10). In other words, the constraint implicit in Salinger's model, provides firms with an unexplained ability to hold up price.

<sup>24</sup> Downstream firms compete in quantities (Cournot competition) and demands are linear. Cases considered are: when the number of up- and downstream firms are equal; two downstream and at least three upstream firms; and two upstream firms and at least three downstream firms. Foreclosure only occurs when there are two up and four downstream firms (Gérard Gaudet & Ngo Van Long, *supra* note 7, 21-2).

outcome is dependent on firms with market power setting linear prices marked up above marginal cost.<sup>25</sup> In particular, it is assumed that competition can be modeled as if firms can only choose output levels and then competition among consumers determines linear market-clearing prices (called Cournot competition in the literature). This might occur if firms choose production capacity before output volume (not formally modeled by Gaudet and Long), since this makes credible the commitment not to produce more than existing capacity constraints allow.<sup>26</sup> However, this is strictly a short run phenomenon. In the long run, competition in capacity will undermine the ability to hold price above marginal cost, and the possibility of foreclosure, when it occurs at all, disappears.

Riordan<sup>27</sup> provides a model of foreclosure with very similar underpinnings to that of Gaudet and Long. However, he extends earlier results by offering an indicator of welfare change based on input and output market shares and the previous degree of vertical integration.<sup>28</sup> Were the model valid, the use of such an indicator could reduce fears that regulators might stymie an efficiency enhancing vertical merger in the mistaken belief that foreclosure is taking place. Unfortunately, exactly as with the earlier models, it is unclear how Riordan's example can be viewed as anything more than a short run outcome.

In Riordan's model, a dominant downstream firm operates with a competitive fringe of firms. All the downstream producers purchase capacity from an upstream market where suppliers have some market power. Fringe firms are assumed to buy a fixed amount of capacity, while the dominant firm's capacity choice is not constrained. In addition, the dominant firm is assumed to be more efficient than its fringe competitors. Backward vertical integration by the dominant firm causes both input and output prices to rise. Although this eliminates double-marginalization, reduces wasteful production by the fringe, and increases the profits of the integrating firm, the net effect may be to reduce overall welfare.

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<sup>25</sup> When prices are linear—i.e. the unit price for any quantity bought is the same—a firm with market power sets prices above marginal costs. In contrast, sophisticated nonlinear pricing can be efficient and still raise monopoly profits (see footnote 10).

<sup>26</sup> David Kreps & J. Scheinkman, *Quantity precommitment and Bertrand competition yield Cournot outcomes*, 14 BELL JOURNAL OF ECONOMICS, 326-37 (1983)

<sup>27</sup> Michael H. Riordan, *supra* note 7.

<sup>28</sup> Riordan's indicator only captures the benefits due to the elimination of double mark-ups. Of course, the benefits of vertical integration in general exceed these.

There are several problems with Riordan's model. While capacity, in general, cannot be adjusted overnight, it is not immutable. Further, it is not obvious why in the short run the dominant firm can adjust capacity, while fringe competitors can never do so. Even if the model could be applied to a given industry, one suspects the relevant time frames in which fringe firms cannot adjust capacity are unlikely to be long. Moreover, Riordan's model unlike the others discussed so far, does not allow the fringe competitors the option of vertical integration. Yet an important feature of his model is that vertical integration is attractive for efficiency reasons alone,<sup>29</sup> and doubly so if the dominant firm vertically integrates and pushes up input prices. In short, the results of this model seem to reflect the very tight constraints imposed on the fringe, which suggests that the real extent of that fringe's competitive effect, even absent the foreclosure, would have been extremely slight.

#### *Foreclosure due to bargaining power*

Hart and Tirole's Variants 2 and 3, and the model of Bolton and Whinston<sup>30</sup> revolve around granting either up- or downstream firms bargaining power through capacity constraints. In Variant 2 of Hart and Tirole there is an excess of capacity upstream. Unintegrated upstream firms face the risk of not being able to sell all of their output. When no firms are integrated, this risk is equally shared by all upstream firms. However, vertical integration ensures upstream sales to the integrated entity. The integrated downstream arm has no incentive to play its upstream arm off against its upstream rivals. The sales guarantee means the integrated firm increases its share of industry profits at the expense of the unintegrated firms. Social welfare, however, is reduced only if the post-integration division of profits drives an independent upstream firm out of business. Exit, when it occurs, increases market power upstream,<sup>31</sup> raising upstream price. In both markets, total quantity produced falls and price rises.

In Variant 3 there is insufficient capacity upstream. Downstream firms face the risk of not being able to purchase sufficient inputs to meet their perceived demand. Integration in this case guarantees needed inputs to the integrated downstream firm. This "harms" unintegrated downstream firms which face reduced prospects of receiving inputs at the levels they desire. If, as a result, any

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<sup>29</sup> Because it eliminates double-marginalization.

<sup>30</sup> Patrick Bolton & Michael D. Whinston, *supra* note 7.

<sup>31</sup> In Hart and Tirole's formal models there are only two up- and two downstream firms, so if here the upstream firm exits, the integrated firm becomes a monopolist upstream. The result, however, generalizes to more than pairs of firms.

downstream firms are driven out of the market, prices will rise and outputs fall. However, in Variant 3, but not Variant 2, it may be profitable for more than one pair of firms to vertically integrate.

Bolton and Whinston<sup>32</sup> present a model similar to Hart and Tirole's third variant. In their model, a single upstream firm supplies two downstream firms but with some probability of being unable to supply both firms. That is, input scarcity underpins the model. Unlike Hart and Tirole, only a single upstream firm is considered; this firm may merge with both downstream firms as well as just one; and downstream firms do not compete in the product market, but rather are monopolists in separate output markets. Downstream firms are, however, competitors for upstream input. Each values the input according to the amount of upstream-specific investment each makes. Unintegrated firms bargain over the price of the input and long term contracts cannot be written. The input price is determined by the lower of the two firm's valuations, but the input goes to the firm with the higher valuation. When the upstream firm is integrated with one downstream firm, it has the option of using the input internally without bargaining. However, if it values the good less (can earn less from it) than the unintegrated firm, the input is sold to the unintegrated firm. That is, in all cases the input is efficiently allocated given firms' investment decisions—in particular, if there is a shortage, the firm with the higher valuation gets the scarce input.

Efficiency, in the model, is determined by how downstream producers invest. In a number of situations, non-integration leads to optimal investment, but this is unstable (some coalition of the players can force integration to their benefit). The reason for this is that in the unintegrated situation, downstream firms gain nothing by manipulating their investment levels. The input price is determined by the lower of the two firms' valuations, but goes to the firm with the high valuation. However, if only one firm is independent, then the integrated firm can increase the price of its input by increasing its downstream investment.<sup>33</sup> In the model, this raises the integrated firm's profits, but by an amount less than it decreases the profits of the unintegrated firm, and so is inefficient and a form of foreclosure.

Foreclosure in these three models, when it occurs at all, requires some kind of vertical capacity shortage. As a result, unless such capacity constraints are expected to last beyond the short run, these models again do not provide a secure basis for market intervention. Bolton and Whinston also explicitly rule out the possibility of sophisticated contracts in the input market (despite the

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<sup>32</sup> Patrick Bolton & Michael D. Whinston, *supra* note 7.

<sup>33</sup> This grants it the ability to commit to a higher price.

assumption of repeated contact between two downstream and one upstream firm).<sup>34</sup> In their model the price of the potentially scarce input is always set linearly in a very competitive spot market. However, when more complete contracts could be written their version of foreclosure collapses.

*Naked Exclusion—Rasmusen, et al.*<sup>35</sup>

In the models considered so far, “foreclosure” involved some manipulation of vertical relationships. Rasmusen, *et al.* however, provide an example where a vertical market structure is not necessary to enable foreclosure.<sup>36</sup>

In many markets, an entrant must gain a certain share of the market before it can become profitable. Rasmusen, *et al.* show that if this is so, an incumbent monopolist can prevent entry by engaging in “naked exclusion”, i.e. by directly negotiating exclusive dealing arrangements with its customers.<sup>37</sup> If enough customers, perhaps on receipt of a payment from the monopolist, sign an agreement to only buy from the monopolist, entry will not be profitable. While the model seeks to identify circumstances in which this can occur, the less than plausible fulcrum of all of Rasmusen, *et al.*'s results is that only the incumbent can coordinate customers in advance of entry. This assumption and the policy implications of the model are discussed below, but first the model is outlined.

Let  $x$  be the number of customers the incumbent must sign to an exclusive dealing contract to make entry unprofitable. There are two possible situations. In one (call it Case 1), the profits the incumbent expects to lose due to entry exceed the minimum total bribes necessary to convince  $x$  consumers to sign an exclusive dealing contract. In this case, only one outcome emerges and it is anti-competitive. When the contrary holds (Case 2), two possible outcomes are possible, and one of these may be anti-competitive.

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<sup>34</sup> Patrick Bolton & Michael D. Whinston, *supra* note 7, at 126.

<sup>35</sup> Eric B. Rasmusen, J. Mark Ramseyer, & John S. Wiley Jr *supra* note 2.

<sup>36</sup> Their results, however, are readily extended to the case of a vertically integrated dominant incumbent which sells not only to the retail market, but also wholesales to firms which compete with it in the retail market.

<sup>37</sup> Rasmusen, *et al.*'s reasoning is very similar to that employed in P. Aghion & Patrick Bolton, *supra* note 7, which also assumes many buyers which are unable to coordinate among themselves.

In Case 1, all consumers will accept a minimal bribe to sign an exclusive dealing contract with the incumbent. With entry foreclosed the incumbent then will charge monopoly prices. This anti-competitive result comes about because each consumer assumes no entry will occur. Each knows the incumbent can profitably ensure this result by making the appropriate bribes. No individual consumer can prevent this and, by assumption, consumers as a group cannot organize against the incumbent. If the incumbent makes any individual an offer to sign an exclusive dealing contract, there is no reason not to sign it—entry is not going to take place in any case. Further, if a bribe of any amount is offered, it is better to take the bribe and sign, than not to sign. Monopoly prices will be faced whether one signs or not. As a result, the incumbent can offer  $x$  consumers minimal bribes and prevent entry, and then behave as a monopolist.

In the second case, when the incumbent cannot profitably bribe enough consumers to ensure losses to an entrant, two possible outcomes can emerge. What actually occurs depends on how each consumer thinks other consumers will behave.<sup>38</sup> On the one hand, if consumers think that no one except those receiving a sufficiently large bribe will sign, then competition results, and the firm makes no bribes. It knows it cannot profitably bribe enough consumers to prevent entry, so entry will occur no matter what it does. Keeping its money is the profitable strategy. On the other hand, if consumers think more than  $x$  consumers will sign, then there is no reason not to sign. In this case, the total amount in bribes offered by the firm is undetermined, but if enough money is transferred to consumers in the form of bribes the outcome may still be efficient. If sufficient bribes are paid out, and the incumbent's costs are sufficiently less than the entrant's, then consumers will be no worse off (and may be better off) than if entry had occurred—a competitive outcome. However, depending on the state of expectations, the outcome might also be anti-competitive, with small bribes and resulting high prices due to no entry.

Despite the theoretical elegance of Rasmusen, *et al.*'s model, the “no-entry” outcomes of the two cases are not plausible. Both rely on the assumed inability of consumers and/or an entrant to coordinate consumer behavior (though in the second case, it is peculiarly assumed that consumers can coordinate their expectations). It is true that coordinating large numbers of consumers, each who only stand to make a small gain, can be difficult. Yet Rasmusen *et al.* assume the incumbent is able to do this. If so, why not an entrant?

Rasmusen, *et al.* argue the entrant faces strong disadvantages as compared with the incumbent when it

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<sup>38</sup> In the jargon of game theory this is a coordination game. The consumer-players have to coordinate their expectations about how each will play.

comes to market coordination.<sup>39</sup> While this may be the case in the short term, e.g. because the incumbent has a first mover advantage, it is unlikely to be so in the long term, especially in markets in which large buyers play an important role in setting the market price. It is not realistic to expect it to be profitable for an incumbent to bribe a sufficient number of consumers to accept an exclusive dealing contract forever. The benefits of competition are likely large over the long term. Thus, in the long term, a “no-entry” outcome can only occur if consumers somehow think enough other consumers will make a long term commitment to the incumbent against their best interests, all in the face of a campaign by a potential entrant which stands to gain a great deal by preventing such an outcome.

This suggests that long-term contracts are far more likely to be observed because they enhance efficiency than for anti-competitive reasons. In effect, it is the efficiency gains they allow which create the scope to provide significant benefits to contracting customers and hence make the contracts durable in the face of attempts by competitors to shift customers away from their existing suppliers.

### *Policy implications*

We have examined a number of models which provide circumstances in which a dominant firm can exploit market power at the expense of its competition, and ultimately the consumer. It emerges that these models are far less robust than has at times been claimed. Thus, to the extent to which foreclosure proves to be profitable it generally involves the claiming of rents due to a cost advantage or capacity constraints, both typically short run phenomena (and not obviously socially harmful). The only variation from this theme came from Rasmusen *et al.* in which the ability to compete is effectively ruled out by assumption.

In Hart and Tirole’s first example, a dominant firm engages in foreclosure in order to overcome a commitment problem it faces. Foreclosure in these circumstances is not the extension of market power, but rather an attempt to exercise it. The successful foreclosing firm is able to set prices at levels which an inability to commit would otherwise prevent. However, the firm’s ability to raise price remains constrained by its competitors’ costs. The presence of more efficient competitors rules out any “foreclosing” strategy. The foreclosing firm can claim no more in market rents than its cost advantage. In technical terms, the foreclosure allows Bertrand rents, something which in general does

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<sup>39</sup> Eric B. Rasmusen, J. Mark Ramseyer, & John S. Wiley Jr *supra* note 2, at 1143-4.

not concern regulators.<sup>40, 41</sup>

Variations of Hart and Tirole's first model allow the foreclosing firm to hold back on investment in cost reductions<sup>42</sup> and production capacity.<sup>43</sup> Hart and Tirole's second and third models also rely on capacity constraints, as does Bolton and Whinston's model. Such strategies are typically not possible beyond the short run. This is also true of Rasmusen, *et al.*'s model. While customers might commit themselves to a dominant incumbent in the short run they are unlikely to do so forever.

A number of policy implications arise from these models, and notably from those which build on work of Hart and Tirole.

To begin with, these models highlight the fact that placing price restrictions on a dominant firm to prevent the abuse of market power can have the reverse effect. Some common forms of regulation can actually increase the firm's power.<sup>44</sup> Tariff disclosure and non-discrimination rules both enable the monopolist to credibly set the monopoly tariff. The former forces the monopolist to announce its tariff structure, and forbids it from making secret deals. If it seeks to undercut its tariff anywhere it must do so publicly and make the lower tariff available to all-comers. Non-discrimination<sup>45</sup> has a similar effect. If the monopolist undercuts any existing contracts, all earlier contracting firms will ask to be shifted to new contracts at the lower price. This means that in both cases—having set the upstream price—it is no longer profit-maximizing to increase output by lowering price on

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<sup>40</sup> Similar reasoning applies to P. Aghion & Patrick Bolton, *supra* note 7. Early innovators gain a small advantage—new entry does not occur without a sufficiently large improvement in technology.

<sup>41</sup> The case for intervention is weakened when industry participants do not know their costs. To improve the situation the regulator must know more about industry costs than industry participants know themselves. See also footnote 16.

<sup>42</sup> Jay Pil Choi & Sang-Seung Yi, *supra* note 7.

<sup>43</sup> Gérard Gaudet & Ngo Van Long, and Michael H. Riordan, *supra* note 7.

<sup>44</sup> Patrick Rey & Jean Tirole, *supra* note 7, at 9, and 22 ff.

<sup>45</sup> A requirement that any firm can claim the same terms as found on any active contract. This also requires all contracts to be publicly available.



subsequent contracts. If the firm attempts this, the high profits from the early signers are lost.<sup>46</sup> These regulatory rules (which come very close to those enacted in the U.S. Telecommunications Act of 1996, and in Australian telecommunications preceding 1997) enable rather than prevent the use of market power.

More generally, these models suggest that there is no *per se* imperative to intervene in the market when a firm “forecloses” to capture rents associated with an upstream cost advantage. As is typical of a dynamically competitive market, this allows the more efficient firm to earn a return for innovation. Indeed, in an integrated market, “foreclosure” may be the only way a firm can recover its investments in cost-reducing or service-enhancing technology. To focus on short run efficiency losses (because price lies at competitors’ costs, rather than at the most efficient producer’s cost), ignores the benefits brought by competition to be the lowest-cost provider.<sup>47</sup>

The case for intervention is less weak when a firm’s cost advantage is substantial and unlikely to be eroded, and especially if this advantage has little to do with the firm’s investment efforts. However, even in this situation the benefits of intervention remain unclear. Vertical integration may occur for the purposes of foreclosure, but it also may occur for a number of other legitimate reasons, all of which are efficiency enhancing.<sup>48</sup> For example, vertical integration may allow substantially better

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<sup>46</sup> R. Preston McAfee & Marius Schwartz, *supra* note 11, show that non-discrimination clauses are not always effective in this role, however, it remains the case that regulatory imposition of non-discrimination strengthens the monopolist’s hand.

<sup>47</sup> On this see N. ROSENBERG, *EXPLORING THE BLACK BOX: TECHNOLOGY, ECONOMICS AND HISTORY* (1994) especially at 53 and 228. R. J. Gilbert & S. G. Sunshine, *Incorporating dynamic efficiency concerns in merger analysis: The use of innovation markets*, 63 *ANTITRUST L. J.* (1995) also argue antitrust enforcement too often ignores the benefits of innovation, though in our view they grant established monopolists too much credit as innovators. Stephen J. Nickell, *Competition and corporate performance*, 104 *JOURNAL OF POLITICAL ECONOMY*, 724-46 (1996) shows innovation (measured as total factor productivity growth) increases with competition (whether measured by the inverse of concentration, increased numbers of competitors, or the absence of rents).

<sup>48</sup> Oliver D. Hart & Jean Tirole (*see supra* note 7, at 206-7, 211-3) are well aware of this having written seminal papers in the area. Their footnotes reference these and others. The point is reiterated by both discussants, Dennis Carlton (*id.* 227-80), and Oliver Williamson (*id.* 280-3), who also express fears that the paper will be misused to justify a more activist approach in oversight of vertical integration. Both are also concerned with its empirical applicability. Carlton, in addition, wonders about the robustness of the paper’s results to changes in its underlying assumptions. The benefits of vertical integration are directly acknowledged in Timothy J. Brennan, *supra* note 2, at 478 ff; Janusz A. Ordover, Garth Saloner & Steven C. Salop, *supra* note 7, their footnote 1, at 127; and Patrick Rey & Jean Tirole, *supra* note 7, at 44 ff. Benefits of vertical integration are explicitly modeled in Michael A. Salinger, *supra* note 7, at 354-5; Patrick Bolton & Michael D. Whinston, *supra* note 7; Jay Pil Choi & Sang-Seung Yi, *supra* note 7, at 5; Gérard Gaudet & Ngo Van Long, *supra* note 7, at 1; and Michael H. Riordan, *supra* note 7, at 2. For a good summary of the literature see JEAN TIROLE, *THE*

coordination between the two firms, especially in an industry where hold-up and other transaction costs are problematic. In these circumstances forbidding vertical integration may reduce productive efficiency by far more than the gain in allocative efficiency (from bringing prices towards costs) is worth. Indeed, virtually all of the papers reviewed note how difficult it is to identify, in any practical case, whether the conduct of vertical integration is harmful and hence counsel against activist policies.<sup>49</sup>

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THEORY OF INDUSTRIAL ORGANIZATION (1988), at 173 ff; on the benefits of boycotts see Timothy J. Brennan, *supra* note 7, at 263.

<sup>49</sup> See footnote 47 and in addition, P. Aghion & Patrick Bolton, *supra* note 7, at 399-400; Roger G. Noll, *supra* note 5, 513 ff; Michael W. Klass & Michael Salinger, *supra* note 6, *passim*; David Reiffen & Michael Vita, *supra* note 3, *passim*; and Michael H. Riordan & Steven C. Salop, *supra* note 3, at 518-19, 522 ff. These last three papers examine the policy implications of accepting the new models of foreclosure at face value. Klass and Salinger doubt intervention will improve welfare, but concede a rule of reason should apply; Reiffen and Vita virtually advocate *per se* legality for vertical mergers; and Riordan and Salop (at 513) call for a rigorous examination on a case-by-case basis before intervention is contemplated.