Historically, economics has been concerned with describing the characteristics and consequences of competition between market participants. Many decades ago, the concept of perfect competition became accepted as a powerful tool of analysis which reduced the market system to its "essential" components and which corresponded to a Pareto optimal allocation of resources. Since then, perfect competition and other static-equilibrium models have dominated the mainstream of our science. An important consequence of this domination has been the neglect of contractual arrangements, such as horizontal agreements between firms, which do not fit neatly into a static-equilibrium framework.

Recently, however, the adequacy of static-equilibrium theory, both as an explanatory device and as a welfare norm, has been challenged from many angles. One of the most fundamental criticisms of such equilibrium theories is the perfectly competitive model; perfect monopoly, and oligopolistic oligopoly is that they do not allow for any real (or nominal) uncertainty. Uncertainty is a pervasive fact of economic life and the assumption of 'perfect knowledge' causes static-equilibrium theory to beg some of the most important economic questions.

The object of this paper is to examine the role of horizontal agreements in an economy characterized by uncertainty. To do this, it is necessary to reject such economic tools as the competitive model which are unable to incorporate true uncertainty. This rejection is without cost—a more realistic model will yield far more deterministic results—but the introduction of uncertainty is essential to an adequate theory of horizontal restraints. In any economic analysis, the legitimacy of assumptions depends upon the purpose of the investigation. In the case of horizontal cooperation, the assumption of complete certainty, especially with respect to future production plans of competitors, simply excludes some of the main incentives for such cooperation as a means of "restraining" competition. This investigation will show that an analysis which deals with horizontal cooperation but abstracts from real-world uncertainty cannot adequately explain the types of arrangements we find in the market. The reward for taking such uncertainty into account will be a richer understanding of certain horizontal restraints and of the market process which actually drives the economy.

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Horizontal restraints in this paper refer to agreements between competitors which reduce their freedom of action in a market. These agreements may be explicit, but they may also include tacit 'Market share maintenance,' price leader agreements, etc. Sellers will be considered competitors as long as they sell to the same broadly defined market, regardless of what other markets they serve. After a brief examination of the role of horizontal restraints in some static-equilibrium analyses, this paper will explore the uncertainty-reducing role which such restraints may play in the real world, and try to determine some factors which limit the profitability of cooperation. The concluding remarks will offer some preliminary implications for antitrust policy.

Horizonal Cooperation in the Static-Equilibrium Framework

Since the "competitive model" is so popular among modern economists, it is important to explain why it will not be used here. In its basic form, perfect competition automatically rules out any interfirm cooperation; all firms are price-taking, independent actors, that simply optimize their functions. Any cooperative behavior thus implies a constraint to restrict output and increase price. Few economists would argue that this model is useful for understanding (as opposed to predicting) market phenomena. We all recognize that, in reality, firms which have no contacts or ties with other firms—whether competitors, suppliers, or buyers—are extremely rare. The market-place is a complex web of such "ties," and it is doubtful that the economy could function smoothly without them.

The extreme assumptions of the basic model of perfect competition have been relaxed somewhat by the development of "the economics of information." Search models describe rational market behaviour in a world of limited knowledge of prices or wages. And, more relevant for this paper, some economists have recognized the effective vertical and horizontal restraints of information which encourage efficient use of information. These developments are innovative attempts to extend the perfectly competitive framework and to account for the abundance of real-world cooperative agreements, but they are problematic in several respects.

For example, the economics of information literature retains the equilibrium emphasis of perfect competition, but stating cooperative arrangements are analyzed as equilibrium moves, rather than as part of the process of reaching such an equilibrium. This type of equilibrium theory is not designed to explain the formation of such an equilibrium. Once this level of knowledge has been achieved, the analysis is simply how to "cash in" on the gain. If one understands this, one understands that the economics of information literature cannot understand the concept of moralizing, nor can one understand the concept of moralizing as a "second best," which implies that with informational and structural limitations (or "infant industries") in some markets the "efficient" solution for another market may require an even greater degree of "superiority". Writers within the perfectly competi-

The Role of Cooperation

The numerous influence of the competitive model, with its emphasis on instantaneous cooperation, has forced any detailed analysis of interfirm cooperation into background discussions. Yet cooperation between market participants is an essential element in any well-functioning market system. At one level, that of the individual firm, the value of cooperation has been well recognized by economists. Coase, in his famous 1937 article, recognized that in some situations pure "market" transactions may not be the best way to coordinate production.

The firm is made up of individuals who could have been self-employed craftsmen or coordinating consultants (managers). Instead, they work together to achieve their goals. It is revealed that, at the same time, the arrangement works to the benefit of consumers. It is revealing that the complete coordination characterized by the firm is usually viewed as efficient by economists, while less complete forms of coordination (such as coordination of advertising, research and development, or prices) is often labeled "anti-competitive." Cooperation on the intrafirm level is automatically accepted, while interfirm agreements are sometimes condemned as automatically.

But cooperation on either level is inconsistent with a perfectly competitive market system. The information necessary to induce the perfectly competitive result would render agreements between economic actors completely useless. Institutions such as contracts, whether interfirm or intrafirm, can only arise in a system characterized by uncertainty.

Given the small amount of previous research on interfirm contractual agreements in a world of uncertainty, an examination of the potential benefits of such cooperation is needed. It will not be argued here that interfirm cooperation is necessary. Certain forms of cooperation could hinder the workings of the market. The point to be made here is that cooperative agreements, even those normally thought of as part of agreements, can work to the benefit of producers and consumers. More specifically, through the provision of certain important information and alleviation of certain incentives, horizontal agreements can facilitate the smooth adjustment of supply to demand.

Information may be conceptually divided into two types: technical information, or information about the underlying data in a market, such as demand and supply conditions; and "market" information, or information concerning the future actions of market participants (such as future prices or information). Although these categories are not mutually exclusive, they will prove useful for the analysis. Technical information can be discovered in several ways, some of which have been recognized as beneficial. The statistical services of an industry trade association are clearly aimed at reducing uncertainty with respect to underlying data. Cost inc
formation (including suggested "common" accounting methods). Industry sales levels, and forecasts of product demand are often provided through cooperation in the form of association newsletters.

The adjustment of supply to changes in demand requires, of course, some knowledge of demand conditions, which are included under technical information. To the extent that trade associations or other cooperative organizations utilize collective demand information (inventory levels, backorders, etc.) to accurately predict market demand changes, such horizontal information transfer can be as effective as promoting orderly industry adjustment. In most economic analysis, such technical data is assumed known and there are, no doubt, situations in which this assumption is justified. If, however, one of the objects of horizontal cooperation is to discover this very information, the importance of such discovery should not be obscured by the assumption that it has already taken place.

Richard Posner (1976) recognized pro-competitive benefits associated with the exchange of market information under certain market structure conditions, such as low industry concentration. If, however, the exchange takes place between firms in a highly concentrated market, Posner views the cooperation as harmful. Accordingly, that an exchange of information was necessary to enable demand and supply to be in equilibrium was recognized by Posner as necessary for correct supply adjustment in concentrated markets as well as in uncontrolled markets.

The correct response of supply to a permanent increase in demand is essential to the survival of a market. In the event that the increase in demand is perceived by all sellers, there is a very real possibility that each seller will increase supply in hopes of capturing profits. This situation could easily generate an unwarranted supply response and is detrimental to the industrial consumer. Alternatively, if individual sellers have reason to believe that all other sellers are aware of the increased demand, there may be no incentive for any particular seller to increase supply since all may fear the possibility of general oversupply outpacing the increased demand. This problem is created by the uncertainty which horizontal relations introduce into the market. The uncertainty of such markets is not necessarily decreased.

Of course, adjustment problems like those involving both technical and market uncertainties. In fact, it is not likely that the two can be separated in actual practice. Market uncertainty, or uncertainty about the future actions of competitors, are both important factors in forming cooperative agreements. It is conceivable that a generally high or low consensus among the members is more acceptable if producers have some reason to believe there will be no overreaction or, alternatively, that an overreaction will not be supported by the actions of everyone and will be perceived by all as a profit opportunity, which is both known to and considered by everyone.

The uncertainty of such processes can cause firms to avoid any response at all to an increase in demand. If all firms believe that demand will not increase sufficiently, all firms may suffer losses. Clearly, neither of these results is consistent with the smooth operation of a market. If we assume cooperative behavior of firms in the face of such market uncertainty, the undersupply result is most likely.

Thus, conscious cooperation may, by decreasing market uncertainty, lead to an increase in output through less conservative responses to demand shifts.

The degree of market uncertainty will, of course, be greater in some cases than in others, and I am not suggesting that cooperation will always lead to an increase in output. If an increase in demand, for example, is recognized by only one firm, there need be no danger of oversupply. Similarly, if supply is sufficiently inelastic to prohibit oversupply, it matters little how many would-be suppliers notice the opportunity. If, however, market uncertainty is significant, there may be a need for horizontal cooperation which facilitates smooth adjustments of supply to changes in demand. One type of agreement which would reduce this uncertainty is market sharing. Firms could agree to divide or to allocate sales in order to maintain proper division of market. Thus, in response to a 10 percent increase in demand, all firms might increase output by 5 percent. Alternatively, an agreement not to undersell competitors would have roughly the same effect. Such firm's market would be reasonably secure. Of course, these strategies would prove effective only if entry were not profitable, as a tendency to set prices at a sufficiently high level could disrupt market shares and result in industry oversupply through new entry.

Although these strategies could involve all firms in an industry, they may involve only a small subset of competitors. If, for example, there are a few firms with knowledge of a profit opportunity, they may still need some assurance that competitors will not overreact before they are willing to make large commitments to increase investments. Similarly, an uncontrolled industry could divide itself into several large groups of cooperating firms, with firms within each group cooperating on some levels and cooperating on others. Since there are benefits to competition (such as strong incentives to minimize costs and innovation), and other benefits to cooperation, it seems logical that some organizations would seek to compete and cooperate horizontally.

The incentives to cooperate with competitors in order to overcome market uncertainty can be illustrated by an historical example. In the early days of the oil industry, a company owned land over an oil well was legally entitled to drill for oil for as many as fifteen years. The oil was "owned" by whoever could put it above ground first. As might be expected, this legal framework led to a large number of wells over a single pool, with each well producing at or near the maximum rate. Each time a new well was discovered, the rush was on, and in many cases, the oil pool was quickly drained. Around 1927, the industry found that if oil was drawn from a pool at a steady, moderate rate, more oil could be recovered from each well. The industry then developed a cooperative utilization plan to regulate output, significantly reducing the losses. A cooperative agreement was established. The incentives to operate an entire pool as a unit limited, but without cooperation, firms could not properly coordinate production. In the absence of some horizontal agreement, each firm had an incentive to pump all oil at maximum speed. If, however, competitors developed a cooperative utilization plan to regulate output, significant benefits would result.

Because of state and federal antitrust laws, the legality of such cooperative agreements was in question. In addition, voluntary utilization plans were not uncommonly enacted once the legality of the voluntary agreement was confirmed. Because of the strong incentives of others, voluntary agreements were not commonly used. An example was the refinery. The first, in 1929, was arranged by the Pure Oil Company for a 1,650 acre field in Texas (Bradley, p. 99). In Texas, the only state without mana-
tory utilization. Over 1,000 utilization agreements were made between 1969 and 1981. Through voluntary utilization agreements, firms were able to provide important information to competing firms. This allowed incentives and to provide the collective firms to recover more A28 and were effectively plan produc-
It is likely that there are other uncertainty-reducing arrangements which, in the above example, a horizontal agreement made it possible - and profitable - for firms to take actions which, in the absence of an agreement, would not have been profitable for any single firm. In other words, the agreement internalized an externality. A similar case of externality internalization through horizontal cooperation involves the medical and insurance industries. 

Most physicians would not find it in their interest to agree to maximum prices for services rendered. And most insurance companies would be reluctant to insist on such coverage because of the low costs of coverage would be 100 percent health care coverage because of the low costs of coverage. It ge
Yet a cooperative arrangement which included both of these provisions was recently developed: The Supreme Court case Aetna Life & Casualty Co. v. Maryland Medical Society (382 U.S. 476 (1966)) involved an arrangement between non-profit hospitals for medical care (PMCs) and health insurance sellers. The insurers

This horizontal price fixing agreement made 100 percent health insurance possible, while avoiding the usual "moral hazard" problem of complete coverage. The agreement was beneficial to participating insurers, who could be guaranteed maximum health case prices and thus lower costs; these lower costs could make lower premiums possible, to the benefit of the insured: and participating physicians premium possible, too. The

These examples of real-world cooperative agreements illustrate the importance of taking uncertainty into account. In a true static-equilibrium world, the inc-

The limits of cooperation

Although the arguments thus far have concentrated on potential benefits of horizon-
tal cooperation, the well-known benefits of cooperation must also be acknowl-
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Conclusion

It has been argued throughout this paper that horizontal cooperation is an im-
portant aspect in the market process. In 1974, Adam Smith remarked that "people
of the same trade seldom meet together, even for merriment and diversion, but
the best and most considerable人物, even to the rise of prices." Smith's remark is an early example of the deep suspicion that most
economists hold for horizontal cooperation. Indeed, as a result of the strong em-
pasis on competition and the fear of monopoly and cartels, almost all cooperation
between firms has been seen as either an inefficient arrangement or as a temporary
aberration.

But cooperation is neither temporary nor aberrant; it can, in an important
sense, be efficiency-promoting. Consider, for example, the function we expect an
efficient market to perform. We expect resources to be allocated to their most
highly valued uses in general, which means we expect supply to respond to shifts
in demand from one product to others. Therefore, to the extent that cooperation
aids the adjustment or supply to changes in demand, it promotes efficiency in this
dynamic sense.

Does this analysis suggest any criteria for judging particular cooperative ar-
rangements? In other words, are there any implications for a "rule or reason" ap-
proach to antitrust? There are two problems associated with such judgments which
make them impractical under a dynamic or "process" framework. The first is clearly
that judgments are necessarily made of equilibrium one-state, and we cannot judge a
disequilibrium stage of a process by equilibrium criteria. The only way to judge
a component of an adjustment process is to know what the optimal AGENDA would
look like, and that brings us to the second problem, which is one of knowledge.

To judge particular real-world arrangements we must have some adequate stan-
dards. That is, we must "know" what the efficient arrangement would be, and in our
world of disequilibrium and uncertainty we receive little help toward this end
from most static-equilibrium market models. Knowing what result the market would
bring about if no "data" changed and if information were perfect (or near perfect)
do not enable us to judge whether the current set of arrangements in a market is
"efficient" or not.

Although it is unlikely that economic analysis provides us with adequate cri-
teria for judging the efficiency of particular contracts which occur in a dynamic
market, there is room for examination of the results under which the market process
operates. Changes that may be brought about by changes in the "rules of
the game" can affect the result, and to the extent that the above analysis is correct, this paper casts
serious doubt on the efficiency of rules against horizontal agreements between
competitors. The antitrust laws, therefore, should be reexamined in light of eco-
nomic analysis which incorporates disequilibrium and uncertainty and is thus more
policy-relevant than static-equilibrium theory.

Before policy implications can be offered with complete confidence, however,
more research into the essential properties of horizontal agreements under uncer-
tainty should be conducted. Economic theory should be revised, where appropriate,
to deal with uncertainty, especially situations in which the gains are not clearly
assumed away. Organizational methods should be investigated to discover what
forms of arrangements are most effective and why. Only by successfully analyzing
such arrangements can we hope to set an Ahmose into the true nature of the market
order.

ENDNOTES

[1] One of the early critics of the competitive model was Hayek (1936), reprinted in 1972. He initiated a long history of Austrian critiques. More recently, Bork (1978) and Posner (1976), while not completely rejecting the competitive framework, have criticized perfect competition as a pure "ideal." However, both Bork and Posner endorse static-equilibrium frameworks which ignore impor-
tant consequences of uncertainty. Another criticism of the perfectly competi-
tive model has emerged in the form of the contestable markets hypothesis (see Baumol, Posner, and Willig). My view is that this development can best be
seen as an extension of the competitive model, since it takes potential cooper-
ation into account while retaining most of the knowledge assumptions and the
equilibrium framework of perfect competition theory.

[2] Although it is sometimes claimed that search theory solves this problem by in-
roducing uncertainty, the linkage uncertainty of search theory still leaves
the model with almost perfect knowledge (see High). Furthermore, the uncer-
tainty most relevant to this paper concerns future plans of other market par-
ticipants, which search models do not consider.

[3] This definition is similar to Richardson's (1960). Richardson includes such
phenomena as demand inelasticity and buyer loyalty as horizontal restrictions
because these conditions also limit the freedom of action of market partici-
pants. My attention here, however, will be confined to actual agreements,
tacit or explicit, between sellers.

[4] For a detailed account of such ties and their essential role in smooth-working
markets, see Richardson (1972).

[5] See, for example, Bork (1978, chapter 4) and Posner (1976, pp. 157-167). Dow-
key defends horizontal collusion because it reduces uncertainty of profitabil-
ity. While his approach is similar to the reasoning in this paper, I am trying
to allow for uncertainty with regard to much more than profitability, as it
will become clear below. Therefore, this approach may be seen as an extension of
David's article. The theoretical analysis of this paper is modeled after
Fink's analysis of resale price maintenance. While he concentrates on verti-
cal cooperative agreements, however, the emphasis here is on horizontal rela-
tionships.

[6] This distinction, taken from Richardson (1960), p. 29), introduces a category of information — "Market Information" — which is crucially important to the
workings of a market: information about the plans of competitors. In perfect
competition, such information is useless because firms experience no interde-
dependence. With pure monopoly, on the other hand, there is such information because there are no competitors. In all other situations, however, some de-
gree of interdependence is necessary and "Market Information" becomes very im-
portant.

[7] Some firms with multidivisional organizational structures — General Motors
is one example — seem to organize in such a manner as to benefit from competi-
tive pressures even within the organization. This strategy could be consid-
ered the equivalent to introducing cooperation on the interfirm level in order
to benefit from cooperation as well as from competition.

10 This example is taken from Bradley (1966), Chapter 3.

11 This argument resembles Coase's theory of the firm (1937), although there is
more emphasis here on uncertainty. Of course, this is a rather sketchy ex-
planation of firm size, but a full discussion of costs and benefits of firm
formation is beyond the scope of this paper.

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