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Economic Nature of the Cooperative Association: A Retrospective Appraisal

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The passage of four decades since the original publication of Phillips' article allows us to draw a new perspective on the work. It also provides us an opportunity to review the progress of cooperative theory since the article's publication and to assess its contributions to contemporary thought. The purpose of this paper is to evaluate the part the Phillips article has played in the advancement of the neoclassical theory of cooperatives. Toward that end, we will examine the role Phillips gave the cooperative in his model and compare it to the roles and objectives assigned to the cooperative by other authors, both before and after publication of the Phillips article. This paper concludes with a summary of Phillips' contributions to cooperative theory. Before turning to these tasks, it will be useful to briefly review the early criticisms of the article.

Early Critiques

After the 1953 publication of "Economic Nature of the Cooperative Association" in the *Journal of Farm Economics*, three major critiques of the article appeared. Within two years, comments by Savage (1954) and Aresvik (1955) both exposed a number of weaknesses in the article. Among them were Phillips' acceptance of Emelianoff's (1942) position that a cooperative is not a firm, the optimality conditions he ascribed to members, and his conclusions about institutional arrangements. Aresvik's criticisms of the Phillips optimality conditions raised questions about them that were not resolved until Trifon's 1961 paper.

Savage criticized Phillips' premise that no entrepreneurial decisions are made at the cooperative level. According to Savage, Phillips' position was based on a narrow definition of the entrepreneurial function—directing the allocation of the factors of production to create profits for the entrepreneur. Under this definition, a cooperative is not a firm and therefore cannot make entrepreneurial decisions because it does not exist to create profits for itself. Savage argued that this conclusion conflicted with reality and pointed to the need for a broader definition of the firm. Trifon contributed

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a useful morphology of entrepreneurship, which allowed for decision making by a cooperative entrepreneur. Later, Helmberger and Hoos (1962) invoked organization theory to provide a similarly broader interpretation of the firm.

Aresvik disputed Phillips' conclusion that a member maximizes its profit by equating the sum of the marginal cost in its individual plant or plants and the marginal cost in the cooperative plant to the marginal revenue in the market in which its output is sold. Aresvik argued that the marginal cost a member firm faces in the joint plant is the plant's average cost and that the marginal return a member receives from a marketing cooperative is the joint plant's average return. Consequently, he restated Phillips' optimality condition, in the case of a marketing cooperative, to say that a member maximizes its profit by equating the sum of the marginal cost in its individual plant and the average cost in the joint plant to the average revenue facing the joint plant. Aresvik did not challenge the decision-making role Phillips ascribed to members.

Further clarification of the Phillips optimality condition was provided by Trifon. Trifon maintained that a member firm maximizes its profit by setting the sum of the marginal cost in its individual plant and the marginal cost it incurs in the cooperative equal to the marginal revenue it receives. However, he demonstrated that, in general terms, the marginal cost a member incurs in the cooperative is neither the marginal nor average cost of the cooperative. Similarly, the marginal revenue a member receives from a cooperative is neither the cooperative's marginal nor average revenue. For example, because total costs in a cooperative are shared by members in proportion to patronage, by increasing its patronage an individual member incurs only a portion of the additional cost to the cooperative while assuming a larger share of the initial costs.

Perhaps even more important are Trifon's comments regarding the equilibrium of the cooperative association. Although Trifon concluded that it was conceivable that there could exist a state at which the restated optimality conditions of all members were satisfied, he argued there was no guarantee, even theoretical, that a cooperative would gravitate toward this state or that members would individually attempt to reach it. Equally troublesome are the questions Trifon raised about the decisions each member must make regarding the optimal allocation of its resources between its individual plant and the cooperative plant.

Both Savage and Aresvik criticized Phillips' statements regarding proportional voting. That criticism was perhaps best articulated by Aresvik, who thought Phillips presented his arguments in such a way that it appeared his conclusions about the appropriate institutional arrangements for cooperatives were derived from his economic analysis of the conditions for an optimum. Instead, Aresvik contended, Phillips' economic analysis was essentially irrelevant to the institutional choices of cooperatives, and these choices cannot be made without introducing additional criteria in the form of value premises. Aresvik suggested that Phillips' conclusions about voting and his remarks about cooperative principles were based on a confusion between positive and normative analysis.

Significance of the Phillips Article

The Phillips article certainly played a noteworthy role in the history of cooperative theory. For nearly a decade, virtually all articles published on cooperative theory were written in response to the Phillips article. Helmberger and Hoos used the Phillips article as the benchmark against which they contrasted their own ideas. However, with publication of the Helmberger and Hoos article in 1962, the torch was passed. The Helmberger and Hoos model, which became widely accepted by agricultural economists, eclipsed the Phillips model, and their article became the most frequently cited article in the literature, a position it has maintained to this day. Meanwhile, authors largely began to ignore the Phillips article.

Prior to the publication of Phillips' article, most of the literature on cooperatives was descriptive, frequently tracing the implications of cooperative principles and concepts and usually devoid of formal economic analysis. The Phillips article differs from earlier work by agricultural economists because it represents an attempt at applying formal economic analysis to the problems of the cooperative association. Unlike the authors of the earlier, descriptive studies, Phillips sought to develop a theory of cooperatives based on an objective function from which rules for optimal behavior could be derived. Phillips constructed a model of the cooperative association by identifying members as decision makers, attributing to them the objective of maximizing individual profits, formulating conditions that would satisfy this objective, and examining the implications of these conditions. Only Enke's 1945 model of a consumer cooperative can be said to have taken a similar approach.

Superficially, Clark's 1952 article might seem to represent an attempt at developing a theory of cooperatives in the same sense as Phillips'. Clark developed a model of the cooperative in which he assumed the cooperative's purpose was to serve its members at the lowest possible cost, accomplished by operating at the minimum point of its average cost curve. The distinguishing feature of the Phillips model is that it was based on the assumption of an objective function from which optimality conditions could be derived. Clark's model differs from Phillips' because Clark did not assume an objective function for the cooperative or its members. Nor did he derive optimality conditions that the decision makers would satisfy in managing the cooperative. Instead, Clark simply placed a restriction on the cooperative—produce at minimum average cost. This was not the objective of the cooperative, which presumably was to maximize member profits. Neither was it a condition for achieving that objective, as Gislason (1952) made clear. Unless the demand curve facing the cooperative intersects the average cost curve at its minimum, member profits cannot be maximized.

The Helmberger and Hoos article represented the first attempt after Phillips to develop a theory of cooperatives. In their model of a processing cooperative, Helmberger and Hoos assumed that the cooperative's objective is to maximize the price of the raw product for whatever quantity members choose to supply. Equilibrium for the cooperative and its mem-

bers occurs where the members' supply function intersects the cooperative's net returns function. The latter is defined as the relationship between the maximum price the cooperative can pay its members, after covering fixed and variable costs, and the level of raw product members supply.

There are several interrelated reasons that may contribute to explaining why the Helmberger and Hoos model eclipsed the Phillips model. Ironically, the most convenient way of organizing these reasons is around Phillips' own criteria. According to Phillips, his article represented an attempt to develop "a realistic, workable, and reasonably complete theory of the economic nature of the cooperative association." The Phillips article largely failed to meet each of these three criteria—*realism*, *workability*, and *completeness*. In contrast, the Helmberger and Hoos model superseded the Phillips model because it was much more successful in meeting them.

Phillips' theory is not *realistic* because it does not give a decision-making role to the cooperative, and the tasks it assigns member firms are unrealistically complex. The optimality conditions for individual members that Phillips derived from his model are extremely burdensome in terms of the information requirements they place on the members. It is unrealistic to assume members have the information on costs and revenues necessary to make individual output decisions that satisfy the optimality conditions and to allocate their resources optimally between their own farming operations and the joint cooperative plant.

Helmberger and Hoos acknowledged the important decision-making role of the cooperative, thereby eliminating a significant deficiency in the Phillips model, albeit the role the cooperative plays in the Helmberger and Hoos model is relatively minor. The Helmberger and Hoos model has additional appeal because the decision-making tasks assigned to the member firms are much more realistic.

Phillips' theory is not *workable* because, as Trifon demonstrated, it is not at all clear that equilibrium can be achieved by all members simultaneously satisfying their individual optimality conditions. On the other hand, the Helmberger and Hoos model provides an explicit equilibrium solution for both the cooperative and its members. The existence of an equilibrium solution makes the Helmberger and Hoos model especially attractive.

Finally, Phillips' theory cannot be considered *complete* because its focus on individual behavior and the lack of a mechanism for relating this behavior to aggregate behavior provides us no information about how a cooperative might behave in various market structures. The Phillips model generates only an individual optimality condition for each cooperative member. It would be necessary to solve these conditions simultaneously to determine a solution to the model. Consequently, there are no aggregate functions to represent market supply or demand. In contrast, the Helmberger and Hoos model generates aggregate cost and revenue functions. These market functions have provided a platform for furthering the study of cooperatives and market structure both through theoretical extensions (e.g., Helmberger 1964; Masson and Eisenstat 1978) and empirical applications (e.g., Youde and Helmberger 1966).

The Role and Objective of the Cooperative

Today we are well aware of the importance of large, diversified regional cooperatives, the creation of joint ventures and other business arrangements involving cooperatives, the increased attention given to cooperative operating results, and the frequent conflicts between members and management. In this environment, it is easy to take for granted the role of the cooperative as a firm and a decision-making unit. Consequently, one must wonder why this role apparently was not obvious to Phillips forty years ago. According to Savage, most farmers and cooperative leaders of the time did not share Phillips' view that entrepreneurial decisions were not made by cooperatives. Savage asserted that a "casual analysis" of almost any cooperative would reveal that its members did not make most entrepreneurial decisions.

Only the agricultural economics literature seems to have been involved in debating the decision-making role of the cooperative. Enke spoke of the management of the consumer cooperative in a matter-of-fact manner, comparing possible goals of the cooperative to other retailers. On the other hand, Emelianoff conceived of cooperatives as nonprofit economic agents governed by the principle of service at cost. As such, they were not "acquisitive" units and therefore not firms. Emelianoff regarded a cooperative association as an "aggregate of economic units," each fully retaining its economic independence. According to Emelianoff, the cooperative is "an agency of associated economic units, owned and controlled by them, through which they conduct their business activities, . . . functioning only as a branch or part of associated economic units, . . . perfectly identical with the special departments or branches of single economic units" (248–49).

In reaction to Emelianoff, Robotka (1947) stated that the conclusion that a cooperative is a firm was almost universally accepted without question. Although he observed that a cooperative seemingly did not meet all the characteristics of a firm, he thought it was undeniable that a cooperative was an economic entity and a decision-making unit. Clark spoke of entrepreneurs in the same narrow sense as Phillips, but he also referred to the management of the cooperative, which he thought should take the interest of members into account when setting its policies.

Thus Phillips seems to have chosen to ignore considerable practical evidence and the precedent set by earlier writers in applying the vertical integration model to the cooperative association in order to implement Emelianoff's concepts—in what Savage termed "slavishness to a model." This decision can also be viewed in the context of positive and normative. By ignoring what might be considered overwhelming evidence and placing all decision-making authority for managing the cooperative in the hands of its individual members, Phillips provided us a normative theory—one that describes how agents "ought to" behave under an idealized regime, based primarily on philosophical ideas about cooperation rather than on observations about how cooperatives actually behave, even when consistent with cooperative principles.

The Helmberger and Hoos article appears to represent a shift from this normative approach to a more positive one. Their mention of the usefulness of their model to empirical research and the derivation of hypotheses about cooperative performance seems to suggest an interest in describing "what is" rather than "what ought to be." Even in some subsequent work, in which theorists have attempted to demonstrate how a cooperative and its members should behave in order to maximize a particular objective function, the decision makers are not forced into the type of artificial and constraining roles that Phillips assigned them.

Despite the emphasis Helmberger and Hoos placed on the decision-making role of the cooperative, the role they gave the cooperative in their model is a relatively minor one. The cooperative strives to maximize the raw product price paid members for whatever quantity they choose to supply. Given the level of member output, the objective of the cooperative is essentially reduced to minimizing the cost of processing the raw product, as Helmberger and Hoos themselves demonstrated. LeVay suggests that reference to the Helmberger and Hoos solution as an optimum may be inappropriate because the solution is not attained as the result of "a deliberate strategy to maximize anything" (1983, 105).

The cooperative is assigned the more proactive role of maximizing aggregate member welfare in later models, including those of Taylor (1971) and Bar (1975). In Taylor's model of a marketing cooperative, which is analogous to Enke's consumer cooperative, the cooperative attempts to maximize the total return to its members. This is equivalent to maximizing the on-farm profits of the members plus the earnings of the cooperative, which are distributed to members as patronage refunds. The cooperative's objective is met when the increment in producer surplus equals the decrement in patronage refunds. In other words, production of the raw product is increased to the level at which the difference between the marginal factor cost and supply price of the raw product equals the difference between the marginal revenue product of the raw product and the marginal factor cost. More simply, the supply price, which is assumed to be the marginal cost of producing the raw product, should equal its marginal revenue product. In contrast, a profit-maximizing firm would restrict output so that the marginal factor cost equals the marginal revenue product.

Ironically, the cooperative's optimality condition can be restated as the marginal cost at the farm level plus the marginal cost at the cooperative level should equal the marginal revenue facing the cooperative, which is equivalent to the original Phillips condition! There exists, however, a fundamental difference between the two models. In Taylor's model, it is the cooperative, not its members, that takes action to ensure the optimality condition is met, presumably by setting the price it pays members for the raw product.

Taylor's choice for the cooperative's objective is based on the traditional concept that a cooperative is operated, not for its own economic gain, but for the benefit of its members. Support for the objective of maximizing total member returns has been offered by Ladd (1982), LeVay (1983), and Sexton (1984). This objective is consistent with the profit-maximizing behavior ascribed to producers in most neoclassical models, and, as Sex-

ton observes, the behavior routinely attributed to economic agents by economists. In addition, LeVay asserts that the solution resulting from this objective corresponds to the overall social optimum, at least when the cooperative is a price-taker in the market it faces as a seller.

Although it is the cooperative, and not the member firms acting individually, that seeks to satisfy the optimality condition in this model, the question about equilibrium must again be raised. As numerous authors have argued, cooperatives will be unsuccessful in restricting member output to the level that maximizes total member returns because the receipt of patronage refunds provides members an incentive to expand output until the cooperative's surplus is exhausted by the supply price and the cooperative breaks even. This point was anticipated by Aizsilnieks (1952), who criticized Clark's model by arguing that the cooperative cannot maintain an autonomous output policy. It also applies to the objective of maximizing the sum of the cash price paid members and the per-unit patronage refund briefly discussed by Helmberger. Consequently, the Helmberger and Hoos equilibrium is the only one that can be attained without resorting to nonprice mechanisms such as delivery quotas, processing rights, and penalty schemes.

Phillips' Contributions

Given the advances in cooperative theory since Phillips wrote his article, it may be difficult to avoid evaluating his contributions too harshly. Certainly, the Phillips model offers little that is useful to cooperative theorists today, given the extent to which it was superseded by the Helmberger and Hoos model. Consequently, an assessment of the Phillips article's value must be made in the context of the contributions it made to the advancement of cooperative theory when it appeared forty years ago.

At first, it might appear that the Phillips article had a stimulating effect on the advancement of cooperative theory, judging from the number of articles it spawned over the next several years. On the other hand, when one considers the extent to which those articles were primarily critiques intended by their authors to correct errors or deficiencies in the Phillips article, one must ask whether appearance of the Phillips article actually advanced cooperative theory and how much effort was required to set cooperative theory back on track. In contrast, the articles that followed the Helmberger and Hoos article were mostly constructive extensions and applications of their model.

The primary shortcomings of the Phillips article are its failure to assign a decision-making role to the cooperative, the inapplicability of the vertical integration model to the relationship between member firms and the cooperative, and the persistent confusion between positive and normative. By contemporary standards, one might expect an author writing today to avoid all three of these problems. One also might have expected Phillips to have avoided the confusion between positive and normative at the time he wrote. Based on the practical evidence and the views expressed by other authors, Phillips' failure to assign a decision-making role to the cooperative was certainly avoidable, and his decision to apply the vertical

integration model to the cooperative association stemmed from that failure.

The nature of these errors and their importance make it difficult to identify an enduring contribution of major significance to the theory of cooperatives within the Phillips article. Perhaps one might consider Phillips' introduction of the concept of optimality to be a modest contribution. Although Enke employed the concept of optimality eight years earlier in his analysis of a consumer cooperative, Phillips' application was the first in the agricultural economics literature. Phillips was justified in his criticism of earlier attempts at developing a cooperative "theory." Those attempts were largely descriptive and imbued with philosophy and principles but lacked any model to describe how either cooperatives or their members behaved or should behave. Phillips was correct in observing that they generally contributed little to understanding the economic nature of the cooperative, and most of us would be sympathetic to his desire to develop a scientific basis for this understanding.

Finally, we should consider Phillips' promotion of proportionality as a contribution, although it is based on value premises and is not derived from his analysis, as Aresvik observed. Before Phillips' article, others, including Robotka, championed the idea of proportional voting. However, Phillips' concept of proportionality, as applied to all aspects of cooperation, including the distribution of costs and benefits, voting rights, and financial responsibility, must be viewed as original to a great extent. Lately, the idea of proportionality, particularly as applied to member financing, has been given considerable attention. Barton (1989), in a recent textbook on cooperatives, presents a class of proportional principles of cooperation and cites Phillips as an early advocate.

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