A REEXAMINATION OF DELIVERED PRICING SYSTEMS*

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I. INTRODUCTION

A delivered price system is one where the price to the buyer is inclusive of transport charges and is stipulated as a function of the buyer's location. In a delivered price system, two firms would quote the identical price to a buyer even if the two firms are located at different distances from the buyer.

The subject of delivered pricing used to attract the attention of some of the best economists.1 The key issue was whether and how delivered pricing could aid collusion. Interest in that issue declined in the late 1940s when the Supreme Court decided that basing point systems violated the antitrust laws.2 Recently, in Boise Cascade v. FTC the FTC unsuccessfully challenged a method of quoting price in which freight charges were always West Coast freight regardless of the product's origin.3 In a private

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2 A basing point system is a special type of delivered pricing in which the price a buyer pays equals some mill price plus freight from a basing point. By agreeing on a mill price and on a common freight schedule from the basing point, firms can create a delivered price system. In Corn Products Refining Co. v. FTC, 324 U.S. 726 (1945), the Court found that basing point pricing constituted unlawful price discrimination. In FTC v. Cement Institute et al., 333 U.S. 683 (1948), the Court found that basing point pricing constituted unfair competition and unlawful price discrimination. See also Triangle Conduit & Cable Co. v. FTC, 168 F.2d 157 (1948).

3 637 F.2d 573 (1980).

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suit, *Plywood Antitrust Litigation*, involving the same industry and pricing practices as *Boise Cascade*, plaintiffs were successful in challenging the method of quoting price.\(^4\) The potential damages in that case could have turned out to be $2.0 billion, which, if paid, would have represented the largest damages ever in an antitrust suit. In another case, *Ethyl* et al., the FTC has challenged the use of quoting list price on a uniform delivered pricing basis and selling on a delivered price basis in which the price charged is independent of the buyer’s location.\(^5\) In the recent cases, as in the early basing point cases, the charge is that the particular method of pricing lessens competition. There have not been any new theories since 1949 as to how delivered pricing facilitates collusion, though there have been significant advances in the theory of oligopoly, especially by Stigler.\(^6\) In the light of recent litigation it is an appropriate time to apply oligopoly theory to reexamine the effects of delivered pricing and to reevaluate the major arguments put forth against delivered pricing.

This paper is organized as follows. Section II defines a delivered price and FOB price system. Section III reviews the objections to delivered pricing. Section IV reviews very briefly the main ingredients of oligopoly theory. Section V discusses in detail the merits of delivered pricing versus FOB pricing as a means of colluding. Section VI discusses noncollusive reasons for delivered pricing, and Section VII applies the analysis to the basing point cases and to the recent cases attacking the use of certain spatial pricing policies.

## II. FOB and Delivered Pricing

Two different types of spatial pricing are freight on board (FOB) pricing and delivered pricing. An FOB price system is one wherein each firm quotes a price at its mill (FOB mill price) and the final price to the buyer equals the sum of the FOB mill price plus actual freight charges from the mill. Buyers are often allowed to pick up at the mill if they so choose. A typical FOB mill price system is illustrated in Figure 1 when there are only two firms, 1 and 2, and transport costs are linear. All customers to the left of \(C\) purchase from firm 1 while all those to the right of \(C\) purchase from firm 2. The price of firm 2 at a point to the left of \(C\) is given by the dotted line that extends along the line \(BC\). Prices of firm 1 to the right of point \(C\) are given by the dotted line that extends along the line \(AC\).

\(^4\) 655 F.2d 627 (1981). This case was settled for $165 million (Wall Street Journal, December 15, 1982, at 1) while under review by the Supreme Court.

\(^5\) In re *Ethyl* Corp., docket 9128 (FTC initial decision August 5, 1981), appeal argued (February 2, 1982). I was the expert witness for one of the defendants, Natco.

A delivered price system will refer to any method of quoting price which results in all firms quoting the same price to any one buyer. For example, the lower envelope $ABC$ in Figure 1 represents a delivered pricing system. The price to the buyer does not depend on the firm's location. For example, if firm 2 bids for business near firm 1, he will bid a price along the line $AC$ if $ABC$ is the delivered price schedule. A key distinction between delivered pricing and FOB pricing is that under delivered pricing different firms quote the identical price to any one buyer, while under FOB pricing different firms quote different prices to any one buyer with the exception of the marginal buyer located at $C$.

III. Delivered Pricing as a Collusive Device: A Review

Since an FOB mill price plus freight is predicted in a world in which price equals marginal cost, any deviation from such a world may be viewed with suspicion. There were two main arguments used to link delivered pricing to noncompetitive behavior. First, it could facilitate collusion by eliminating differences among firms on one dimension of the product (that is, shipping charges) which was likely to vary among firms. By removing pricing discretion on shipping charges, the task of maintaining a noncompetitive price might be made easier. Without agreement on freight charges, one firm could disguise price cuts by lower freight charges. If freight charges of other firms were hard to discover, each firm would find it difficult to disentangle price cuts of other firms from low freight rates. Without any way to monitor confidently others’ prices, firms would be unlikely to maintain a noncompetitive price and therefore be less likely to collude in the first place.\(^8\)

A second way by which it was argued that delivered pricing could

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\(^7\) "Freight equalization," in which a seller quotes a price to each buyer using the freight from the firm nearest the buyer, can be used to create a delivered pricing system.

\(^8\) For arguments along these lines see, for example, the summary in F. M. Scherer, Industrial Market Structure and Economic Performance (2d ed. 1980), at 329.
facilitate collusion was proposed by Stigler.\textsuperscript{9} In industries where demand was geographically unstable, delivered pricing enabled fortunate firms (that is, those located in regions enjoying increases in demand) to “pay back” unfortunate ones, by allowing the unfortunate firms to invade their territory without any changes in the price schedule. The invasion of the fortunate firms’ territories would be limited by the rising transport charges that the invading firms had to pay. By moderating the losses of unfortunate firms, the need for frequent changes in the price schedule would be eliminated and there would be fewer outbreaks of price cutting, making any noncompetitive price more stable.

IV. Oligopoly Theory

Any time an oligopoly succeeds in raising prices above competitive levels, there must be some implicit or explicit understanding to restrain output. Without it, each firm would have an incentive to supply any buyer for whom a profit could be made, and the competitive price would result. But how can firms succeed in collectively restraining output? There are of course many ways, some of which are illegal. One way is to set price above competitive levels and to have no firm sell at a lower price.\textsuperscript{10} If firms could perfectly and costlessly monitor the prices charged by other firms, then there would be no need for any firm to worry about cheating. Of course, such perfect and costless monitoring is rare. We postulate instead that firms agree on what price system to use, whether FOB or delivered, and on what prices to charge, but cheating on any price agreement may occur depending on the gains from cheating.

As Stigler has shown, the success of any noncompetitive pricing structure will depend on the ability of firms to detect deviations from the implicitly agreed upon pricing arrangements.\textsuperscript{11} There are two ways to detect cheating. One is to learn directly the prices that are offered to each buyer by each seller. The other is to observe the customers that firms are gaining and losing and from that to infer whether cheating is occurring. In general firms will use both methods to detect cheating. This paper will show that delivered pricing may be effective in maintaining supracompetitive prices if price observations are the primary means to detect cheating, but very ineffective if observations on shifts in customers are the primary means used to detect cheating.

\textsuperscript{9} Stigler, supra note 1.

\textsuperscript{10} Of course, there are other ways to collude. For example, each firm could be assigned some share of the market. We focus attention on the collusive nature of price agreements because the criticism of delivered pricing is that it is a collusive price agreement.

\textsuperscript{11} Stigler, supra note 6.
V. Relative Merits of FOB versus Delivered Pricing as a Method of Collusion

A. Market Allocation

The most serious limitation of delivered pricing as a collusive device is that it fails to divide the market among sellers. If buyers and sellers are spatially dispersed, it is true that firms have the greatest incentive to obtain business close by. But without any output restrictions and as long as the delivered price is above competitive levels, firms will have an incentive to expand into other firms' territories. For example, if ACB in Figure 1 is a delivered price schedule, firm 2 will have an incentive to sell to customers to the left of point C as long as the delivered price to the left of point C exceeds its marginal cost plus transport costs. In other words, even without deviating from the delivered price schedule there is an incentive to expand and obtain business from neighboring firms. Of course, if the delivered price schedule is adhered to, not all firms can succeed in expanding their output. To the extent that buyers are indifferent among suppliers if they all charge the same delivered price, firms could undergo shifts in their market shares even as they adhere to the delivered price schedule, all of which creates instability in the cartel. Moreover, even if, ex post, buyer inertia prevents shifts in market allocations, ex ante prediction of the market allocation may be highly uncertain—and that alone may prevent an initial agreement from being reached.

In contrast to delivered pricing, when all firms adhere to the FOB pricing rule, the market is automatically divided among firms. In Figure 1, both firms charge the same FOB mill price and the market is divided at point C. There is no uncertainty about the mechanism determining each firm's market area. And this division of the market may be highly predictable provided transport cost is known, an assumption whose implications we examine more fully below. The different ease of detecting cheating under FOB pricing and delivered pricing will turn out to depend heavily on the different properties the two pricing systems have regarding market allocation.

B. Detecting Cheating—No Uncertainty in Transport Cost

As discussed in Section IV, firms have two ways to find out if other firms are cheating on the implicit pricing arrangement. First, they can observe price directly—as when one firm finds out that another has cut its

12 Some uncertainty may be reintroduced if there is nonprice competition, but nonprice competition introduces uncertainty into the market allocation under delivered pricing too.
delivered or FOB mill price. Second, they can infer it from the behavior of demand. In general, both methods will be used.

Both FOB and delivered pricing are equivalent in detecting cheating if the firm can learn from customers either the actual FOB mill price or delivered price charged by its rivals. They are of course of different effectiveness if the delivered price is revealed when delivered pricing is used, but the FOB mill price is not revealed when FOB pricing is used. But if customers are willing to reveal the total price paid under delivered pricing, why would they not reveal the total price paid under FOB pricing? Under FOB pricing, if the customer reveals his total price, then the actual FOB mill price can be inferred easily, assuming, as we are in this section, that transport costs are known.

The FOB and delivered price systems are of very different effectiveness in detecting cheating when direct observations on rivals’ price are unavailable (or unreliable) and observations on demand are used to infer cheating. For example, suppose that there is no uncertainty about freight and that firm 1 observes that he has lost a customer far to the left of C (see Figure 1). The likelihood of this happening under delivered pricing may be quite high even if all firms are adhering to the agreed upon delivered pricing schedule, ACB, since buyers may be indifferent in their choice of suppliers charging the same delivered price. On the other hand, the possibility of this happening under FOB pricing is quite low unless there is cheating. As long as each firm is adhering to the agreed upon FOB pricing scheme, no buyer far to the left of C would purchase from firm 2. The reason is that to the left of C the price of firm 2 exceeds that of firm 1. An inference of cheating is warranted under FOB pricing but not under delivered pricing. Cheating is more likely to escape detection under delivered pricing because under delivered pricing different firms must quote the identical price to any one buyer while under FOB pricing different firms must in general quote different prices to any one buyer.

A related point is that delivered pricing makes each consumer a competitive battleground. On every transaction, a slight decrease in price will guarantee a sale. In contrast, under FOB pricing only the marginal consumer (located at C in Figure 1) is a battleground. The ease of detecting cheating on most customers is increased under FOB pricing because significant concessions have to be made to obtain additional business, and it may be easier to detect significant rather than slight price cuts.

C. Detecting Cheating—Uncertainty about Transport Cost

Those who have argued that delivered pricing is a collusive device have stressed the importance of transport cost uncertainty. This uncertainty
could arise for several reasons. For example, freight costs could vary greatly among firms if different products are shipped together, if there are empty backhauls, if several different transport modes are used, or if several different-size shipments are used. The argument is that by using a delivered price schedule, problems of detection of cheating that arise under FOB pricing when firms do not know their rivals' freight cost are eliminated or mitigated.

There are two objections to the argument. First, anytime the delivered price schedule departs from some FOB pricing schedule, there is an economic inefficiency, and that by itself could create incentives for some firms to try to shift around business. In other words, the more serious the departure of delivered prices from inducing an efficient spatial allocation of firms to buyers, the greater the instability of the arrangement. Second and more important, it is by no means obvious that delivered pricing is superior to FOB pricing in detecting cheating when transport costs become uncertain. It will turn out that whether FOB or delivered pricing is superior as a collusive device will depend on whether firms use direct price observations or observations on shifts in business to detect cheating.

Consider the method of detecting cheating by direct price observations. If direct observations on rival firms' delivered or actual FOB mill price are available and are used to detect cheating, the transport cost uncertainty argument is completely irrelevant. In other words, if firm A can reliably observe firm B's actual delivered price (when delivered pricing is used) or firm B's actual FOB mill price (when FOB pricing is used), then firm A knows for sure whether firm B is cheating or not.

The argument about transport cost uncertainty becomes relevant if direct observations on rival firms' prices are available only for the delivered price (when delivered pricing is used) but not for the actual FOB mill price (when FOB pricing is used). In that case, it is indeed true that cheating under delivered pricing can be detected easily, while cheating under FOB pricing cannot. But why should it ever be the case that a firm could discover the delivered price of a rival if delivered pricing is used but could not discover the actual FOB mill price of a rival if FOB pricing is used? Presumably the customers are the source of information on pricing in each case. Why would customers reveal the delivered price when delivered pricing is used, but not the actual FOB mill price when FOB pricing is used? One possible reason is that under FOB pricing the total price (FOB mill price plus freight) is the price the buyer cares most about, not

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13 The "actual" FOB mill price equals the total price to the buyer minus actual transport cost.
the FOB mill price. It is conceivable that under FOB pricing the buyer can only easily reveal the total price because the buyer may not know the actual freight costs per product especially when many products are shipped together.\(^{14}\) Therefore, since the buyer cannot calculate freight, he is unable to reveal the actual FOB mill price (that is, total price minus actual freight). Here, then, we see a possible advantage of delivered pricing over FOB mill pricing. If transport cost is uncertain, if under delivered pricing the delivered price of rivals is revealed by customers, and if under FOB pricing the actual FOB mill price of rivals is not revealed by a customer, then delivered pricing may have an advantage over FOB pricing for detecting cheating.

The second method of inferring cheating is to observe shifts in business. Here delivered pricing seems inferior to FOB pricing to detect cheating. In general, the range of customers over which cheating can be successful is smaller for FOB pricing than for delivered pricing. Let us illustrate this point with an example.

Suppose that FOB pricing is used and suppose that firm 1 is trying to see if firm 2 is cheating on an implicit pricing arrangement to use FOB pricing and charge the same FOB mill price. Firm 1’s own transport costs are known to it, but firm 2’s transport costs are uncertain, and vary between the two costs as illustrated in Figure 2. Let the constant marginal cost equal \(m\). As Figure 2 illustrates there will be several different ranges relevant to firm 1 in detecting cheating, provided firm 1 is adhering to the FOB pricing scheme. First, between \(A\) and \(B\), there will never be sales of

\(^{14}\) Alternatively, perhaps only total price is revealed publicly. For example, on bids that are publicly revealed, perhaps only the total price need be revealed. Moreover, in some cases (for example, multiproduct shipments) it may be impossible to define actual transport cost per product. In such cases, the buyer obviously cannot reveal the actual FOB price since it is not a well-defined price.
firm 2 because, even with the lowest transport cost, it is not profitable for firm 2 to ship to the left of $B$. Second, between $B$ and $C$, it is profitable for firm 2 to ship, but firm 2 can obtain business between $B$ and $C$ only if firm 2 definitely deviates from the FOB pricing arrangement.\(^\text{15}\) Sales by firm 2 between $B$ and $C$ allow a sure inference of cheating. Third, between $C$ and $D$, it may be profitable for firm 2 to ship even if it adheres to the FOB pricing arrangement. Sales of firm 2 in this range do not allow a sure inference by firm 1 that firm 2 is cheating but suggest the possibility of cheating with the probability rising to one the closer firm 2 sales are to $C$. We call the range $CD$ the zone of indeterminacy. Fourth, between $D$ and $E$, firm 1 will not sell if both firms adhere to the FOB pricing arrangements. In summary, given that firm 1 is adhering to the FOB pricing arrangement, firm 2 can cheat (that is, lower prices below the implicitly agreed upon price) only on customers in the range $CD$ without its cheating being detected with certainty by firm 1.

Before contrasting the range of uncertainty under FOB pricing with that under delivered pricing, let us examine when we expect the zone of indeterminacy to be small under FOB pricing.

In general, freight rates tend to be correlated across firms. When firm 1 has low transport costs because of, say, excess shipping capacity, so too will other firms. But if freight costs are highly correlated across firms, then even though the freight is hard to predict in advance, firm 1 may be able to predict accurately firm 2’s freight based on its own freight, and the market division may be very well defined. For example, in Figure 2, with unknown but equal (that is, perfectly correlated) freight costs, markets are always allocated half to each firm, the zone of indeterminacy under FOB pricing shrinks, and cheating anywhere is easily detected. So, what the opponents of delivered pricing must be stressing is that uncorrelated variation in freight rates across firms makes it difficult to detect cheating in a price-fixing agreement that uses FOB pricing.

One interesting fact about the zone of indeterminacy under FOB pricing is that it can diminish as the importance of freight increases. (It is only when freight is significant that the method of charging freight can significantly influence prices. The standard examples of basing-point systems are cement and steel, products for which freight can become a significant fraction of price.) Figure 3 illustrates this simple point. (The steeper lines emanating from the location of firms 1 and 2 reflect higher transport costs than those in Figure 2.) Notice that $CD$ is smaller in Figure 3 than in Figure 2. For example, let the mill prices be equal, and let freight

\(^{15}\) Point $B$ will coincide with point $C$ when, for example, the mill price equals the (constant) marginal cost.
equal \((F + E_i)t\) where \(t\) is shipping distance, \(F\) is the mean freight per mile, and \(E_i\) is the random component in freight to firm \(i, i = 1, 2\), caused by uncertainty. If the distance between firm 1 and firm 2 is 1 mile, then the market division will occur at a distance from firm 1 of

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t = \frac{1 + E_2/F}{2 + (E_1 + E_2)/F}.
\]

Obviously as \(F\) increases, \(t\) will vary more closely around \(\frac{1}{2}\) and the zone of indeterminacy will diminish. In other words, it is the percentage fluctuations in freight that determine the size of the zone of indeterminacy. If the percentage fluctuations in freight diminish for products with higher freight costs, FOB pricing *improves* as a method of detecting cheating because the zone of indeterminacy narrows.

How well does delivered pricing do in detecting cheating when transport costs are uncertain and when shifts in business are used to detect cheating? Delivered pricing will usually lead to a zone of indeterminacy much larger than under FOB pricing and will never lead to a range like \(BC\) in Figure 2, in which inferences of cheating are automatic if cheating does occur.\(^\text{16}\)

For example, suppose firm 1 and firm 2 are adhering to a delivered pricing schedule and are located at \(t = 0\) and \(t = 1\), respectively. Let the freight cost of firm 1 be \(f(d)\), where \(d\) is distance shipped, and that of firm

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\(^{16}\) If we complicate our assumptions and do not allow firm 1 to know whether a buyer in the range \(BC\) in Figure 2 has switched to firm 2, but only that for some reason the buyer has ceased purchasing from firm 1, then automatic inferences of cheating will not occur under FOB pricing. It would still be the case, however, that the probability of detecting cheating in the range \(BC\) would be higher under FOB pricing for the reasons given in the text.
2 vary between $f_{\text{max}}(d)$ and $f_{\text{min}}(d)$; $P(t)$ be the delivered price schedule as a function of the buyer’s location $t$; and $m$ be constant marginal cost. The closest location, $t_1$, to firm 1 that firm 2 would ever sell is determined by the equation

$$P(t_1) = m + f_{\text{min}}(1 - t_1).$$

Firm 2 would lose money if it ever shipped beyond $t_1$. The farthest distance, $t_2$, that firm 1 would ever ship is given by

$$P(t_2) = m + f(t_2).$$

These two equations determine the maximal range $[t_1, t_2]$ over which both firm 1 and firm 2 will find it profitable to make sales. It is the zone of indeterminacy. There is no range over which firm 1 can definitely infer cheating by firm 2. It is reasonable to expect $[t_1, t_2]$ to exceed the corresponding range under FOB pricing. Under delivered pricing, the boundary, $t_1$, is determined by the intersection of the delivered price schedule with the curve emanating from firm 2 of $m + f_{\text{min}}$. Under FOB pricing, the boundary, $t_1$, is determined by the intersection of the total price schedule from firm 1 (FOB mill plus freight) with the curve emanating from firm 2 of $P_0$ (not $m$) plus $f_{\text{min}}$ where $P_0$ is the FOB mill price. As long as the general level of prices under delivered and FOB pricing are comparable, $t_1$ will tend to lie closer to firm 1 under delivered pricing than under FOB pricing since $P_0$ will exceed $m$ under noncompetitive pricing. A similar argument explains why $t_2$ is likely to lie closer to firm 2 under delivered pricing. This reasoning is illustrated in Figure 4. In Figure 4, we assume that $P(0) = P(1) = P_0$, that $m = \text{constant marginal cost}$, and that firm 1’s FOB mill price plus freight is one segment of a delivered price schedule. (The exact
location of $E$ depends on the delivered price schedule to the right of $D$.) With delivered pricing, there are only three ranges of interest to firm 1. To the left of $B$, firm 2 never finds it profitable to make sales as long as firm 1 charges at most the delivered price schedule. (To the left of $B$, $m$ plus minimum freight from firm 2 exceeds price.) Between $B$ and $E$, both firm 1 and firm 2 make sales. To the right of $E$, firm 1 makes no sales as long as firm 2 charges at most the delivered price schedule. (That is, to the right of $E$, $m$ plus freight from firm 1 exceeds price.) Under FOB pricing, the zone of indeterminacy, $CD$, is much smaller than the comparable zone, $BE$, under delivered pricing.

Within the zone of indeterminacy, it is possible that one type of spatial pricing will be superior to the other in the detection of cheating. Some of the more important factors influencing the ability to detect cheating include the number, size, and location of buyers and the frequency of transactions. It seems possible to give examples where either form of spatial pricing represents the better one for collusion within the zone of indeterminacy. For example, if there are many equal-sized buyers, and transactions are not repeated often, then it follows from the law of large numbers that the detection of cheating within the zone of indeterminacy could be more rapid under delivered pricing than under FOB pricing. Alternatively, if one buyer is large but located far from a firm, then it will be much easier to cheat under delivered pricing than under FOB pricing. The reason is that FOB pricing allows differential detection of cheating by location and makes it very hard for a firm to cheat on far away customers even within the zone of indeterminacy. Because of the ambiguity in whether FOB or delivered pricing is the superior method for collusive pricing within the zone of indeterminacy, I shall focus attention solely on the relative size of the zone of indeterminacy in comparing the efficacy of FOB and delivered pricing systems as collusive devices. Such an approach should yield useful general conclusions provided that there are not unusual differences in the ability to detect cheating between FOB and delivered pricing within the zone of indeterminacy.

So far, the analysis showing FOB pricing to be superior to delivered pricing has proceeded on the implicit assumption that firms are spatially separated. If firms are not significantly spatially separated, then the relative advantage of FOB pricing completely disappears. For example, in Figure 5, firms 1 and 2 are located very close to each other. The zone of indeterminacy under FOB pricing as viewed by firm 1 consists of points to the left of $A$ and to the right of $B$ and is practically the entire market, just as it would be for delivered pricing.

In summary, uncertain freight costs limit the ability of a firm to detect cheating. In the case where the total price (and only the total price)
inclusive of freight is always revealed and transport costs are uncertain, it is possible for delivered pricing to be a better method for colluding than FOB pricing. But as long as shifts in business are the primary method used to infer cheating, FOB pricing is in general better than delivered pricing as a collusive device. The closer together the firms are located, the less the advantage offered by FOB pricing.

D. Unstable Geographic Demand

With unstable geographic demand, a noncompetitive FOB system will need to be renegotiated frequently to prevent firms experiencing business declines from cutting prices. Stigler correctly argues that such renegotiations can lead to difficulty in maintaining supracompetitive prices.

Stigler goes on to argue that delivered pricing surmounts the difficulties in setting a noncompetitive price caused by unstable geographic demand. His argument is that fortunate firms allow unfortunate firms (that is, those beset by low demand) to invade their territory to prevent less fortunate firms from resorting to price competition to improve their sales. This argument is not entirely convincing. Why do fortunate firms not increase their profits by feigning demand pressures and invading other fortunate

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17 The advantage of FOB pricing emerges because FOB pricing simplifies the detection of cheating by forcing different firms to quote in general different prices to any one buyer. The advantage of delivered pricing emerges when observations on the total (that is, delivered) price are available, and it is the delivered price that is the subject of the agreement. A pricing system that combines the best features of each would be an FOB price system in which there was an agreement on “freight per mile” (even though it differed from actual freight) and on FOB mill price. Under this system, each firm’s total price to each buyer would be the subject of the agreement and different firms would be quoting different prices in general to any one buyer.

18 Stigler, supra note 1.
firms' territories? The explanation Stigler gives for delivered pricing, namely, that it allows territories to be easily shifted around without upsetting the price structure, means that market allocations could be continually changing and that it would be very hard to distinguish invasion of a cheating firm from invasion by an "unfortunate" firm. The very condition Stigler stresses in his "Theory of Oligopoly" as an essential element of noncompetitive pricing, namely, being able to detect cheaters, is lacking in his collusive explanation for delivered pricing.

With unstable geographic demand, it is not at all obvious that delivered price is superior to FOB pricing in setting a noncompetitive price. Both pricing systems are likely to encounter difficulties with unstable geographic demand.

E. Punishing a Cheater

A noncompetitive arrangement must provide an effective deterrent against cheating. The threat of competition can often be a sufficient threat. But suppose one firm is caught cheating. Should all other firms inflict lower profits on themselves in order to punish the cheater?

For example, suppose that there are three firms in the market all charging an FOB mill price of \( P_0 \) plus freight (see Figure 6). Suppose firm 2 is caught cheating and firms 1 and 3 decide to punish firm 2 by reducing firm 2's mill price to \( P \). To punish firm 2 under FOB pricing, both firms 1 and 3 must lower their prices everywhere by the same amount. Under a delivered price system, firms 1 and 3 could agree to lower their delivered prices only in the area around firm 2's location, that is, adopt the delivered price schedule \( ABCDE \). In this way, firm 2 would be punished yet the profits

\[ \text{Note 6, supra.} \]
of firms 1 and 3 would not suffer as severe a decline as previously. The less costly it is to inflict punishment, the greater the deterrent effect and the more likely the noncompetitive arrangement is to succeed. To the extent delivered pricing can be used to punish selectively, its use facilitates collusion.

VI. DELIVERED PRICING—NONCOLLUSIVE EXPLANATIONS

What reasons, other than collusion, can explain the use of delivered pricing? Several possibilities deserve consideration. First, there may be efficiencies in quoting price as delivered. This may be especially true of goods sold on a uniform delivered pricing (UDP) basis. For example, if freight costs (or, more important, variation in freight costs across buyers) are small, then it may be easiest just to charge everyone the same price. In many competitive industries, such as food retailing and mail ordering, UDP is quite prevalent. Bingham found that freight cost as a fraction of price was on average around 3 percent in food retailing. Sample calculations for mail-order houses practicing UDP (Neiman Marcus and L. L. Bean) indicate freight costs of about 5–10 percent of price. Testimony in the Ethyl case revealed that for several chemicals sold in uncompetitive markets, UDP was a common form of pricing. The survey of Greenhut et al. on spatial pricing schedules showed that 20 percent of the surveyed firms used uniform delivered pricing. A second justification for delivered pricing is that customers may not want to bear the risk in delivered price caused by freight variations. (I thank R. Topel for this second justification.)

Many have criticized delivered pricing as artificial. But it is important to remember that the transport costs to the marginal supply source are what matter in setting price. A factory in Kansas that sells at a Chicago delivered price may be responding to economic forces that make Chicago

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22 Id. at 595.
23 Note 5, supra.
the marginal supply source. See Haddock for an analysis questioning the alleged artificiality of delivered pricing.26

VII. APPLYING THE THEORY

Based on the preceding discussions, we can form a checklist to help determine when delivered pricing is being used to facilitate collusion and when a move to FOB pricing would promote competition. This is a reasonable inquiry, for FOB pricing and delivered pricing represent two of the most likely alternative spatial pricing policies that colluding firms might consider adopting. Presumably, in order for the inquiry to be of interest, collusion must be feasible and freight (or actually variation in freight among buyers) must be significant (say, over 5 percent of price). Different pricing methods of handling freight cost can matter only when freight is a nontrivial fraction of price. A yes to a question on the checklist suggests that delivered pricing could be being used to facilitate collusion and that a move to FOB pricing could promote competition. The checklist is:

1. Is freight hard to calculate or changing frequently? Is the product frequently shipped by more than one transport mode?
2. Do firms learn quickly and reliably of the actual delivered prices charged by other firms? Is it rare for discounts to be kept secret?
3. Is monitoring of delivered price the major way in which one firm detects price changes of other firms? Is it less frequent that shifts in business are used to detect price changes of other firms?
4. Are there any regions in which major competitors are located close together?
5. Have there been any instances of punishment in which the delivered price schedule is lowered in the specific geographical area of the cheater?

As is no doubt evident, it will be much easier to obtain unambiguous answers to some questions on the checklist than others. For example, readily available data will usually be available to answer questions on freight costs or firm locations, while (possibly conflicting) testimony might be the only source to answer questions about one rival's knowledge of other rivals' pricing and sales activity. Despite these difficulties, it is instructive to use this checklist to examine some of the basing point cases and the recent cases directed at spatial pricing policies. In the early cases, there was often direct evidence of collusion in the design and maintenance

of the basing point system. It seems clear that the firms involved must have felt they benefited from maintenance of the basing point system, so that our theory applied to the facts of those cases should indicate that delivered pricing was an effective collusive device.

Among the industries involved in basing point cases, the two most well known are the steel and cement industries. In both industries freight was substantial. Uncertainty about freight arose in each industry because transport modes other than rail could be used. In cement, manufacturers could learn quickly through cement dealers of a rival's price change. In both steel and cement there were often several plants located within the same area. In cement in 1932, there were twenty-five mills owned by fourteen firms located in the Lehigh Valley of Eastern Pennsylvania. Pennsylvania accounted for about 24 percent of all cement production in 1928, the bulk produced by mills in the Lehigh Valley. In steel in 1929 there was a high concentration of plants around Pittsburgh with Pennsylvania and Ohio together accounting for over half of total steel production of steel ingots and castings. For blooms, billets, and slabs, about 25 percent of U.S. capacity in 1934 was located within fifty miles of Pittsburgh. In cement, there was evidence that the delivered pricing schedules had been used to punish firms who failed to adhere to the price rules. In particular, a cheating firm not located at a basing point was punished by making the firm's location a basing point. Based on our checklist, these industries are ones for which delivered pricing could well be superior to FOB pricing as a collusive device.

In *Boise Cascade Corp. v. FTC*, the FTC attacked a method of pricing

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27 For a history of the basing point cases in these industries see Machlup, *supra* note 1, at ch. 3.

28 The Cement Association actually forbade truck deliveries. See Machlup, *supra* note 1, at 77.


30 Source: Letter from Chairman of the FTC, Senate Document No. 71, June 6, 1933.


34 Machlup, *supra* note 1, at 132.

35 Another industry involved in basing point cases was corn products. That industry too was concentrated geographically in terms of production. For example, in 1935, roughly 70 percent of employment was from firms in Iowa and Illinois. Source: U.S. Department of Commerce, Bureau of the Census, Biennial Census of Manufactures, vol. 1, ch. 3, Table 2, at 122 (1935).

36 Note 3, *supra*. 
in which southern plywood manufacturers routinely added West Coast rail freight to their mill price quotes. Before 1947, the plywood industry was primarily located in the Pacific Northwest. Technological changes since 1947 enabled fabrication of plywood from southern pine. By 1974, the South accounted for a substantial fraction (32.3 percent) of all plywood marketed. My reading of the evidence was:

1. Freight could be significant.
2. The product could be delivered by truck or rail.
3. Several plants were located in the South, and the industry was concentrated (five companies involved in the suit accounted for 50 percent of all southern plywood shipments).
4. There was evidence that the price to which the West Coast freight factor was added was subject to negotiation and varied considerably from transaction to transaction.
5. There was no allegation that prices had ever been lowered in a specific geographic area to punish a price cutter.

The Boise Cascade case is an interesting one because the first three facts listed above bear a striking similarity to the facts in the basing point cases in which delivered pricing was a successful collusive device. However, the evidence cited in point 4 was sufficiently strong that the Ninth Circuit found that there had been no effect from the practice. On the basis of our checklist, it would appear that plywood was an industry in which the FTC was properly on guard to check that the spatial pricing policies did not facilitate collusion.

In Ethyl, the FTC attacked the use of uniform delivered pricing (UDP) as a device that facilitated collusion in the lead antiknock industry. There were only four firms in the industry, Ethyl, Du Pont, PPG, and Nalco, and the products produced were homogeneous. Ethyl and Du Pont were of roughly equal size with a combined market share of about 70 percent and were the price leaders in the industry. My reading of the evidence was:

1. Freight costs averaged 2–3 percent of price. Freight variation was small with 90 percent of the customers paying 1–3 percent of price as freight.
2. Most shipments (over 85 percent) went by rail in tank cars owned by the

37 Note 5, supra.
38 The FTC also attacked the use of public press announcements of price changes, thirty-day advance notice of price increases, and a “most favored nations” clause that, according to the FTC, guaranteed each buyer that his price was the same as that for other buyers of the same product. For an analysis of these practices, see Steven Salop, Practices That (Credibly) Facilitate Oligopoly Coordination (1981) (mimeographed, Georgetown Univ.) and Charles Plott, The Effects of Market Practices in Oligopolistic Markets: An Experimental Examination of the Ethyl Case (undated) (mimeographed, California Inst. Tech.).
producers. There were very few different-sized cars used. Because rail rates are regulated and published, it was easy to ascertain freight. Because of the toxicity of the product, buyers were not generally interested in being allowed to pick up at the plant.

3. At each major buyer location, the largest two firms, Du Pont and Ethyl, employed salesmen whose duties included keeping track of rail deliveries of other firms. The rail cars of the two largest firms (market share of about 70 percent) were easy to identify. It was more difficult to ascertain deliveries made by the two smallest firms.

4. Buyers would reveal to one firm the list prices of another, but not necessarily discounts. There were numerous instances of secret discounts.

5. There were very few supplier plants in the industry, and the plants of the two major producers were spatially separate. During 1974–80, Du Pont had two manufacturing facilities, one in Deepwater, New Jersey, and another in Antioch, California. (Du Pont had a blending facility in Texas, but it accounted for a small fraction of its shipments. The facility was discontinued in 1978.) Ethyl had manufacturing facilities in Houston, Texas, and Baton Rouge, Louisiana. PPG and Nalco had manufacturing facilities in Beaumont and Freeport, Texas, respectively.

6. There was no evidence of price decreases confined geographically.

Applying these facts to the checklist presented earlier, it is unlikely that abandonment of UDP and a move to FOB pricing would produce competitive benefits. The evidence suggested that UDP was adopted for its simplicity and not for collusive reasons. In fact, UDP was used in the industry when there was only one firm. To the extent that the market was noncompetitive (that is, price exceeded marginal cost), the noncompetitiveness of the market was more likely attributable to the structure of the industry than to the use of UDP. The Administrative Law Judge disagreed and declared that the spatial pricing practice constituted an unfair method of competition.

VIII. Summary

The circumstances under which delivered pricing is better than FOB pricing in facilitating the setting of a noncompetitive price are special ones. Delivered pricing is likely to be better as a collusive device when buyers readily and reliably reveal the actual delivered price (including “secret” discounts) of one firm to another but would refuse or be unable to reveal the actual FOB mill prices, and when there are several firms located in the same area. When firms are spatially separate, and when shifts in business are the primary way firms monitor cheating, FOB pricing is likely to be the superior collusive device.

In order to distinguish between valid business reasons and collusive reasons for delivered pricing, one must understand the conditions under
which delivered pricing is well suited to be used as a collusive device. The existing literature fails to spell out these conditions clearly. This paper has attempted to fill that gap. By applying the theory to two recent cases, we saw that in one case the FTC was justifiably suspicious of the spatial pricing policies, but in the other the FTC was probably wrong to expect that a change in spatial pricing policies would have a significant effect on price.