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# A Reformulation of Certain Structure and Conduct Attributes of Pure Competition

By Norman Townshend-Zellner

Farmers are getting more and more concerned about problems of bargaining power. This is partly because corporations and labor unions in the food marketing business are becoming larger and stronger. We may need new theories, and new concepts, to understand how prices and incomes are actually made. Mr. Townshend-Zellner's paper suggests modifications in the usual assumptions of pure and perfect competition in order to develop a theory that is more realistic, and to open up a field for statistical measurement and analysis.

**T**HIS REPORT suggests three revisions to attributes of structure and conduct of sellers in markets approximating the classical conditions of pure competition. Similar structural relationships logically are applicable to buyers in pure competition. But the emergent conduct on the part of sellers in pure competition—for example, the formation of marketing orders—is of more interest at present. Attention here is therefore focused exclusively on sellers. Differences between the revised concepts suggested in this article and existing ones are shown schematically in figure 1.

1. The fundamental structural attribute among sellers in pure competition is that of very slight (albeit "virtually negligible") interdependence—not independence. This is especially relevant to sellers in agricultural market structures. The competitive model of received theory accepts independence as the relationship among sellers, ignoring the tacit admission of very slight interdependence typically found in the formal statement of assumptions.

2. Three basic *variants* of conduct by purely competitive sellers may emerge in response to the structural attribute of very slight interdependence.<sup>1</sup> Each may be observed empirically.

<sup>1</sup>The focal point of research needed concerns what determines the prevailing variant of conduct. It is neither an arbitrary choice nor a random occurrence. However, this paper is concerned with the necessary prior task of changing our concept of purely competitive

*Passive* conduct is identical with the classical conduct of competitive theory. Here the interdependence is ignored. But two forms of transitional conduct, usually neglected in theory because they are exceptional and unstable, are significant for agriculture.

*Active, collusive* conduct exists where the interdependence evokes a collusive response by sellers. This response typically leads to some form of market reorganization.

In some cases *active, rivalrous* conduct—the third basic variant—may become a dominant, temporary feature when the interdependence induces a rivalrous response leading to market disorganization or dysfunction.

The character of performance emerging from an industry of sellers in pure competition will vary widely, depending upon the prevailing variant of conduct. The notion of *variant* conduct (as opposed to *invariant, static* conduct in received theory) gives a dynamic dimension to the theory of competitive market structure.

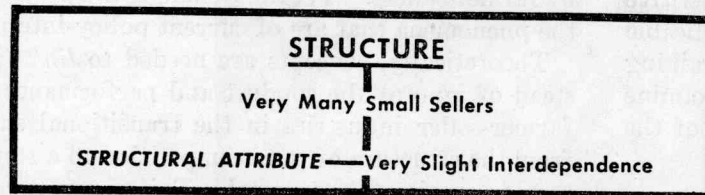
3. The notion of independence among sellers in pure competition (incorporated in most models of pure competition) suffers from the following defect. Independence is identified as an *invariant structural* attribute—that is, as a relationship among sellers—instead of what it really is, namely, a prevalent, indeed typical, mode of seller *conduct* in response to the existing structural attribute of very slight interdependence. To define independence as a fixed structural attribute of pure competition is to close the door, conceptually, to analysis of other important existing variants of seller conduct emerging from pure competition, namely, collusive and rivalrous conduct.

The revisions summarized above were developed largely in response to specific problems in policy and theory which could not be engaged with concepts of market structure derived from the classical competitive model.

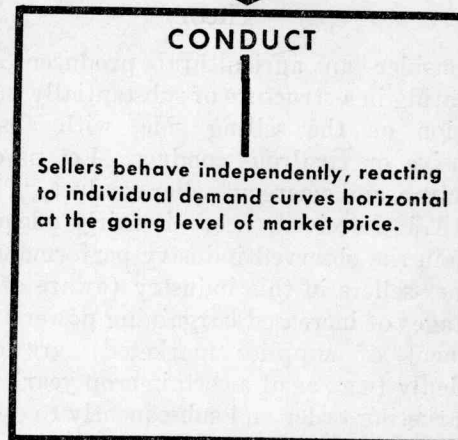
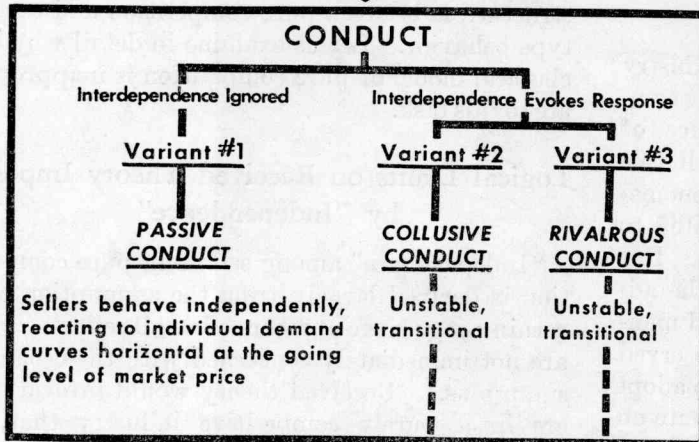
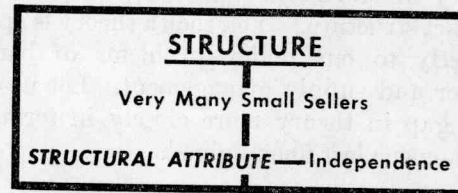
structure to show that more than one variant of emergent conduct is possible.

# PURE COMPETITION

## REVISED CONCEPTS



## EXISTING CONCEPTS



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Figure 1.

## Policy-Problems: Farmers' Bargaining Power and Supply Management

Ordinarily, farmers sell their products in market structures approaching pure competition, while the buyers they face operate in market structures much farther removed<sup>2</sup> from purely competitive conditions. This is the root of the problem of farmers' bargaining power. Usually farmers tend to "overproduce" in relation to existing demand, especially under pressures of research and development of new technologies, and given the limited rate of increase in demand. This is the root of the supply-management problem.

<sup>2</sup> In the sense of containing important oligopoloid elements, for example, fewness.

Remedies to these problems in many cases have involved control over supply through a variety of devices. But some "self-help" supply-control programs for sellers in pure competition (particularly marketing order programs) transform the sellers' market structure from one approximating pure competition to a structure containing a variety of important noncompetitive, collusive elements. And it is the latter elements which are crucial to the processes of supply-control and any derived impact on bargaining power. If economists are to understand these elements and their implications, to advise farmers to increase their bargaining power and to manage their supplies, the economists must also understand, and appropriately conceptualize, the process by which a purely competitive market on the selling side is dynami-



cally transformed<sup>3</sup> into a market structure significantly *less* competitive. But the classical model of pure competition is essentially static. There exists now no conceptual basis for a dynamic theory of transition out of a purely competitive market structure.<sup>4</sup> Yet, such a theory is applicable directly to our policy problems of bargaining power and supply management. Let us examine this gap in theory more closely in terms of the phenomena left unexplained.

### Unexplained Phenomena and the Gap in Theory

Consider an agricultural producer industry operating in a structure of substantially pure competition on the selling side, with absence of collusive or rivalrous conduct. Let us call this structure, and emergent seller conduct, "Phenomenon A." Received theory is fairly adequate<sup>5</sup> to explain the observed industry performance. But farmer-sellers in this industry (aware of the advantages of increased bargaining power and management of supplies marketed) are observed suddenly (e.g., as of a certain crop year) to adopt a marketing order and subsequently to operate on the selling side as a type of cartel.

Let us call this new structure and emergent conduct "Phenomenon B." The concepts of received theory also can explain the industry performance resulting within the context of Phenomenon B. But we cannot ignore the phenomenon of the transition, the conduct leading to a structural innovation which moved the seller-industry from a situation approximating pure competition to one of a cartel-type arrangement. Clearly, the really significant variation in industry performance (from purely competitive to cartellistic results) is associated with the *transitional* phenomenon.

But this variation is not formally explained by received theory. Received theory can explain variation in conduct and performance *within* purely competitive and cartellistic structures, but not *between* (in a dynamic sense) such structures.

<sup>3</sup> One hypothesis is that this transformation exists in the short-run as a reversible phenomenon, but in the longer-run as a one-way metamorphosis.

<sup>4</sup> Methodologically this has been handled by merely accepting the changed market structure as a new parameter.

<sup>5</sup> This does not deny shortcomings in received theory, e.g., the pervasive problem of price-determination as between purely competitive sellers and oligopsonistic buyers.

That is, received theory tends to accept as a *given* the existing market structure. Consequently, it cannot explain variation in conduct and performance due to changes produced in market structures by farmer-sellers. Yet these changes are precisely the phenomena that are of current policy-interest.

Theoretically, concepts are needed to *link* (instead of ignore) the conduct and performance of farmer-seller industries in the transitional shift from the structure of pure competition to a structure approximating a cartel. This requires concepts appropriate to a theory of change in market structure as between pure competition and cartel-type behavior. Let us examine in detail why the classical model of pure competition is inappropriate to this task.

### Logical Limits on Received Theory Imposed by "Independence"

"Independence" among sellers in pure competition is derived largely from the assumption concerning very large numbers of small sellers. (We are not immediately concerned with the other assumptions.) Received theory would inform sellers in a purely competitive industry that, to paraphrase Bain:

(1) No one of you ". . . produces a significant proportion of the total market supply."

(2) No one of you ". . . by extending [your] own output to the practical limit or by withdrawing it entirely, can perceptibly influence the market price of [your] product."

(3) Thus, the demand curve for your output ". . . is a horizontal straight line at the level of market price."<sup>6</sup>

That Bain would go on to infer independence (as a structural attribute among sellers) from these assumptions is clear, as he equates the purely competitive seller and the monopolist in this respect:

"Monopoly, in the sense of fullfledged single firm monopoly which can *disregard the rivalrous reactions of other sellers*, is rare in the American economy. *This is also true of the markets at the opposite extreme, with many sellers, all of whom sell a homogeneous [identical] product, often*

<sup>6</sup> Bain, Joe S. *Pricing, Distribution, and Employment. Economics of an Enterprise System*, New York. Henry Holt & Co., 1948, pp. 47-48.

characterized as markets in pure competition."<sup>7</sup> (Emphasis added.)

Thus, received theory travels the route from very large numbers of small farmer-sellers to a system where each seller exerts no perceptible influence on price, and thence to a model featuring a seller's horizontal demand curve. However, in the process it has committed itself to the notion that independence is an attribute of the structural relationship among sellers.

But there is no denying that farmers as sellers, and especially as *atomistic* sellers, have wished for effective collusion to increase bargaining power (and secure other gains translatable into price) by managing supplies. And the real world is full of examples where farmers in pure competition have made the transition to a collusive group managing supply. But economic theory cannot follow the atomistic farmer-seller in the causal events underlying the transition because conceptually it assigns farmers (once they are there) forever to pure competition. If theory regards farmers in pure competition to be independent *as part of the structural nature of things*, then it cannot explain, or even countenance, collusive tendencies.<sup>8</sup> And the price of escaping from this theoretical dead end might appear to be too high. To give up the independence attribute it might seem that theory would have to accept at least a slightly sloping, instead of a horizontal, seller's demand function in pure competition.

### Re-examination of the Independence Concept

Can we admit enough interdependence into a purely competitive situation to explain the movement to a collusive solution, and yet retain the seller's horizontal demand function of competitive theory? Can we have our theoretical cake and eat it too? If, literally, each seller's supply does *not* in any degree affect price—*ceteris paribus* has

<sup>7</sup> *Ibid.*, p. 47.

<sup>8</sup> Contrast, for example, the following statement with farmers' widespread use of marketing order programs: "Since increases in his (the small seller in pure competition) own output do not tend perceptibly to reduce his price, he does not have the virtual tendency that the monopolist does to restrict his output. Only the rise in his costs with increases in his output will limit his production. In short *he is not in any position to exploit for his own ends the slope of the industry demand curve for the good he produces.*" *Ibid.*, pp. 48-49. (Emphasis added.)

zero effect as opposed to the "virtually negligible," or "imperceptible," effect of theory, then the sum of the zeros for each of the competitive sellers is zero, and collusion and supply management are not profitable.

But, of course, in most agricultural industries approximating pure competition this is not the case empirically. The sum of the "virtually negligible" impacts on price *is* important. Economists (and farmers) are aware that the industry demand curve *is* sloped irrespective of assertions concerning the slope of the individual seller's demand. And the number of sellers in most industries, while large enough to be considered an approximation to pure competition,<sup>9</sup> is short of being infinitely large.

Thus, in the real world farmers are not in fact completely and entirely independent. For a sloping industry demand function implies that the sales of each of a very large number of farmers must have *some* (i.e., greater than zero) effect on the price of each other farmer. This implies that a theory of pure competition whose assumptions are empirically consistent must acknowledge that farmers are to some very *slight* degree *interdependent*. And the totality of all these "imperceptible" impacts of atomistic sellers on price is the counterpart of the sloping industry demand.

Competitive theory, accurately stated, contains this admission, if only by implication. As we have seen, the usual statement of theory is carefully qualified<sup>10</sup> to point out that (emphasis added): sellers ". . . are so many in number and so small that no one of them can *perceptibly* influence the price of the product" (Bain).<sup>11</sup> Or, to quote Stigler:<sup>12</sup> Each firm is ". . . so small relative to the market that it exerts no *perceptible* influence on the prices of the things it buys and sells." Clearly, theory does acknowledge that there is an effect but that crucially it is imperceptible and therefore negligible, e.g., the effect of 1/1000 of the total supply on price. It is the

<sup>9</sup> Bain states: "Ordinarily a hundred or more sellers, none of whom produced more than 1 or 2 percent of the market output, would be required to fulfill approximately the condition regarding numbers [in pure competition] . . ." *Ibid.* p. 47.

<sup>10</sup> "Virtually," "imperceptible," and "negligible" are the most commonly encountered qualifiers.

<sup>11</sup> Bain, *op. cit.*, p. 99.

<sup>12</sup> Stigler, George J. *The Theory of Price*. New York. MacMillan, 1946, p. 21.

thesis here that this effect, though imperceptible, is not therefore *entirely* negligible. The point is that under certain circumstances the effect is crucial.

The farmer-seller acknowledges that his supply does not change price "perceptibly," but he is especially sensitive to the slight impact of the supply of any one of his fellow sellers in terms of its potent effects when aggregated for all of his fellow sellers. Farmers know that price is forced down precisely by the *compounding* of the slight, "imperceptible" effects of individual sellers. That is, they are aware of the very slight, equally "imperceptible" interdependence between individual sellers. They know that the very slight interdependence existing between any seller and any other seller ordinarily can be ignored. Or, perhaps put more accurately, farmers are painfully aware that ordinarily they cannot do anything effectual about the very slight interdependence. But, crucially, they are also very much aware of the significance of this very slight interdependence. Politically, they have sought and gained legislation enabling each farmer to limit his supply with a guarantee that *each* of his atomistic rivals will equally limit supplies. Prior to this legislation the compounding of the "imperceptible effects" of noncooperators' supplies wrecked many a marketing program based on supply limitation.

So far, it would appear that the job of reconciling competitive theory to the notion of interdependence has a foundation on which to build. Theory opens the door slightly by admitting that each farmer-seller does have an "imperceptible" effect on price. However, in the next breath it shuts the door by maintaining the independence concept to derive a *perfectly* horizontal demand curve. Is it necessary to shut the door on interdependence to get the perfectly horizontal demand curve of competitive theory? Is theory paying too high a price?

#### **Reformulation: Interdependence the General Attribute of Structure—Independence a Variant of Conduct**

The inability to handle collusive (or rivalrous) activity as these emerge in purely competitive markets is the price that theory has paid for independence as a structural attribute. But we can have our assumption of independence and our explanation of the transition to collusion, too, if we are

willing to be consistent with the empirics of the case and accept a formulation which makes interdependence the general structural attribute and consigns independence to the role of a major, emergent variant of conduct.

The suggested conceptual revision begins by acknowledging the existence of very slight, albeit negligible, interdependence among sellers in pure competition, and accepting it as the basic structural attribute. The major advantage of this revision, then, is that it does not abstract from (ignore) the slight "discrepancy" which has put existing theory into its current sterile situation vis-à-vis the emergence of collusion and supply management from a purely competitive group of sellers. It already has been shown that slight interdependence is admitted in existing theory, but only by a qualifying phrase, whose logic and implications are never traced out.

But, with the concept of very slight interdependence, can we account (as does existing theory) for the ordinarily observed "independence" of pure competition? This is accomplished by distinguishing conceptually between the notions of structure and emergent conduct. "Very slight interdependence" is a structural attribute and the general structural case. Farmers and sellers in pure competition typically (for example, when there is no move or transition to collusion) choose (implicitly or explicitly) to ignore the very slight interdependence. As sellers then, they behave independently of each other.

"Independence" thus is not a basic structural attribute. It is a mode of seller conduct emerging in response to the structural attribute of very slight interdependence. But suppose, in the competitive situation, that institutional conditions (e.g., enabling legislation) and demand and supply conditions were conducive to collusive activity. Conceivably, another variant of conduct might emerge, namely collusive farmer behavior in response to the slight existing interdependence. Such conduct is dynamic, leading to a structural reorganization of the market. This in fact is typical conduct in every case of instituting a marketing order. Research into this process is one of the most important avenues opened by the reformulation suggested in this paper.

Under the revised concepts, large numbers of atomistic farmers in a market structure usually conduct themselves as though they were inde-



pendent sellers, i.e., their conduct is passive with respect to the existing slight interdependence. Under this passive-conduct variant it is correct analytically to treat the farmer-seller demand function as horizontal at the going level of market price. In this sense, independent behavior is reconciled with a structure of very slight interdependence. But, using this revised concept, we can also handle the observed phenomena of the collusive-conduct variant.

In the early steps of forming a marketing order a voluntary working committee of atomistic sellers is formed. Here the emergent conduct of purely competitive sellers is *active* with respect to the very slight interdependence. Instead of independent conduct emerging as a passive response to the slight interdependence, we now have conduct based essentially on recognition of, and reaction to, the slight interdependence. Similarly, under extremely depressed demand, falling prices, and heavy supplies, atomistic sellers might actively respond to the slight interdependence by rivalrous

conduct, leading to market disorganization, often termed "demoralization."

### Implications

The reformulation suggested in this paper shows that the independence of purely competitive sellers in received theory is actually a special case of competitive market conduct and not a general attribute of competitive market structure. Thus, it enables us to break out, conceptually, into full treatment of all the conduct variants (in addition to the one handled by existing theory) inherent in the purely competitive structure of very slight interdependence. It is basically because of this enlarged capability that the revised concepts may be analytically more fruitful than those of existing theory. The fundamental implication of this paper is that the concepts developed enable us to embark on the dynamic analysis of collusive and rivalrous conduct by farmer-sellers in purely competitive markets. The analysis itself remains as a future challenge to economists.