Subject: FW: AMC Comments - Capper Volstead
Date: Friday, July 15, 2005 3:41 PM
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To: <comments@amc.gov>
Cc: Jean-Mari Peltier <[redacted]>

Dear Commission,

Please find brief comments regarding your request for Public Comment regarding specific questions relating to issues selected for Antitrust Modernization commission study. Attached are documents that support the brief comments which are included in the Word document. Thank you.

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I understand that the Antitrust Modernization Commission is examining antitrust exemptions including the Capper-Volstead Act of 1922. It is also my understanding that the Commission is specifically examining the necessity of exemptions, their costs, benefits and impact on commerce, and whether they should be time limited. My comments address a number of these issues.

Currently, I am a Professor of Agricultural and Organizational Economics at the University of Missouri-Columbia. My responsibilities entail research, outreach and teaching of organizational design and consequent implications for stakeholders. Our research program explores the control and capital constraints of user owned firms such as agricultural cooperatives and how organizational efficiency is affected through incorporation statutes, related federal laws and regulations. Our research is both theoretical and applied. Theoretically, it can be shown that clauses and conditions such as those institutionalized in Capper Volstead provide an organizational design of agricultural cooperatives that promotes competition and inhibits market imperfection. Constraints such as democratic control, limited return on equity capital, and narrowly defined membership create a set of ownership and control rights that are less than completely defined. These constraints act as incentives for producers to act collectively when they face hold-up or market imperfection conditions but these constraints curb rent extracting behavior due to the emergence of free rider, horizon, portfolio, influence cost, and agency problems if cooperatives veer from their original intent and purpose. In general our applied research supports this line of reasoning.

My outreach work includes directing the executive education arm of the Graduate Institute of Cooperative Leadership, an institute formed thirty five years ago to educate cooperative management about the complexities of managing and leading user owned and controlled entities under regulatory constraints such as the Capper-Volstead Act. Generating the cases and materials for this institute has allowed me to travel the world and the nation in exploring the reasons of success and failure among producer owned cooperatives. The insights gained from these experiences allow me to make the following observations:

1) The cooperative model of business organization is a very creative economic development tool. The designers of Capper Volstead employed genius in the powerful but simple construction of the law because it permitted for the establishment of a legal corporation with low ownership and low contracting costs – a necessity for starting a business that enhances competition. Market failure, the basic reason for initiating collective action, usually has a temporal dimension. Capper Volstead solved many temporal market imperfections by legalizing a low ownership cost and low contract cost corporation. Thus the Act creates a corporate form that can easily be established by low income founders. Then, as now, farmers, producers, and ranchers could easily form a countervailing power organization. These entities may be either a bargaining group or a joint vertical integration firm and usually have immediate positive competitive impacts. This

economic development tool has positive externalities in rural communities and provides collective and private goods not only to the organizers but also to non cooperative members in the community.

2) Capper Volstead enables producers to engage in joint vertical integration. This creates a more competitive set of industries up and down the supply chain. Downstream and upstream integration such as North American Bison, Oregon Cherry Growers, Tillamook, Cabot Cheese, Prairie Farms, Welch's, Blue Diamond Almonds, National Cooperative Refinery Association, Florida's Natural, CHS, and MFA Oil have each made their respective industries more competitive. By enabling joint vertical integration, , Capper Volstead reduces risk and uncertainty for producers who are constantly faced with biological production function variances including quantity, quality, and temporal challenges; market access uncertainties and hold ups. This also allows for margin capture at other levels to offset low net margins caused by increased globalization and industrialization impacts. One of the great challenges in modern US agriculture is the growing spatial monopsony and monopoly situations. Multinational firms have shifted capital expenditures offshore leaving areas in the US where no processor or input supplier provides access to needed services or processing facilities. Capper Volstead allows producers to vertically integrate without fear of government intervention because of high market shares in such cases.
3) Capper Volstead permits local cooperatives to develop scale and scope economies through the federation of cooperatives. There are at least twenty four federations among US agricultural cooperatives. These federations contribute to public and private welfare in a number of ways: a) increased competition for the regional, national, and multinational firms that operate in a number of the local market areas, b) creating an institution which enables and encourages local cooperatives to develop rural leaders through local board governance requirements-- "growing" rural leaders who make decisions at local and regional levels rather than agents taking orders from headquarters based in far off urban areas or foreign capitals contributes significantly to the social capital of the United States and each respective state, c) allow for higher quality time for federation managers and boards to concentrate on strategic issues rather than solely on operational issues, and d) allow for more efficient information flows from a set of heterogeneous users to more centralized decision points thus enhancing consumer welfare as well as organizational efficiencies.
4) Capper Volstead also provides a platform for producers to form countervailing balance in transaction negotiations. Given the increased uncertainty and risk associated with industrialization and globalization of the food and fiber sector potential hold up situations are as likely, if not more likely, to occur in today's complex and rapidly changing environment as was true in the 1920s.
5) . Only recently, with advanced organizational and new institutional economics are we coming to understand more completely the genius of the originators of Capper Volstead. By allowing producers limited immunity to certain antitrust provisions Capper Volstead simultaneously placed conditions or covenants in the form of organizational design. These provisions can be summarized from a property rights

point of view by stating that the ownership and control rights are less well defined. Consequently the organizational structure of producer owned cooperatives are more susceptible to internal conflicts often defined as internal free rider, horizon, portfolio, agency, and influence cost challenges. These five characteristics of a user owned organization prevent/inhibit the extraction of monopoly rents by the cooperative through creation of a set of incentives to a heterogeneous membership to exit. In other words, these characteristics eventually give rise to the emergence of a set of capital constraints. These constraints create a disincentive to provide risk/growth capital to a cooperative because: a) cooperative residual claims are restricted to members, b) members have inappropriate incentives to invest because of residual claim illiquidity and non-appreciability, c) growth capital acquisition is tied to patronage, d) equity capital is not consider permanent, and e) limited access to external finance. These organizational characteristics play a major role in counterbalancing the advantages bestowed by Capper Volstead. This relatively new area of research and these preliminary findings are expanded upon in the following papers – a number of which are attached.

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Agricultural Economics 23 (2000) 207–218

AGRICULTURAL ECONOMICS

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Agroindustrialization of the global agrifood economy: bridging development economics and agribusiness research

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Abstract

This paper examines the agroindustrialization process from two supposedly disparate views: development economics and agribusiness research. The evolution of conceptual and methodological approaches emanating from these fields is explored and general observations are made concerning farm economic interdependence, institutional and organizational change, differing scopes of interest, the causes of agroindustrialization, orientation, and the choice of microanalytic tools, terminology, and unit of analysis. Despite an impressive list of hurdles, disincentives, and disconnects, complementarities between the two fields are identified. The paper concludes by exploring the potential of bridging development economics and agribusiness research to inform the future agroindustrialization research agenda. © 2000 Elsevier Science B.V. All rights reserved.

Keywords: Agroindustrialization; Development economics; Agribusiness

1. Introduction

The global food and fiber system is in a process of radical transformation. Numerous scholars and public policy makers have entitled this transformation "the agroindustrialization process". What is agroindustrialization? A perusal of social science literature addressing the industrialization of the agricultural and food system suggests the term invites a broad and heterogeneous set of definitions. Notwithstanding the lack of scholarly unanimity as to common reference, there is a general consensus that agroindustrialization is a process leading to a distinctive economic and social system exhibiting three dynamic characteristics. We initiate our discussion by adapting the Reardon and Barrett (2000) definition of agroindustrialization: "(a) The growth of agroprocessing, distribution, and farm input provisions off-farm; (b) institutional and organizational change in the relation between agrifood firms and farms such as a marked increase in vertical coordination; (c) concomitant changes in the farm sector, such as the changes in product composition, technology, and sector and market structures".

Agroindustrialization, whether analyzed in developing or developed economies, is generally regarded as ushering in periods of individual and collective stress, discontinuous change, and economic disorder. Evans and Stephens (1988), Stiglitz (1988), and Barry (1995) discuss in detail the positive, negative, and neutral implications of this oft-maligned agent or process of social and economic change. This paper does not attempt to review or evaluate this agroindustrialization literature — instead it attempts to review the evolution of two applied fields of economics in their attempt to inform the process of agroindustrialization.

Complex economic and social phenomena such as agroindustrialization are usefully informed from several perspectives. Unfortunately, because of space limitations, we address but two related fields — the contribution of development economics and the

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PII: S0169-5150(00)00093-1

insights emerging from the field of agribusiness research. In the first two sections, we map the evolution of conceptual and methodological approaches emanating from these fields and proffered by scholars addressing industrialization of agriculture phenomena. Then, observations are shared as to the possibilities certain approaches might complement or bridge gapping lacunas of indifference and misunderstanding that have traditionally separated these two seemingly unrelated fields of inquiry. In the closing section, we attempt to demonstrate the promise of bridging these two complementary fields.

2. Development economics informing agroindustrialization

Development economics is a broad field of inquiry.[1] Its main research question — why are some countries poorer than others? — is complex and multifaceted. Because development economics encompasses such a vast set of fields and subfields it is necessary to make choices in writing a brief review. Hence, we concentrate on a specific subset of the development literature that explicitly informs the industrialization of agriculture. We narrow the scope of our survey based on the Reardon–Barrett definition of agroindustrialization, which invites a microanalytic approach. The distinguishing feature of the microanalytic approach to development is that institutions are explicitly endogenized, particularly the process of institutional change and the choice and design of institutional arrangements (Williamson, 1996a).

The microanalytic approach to development contends that institutions matter. Institutions are tantamount to economic development because they affect production and transaction costs (North, 1990). According to Hoff et al. (1993), in the presence of transaction costs and information constraints, institutions influence the efficiency and distribution of resource allocation. From the empirical perspective, Adelman and Morris (1997) observe that institutions matter greatly in explaining how fast nations grow and how widely growth's benefits are shared. Development economics offers hospitable territory for institutional analysis because transaction costs, market failures and missing markets are the rule rather than the exception in developing countries (Bardhan, 1989a).

Pre Coase institutionalists and marxists alike share the common criticism that the neoclassical model fails to take institutions into account. Their approaches emphasize institutional impediments to development, but the persistence of inefficient institutions is left unexplained or attributed to peasant irrationality. Subsequent advances in economic theory suggest institutions are susceptible to analysis. Institutions are introduced into mainstream economics by relaxing the restrictive assumptions of the frictionless neoclassical model. More recently, two non-Walrasian schools of thought have emerged offering formal endogenous theories of institutions (Bardhan, 1989a): the new institutional economics and the information theoretic school.

The new institutional economics focuses on the historical process of institutional change (North, 1990), the economics of property rights (Demsetz, 1967) and the transaction cost economics theory of the firm (Williamson, 1985). Building upon Coase's (1937, 1960) insight that exchange is costly, new institutional economists seek to understand the interplay between institutional factors and market and non-market exchange under positive transaction costs.[2] A complementary perspective evolves from the theory of imperfect information having roots in the work of Akerlof (1980).[3] The economics of rural organization analyzes market and non-market institutional arrangements within the rural sector of developing countries (Stiglitz, 1988; Bardhan, 1989b; Hoff et al., 1993). The emergence and structure of contracts are explained in terms of information incompleteness, moral hazard, and missing markets.

Models of sharecropping examining the nature and design of contractual arrangements in developing countries illustrate the applicability of both schools of thought (Stiglitz, 1974; Eswaran and Kotwal, 1985; Allen and Lueck, 1996). These seemingly alternative models explain mechanisms of contracting from

[1] For a recent review of development theories, refer to Waelbroeck (1998).

[2] For a comprehensive account of new institutional economics research, refer to Furubotn and Richter (1998).

[3] The imperfect information theory is closely related to new institutional economics because the definition of transaction costs encompasses information costs.

complementary perspectives: the ex ante contract design approach of imperfect information models and the ex post governance structure explication of transaction cost economics. Augmenting our microanalytical understanding, Fafchamps (1996) integrates ex ante and ex post considerations in his analysis of credible contract enforcement mechanisms in Ghana.

A second microanalytical approach in the development economics literature directly related to agroindustrialization is the organization of marketing channels. In contrast to the sharecropping literature the unit of analysis in market channel studies is not contractual arrangements per se, but the many feasible forms to effect exchange under conditions of information asymmetries and enforcement problems, which in turn invite horizontal and vertical approaches to market organization.[4] For example, Barrett (1997) applies post-Bainsian industrial organization horizontal concepts, including mobility barriers, in his study of grain and food marketing channels in Madagascar following market deregulation and liberalization. On the other hand, in the extensive literature dealing with the vertical organization of market channels, Staal et al. (1997) provide case study evidence of how transaction costs influence commercialization and processing of dairy products in Kenya and Ethiopia. Additionally, Glover (1990) and Key and Runsten (1999) analyze contract farming and outgrower schemes emerging in developing countries.

A non-microanalytic approach in the development economics tradition informing the industrialization of agriculture is the intersectoral linkages literature. This field focuses on linkages between farm and non-farm sectors in a rural setting building on the backward and forward production linkages concept attributed to Hirschman (1958)[5] and consumption linkages proposed by Mellor (1976).[6] The early intersectoral linkages literature is concerned with measuring the magnitude of production and consumption linkages by means of static multipliers based on national input–output tables (Haggblade et al., 1989; Delgado et al., 1994). This empirically oriented literature also examines the economic extent and structural characteristics of nonagricultural enterprises in rural economies revealing increased economic activity and heterogeneity of firm size in the non-farm sector. Despite limited time series evidence, a rural structural transformation is documented involving producer specialization and consumer demand diversification into non-farm goods and services (Haggblade et al., 1989).

Machethe et al. (1997) build on this literature proposing a research agenda dealing with how to spur linkages between farm and non-farm sectors. The authors identify a set of determinants of investment and capacity utilization affecting the establishment of linkages, among them, transaction costs. Because high transaction costs may constrain linkages institutional and organizational innovations are needed to support the growing interdependence in rural economies brought about by agroindustrialization. Escobal et al. (2000) present an analysis of endogenous institutional innovations in Peru, such as outgrower contracts and stringent quality and safety standards, to support export of nontraditional crops. In doing so, the intersectoral linkages literature appears to initiate a move toward the microeconomic analysis of agroindustrialization related phenomena.

3. Agribusiness research informing agroindustrialization

The concept and definition of agribusiness — "the sum total of all operations involved in the production and distribution of food and fiber" — refer to the post-WWII phenomenon of increasing "unified functions" and "interdependency" between the agricultural production sector and the pre- and post-farmgate business world (Davis, 1956). Subsequently, agribusiness research evolved along two parallel levels of analysis: the study of coordination between vertical and horizontal participants within the food chain, known as agribusiness economics, and the study of decision-making within the alternative food chain governance structures, known as agribusiness

[4] Subsector analysis dealing with horizontal and vertical market organization may offer a basis for an integration of the literature. Despite its development in the US, it has fruitful applications in developing countries (Harrison et al., 1974).

[5] Hirschman was concerned with the complementary effects of investment, i.e., positive external economies generated by public and private investments leading to self-enforcing industrialization. The concept that investment begets more investment receives a formal treatment in Krugman (1995).

[6] Consumption or expenditure linkages refer to the notion that increases in farm income foster investments in the non-farm sector.

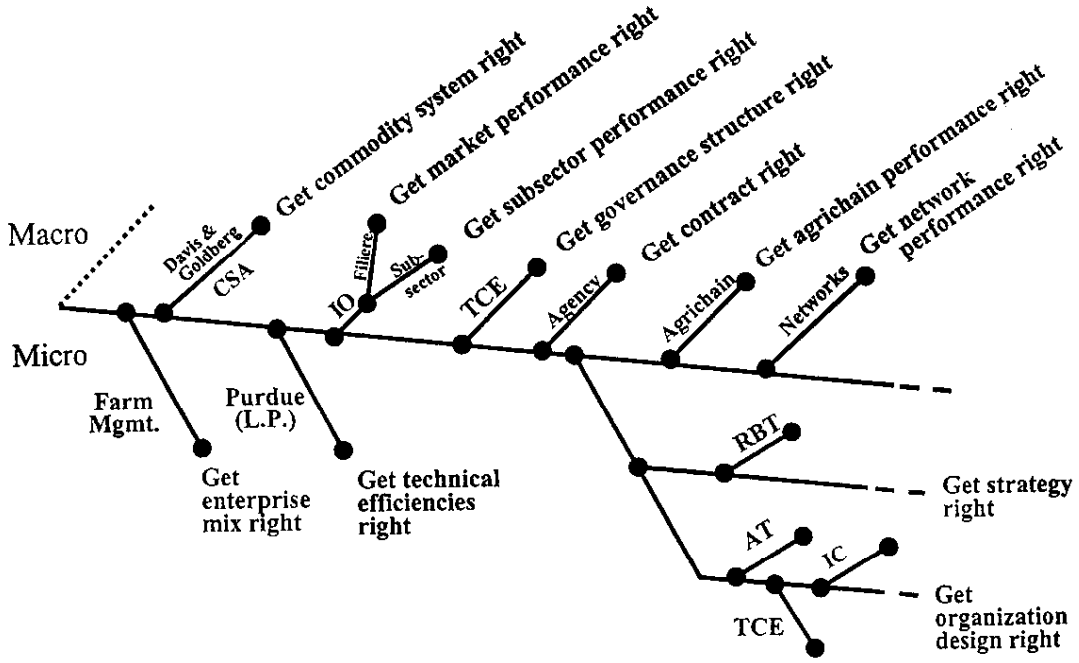

Fig. 1. The evolution of agribusiness research.

management. In the Williamsonian influenced Fig. 1, branches emanating upward from the main trunk represent the evolution of the study of agribusiness economics, while branches egressing downward represent the evolution of agribusiness management.[7] The origins of this parallel level of inquiry can be traced to the early 1900s convergence of plant and animal scientists, accounting and budget oriented farm management specialists, and market oriented economists. This fusing of academic disciplines spread to the rest of the world and was comfortably integrated by the 1950s.

3.1. Agribusiness economics

By the mid-1950s, utilizing Leontieff's input–output intersectoral dependence model, Davis and Goldberg (1957) document a pattern of increasing specialization within the agrifood system. Furthermore, their findings suggest value adding economic activities at the pre- and post-farmgate levels were increasing, while decreasing at the farm production level. From these findings, researchers moved toward describing and identifying interfirm coordination arrangements within individual commodity systems (Goldberg, 1968). The first explicitly labeled work under the rubric of "agribusiness" was the commodity systems approach (CSA). "Getting commodity systems right" focused attention on coordination and harmony, particularly in vertical agrifood system relationships. CSA proponents argued through durable exchange arrangements tightly coordinated systems would lower per unit costs, increase system and participant profits, increase responsiveness to market demand, and in many cases increase output. The groundwork provided by the CSA, recognizing the process of industrialization of agriculture in developed economies, was now in place.

After the business school origination of the CSA, a more theoretical yet complementary approach to agrifood system coordination emerged rooted in applied microeconomics and the workings of agricultural marketing researchers (Marion, 1986). Economists in many countries utilizing the Bainsian industrial organization model (IO) concentrated their work on two major issues: a market structure approach to agrifood system and agricultural industrialization. Evolving simultaneously, the French "*filière*" concept and the American "subsector" approach incorporated

[7] Refer to Williamson (1996a) for a schematic evolution of development economics.

a more dynamic paradigm than the static, horizontally oriented, structure–conduct–performance approach of traditional industrial organization. "Getting market performance right" was the policy objective of researchers applying the *filière* and subsector approaches. Correcting for vertical market constraints, market failures, and coordination frictions motivated these schools to expand industrial organization models toward more integrative analysis of supply and demand conditions, price-institutional management relationships, and government–market interfaces. These schools of research emphasized a more dynamic research process and broadened the set of dependent variables to encompass not only efficiency but also equity measures as the question — who will control agriculture? — frequently surfaced (Shaffer, 1973). As interest in agroindustrialization grew, this verticalized market structure approach garnered increasing attention among international agricultural development specialists as an applicable public policy oriented diagnostic research methodology (Boomgard et al., 1991). Sauvee (1998) reviewed a European extension of the *filière* approach known as convention theory. In this school quality uncertainty plays the central role in structuring interfirm coordination.

As the vertical coordinating characteristics of global agroindustrialization increased, demand for more specific, contract evaluation analytical techniques emerged. Initially, agribusiness and agricultural marketing researchers turned their attention to the Coasian–Williamsonian transaction cost economics paradigm (TCE). This "get governance structures right" approach to vertical systems introduced to the agribusiness researcher a set of tools and concepts by which the increasing relationship-specific investment nature of industrialization could be addressed. As agroindustrialization permeated the vast majority of agribusiness system regimes an increasing number of transactions were carried out in non-market, nonhierarchical arrangements. Consequently, as hybrid governance structures grew in importance, more complex contractual designs influenced organizational transactions. With the onset of more complicated contract design, incomplete contracting costs increased. And in the absence of credible and enforceable contractual arrangements, the opportunity for one of the transacting parties to extract appropriable quasi-rents accruing to a relationship-specific investment leads to the under-investment hold-up problem. Brousseau (1994) expands and constructively challenges Williamson (1985) deterministic governance structure model by focusing on the dynamics of contracting categorization. Sporleder (1992), Hobbs (1996), Zylbersztajn (1996), and Gow and Swinnen (1998) are examples of an increasingly more microanalytic transaction cost literature that informs our understanding of the agroindustrialization process.

Accompanying transaction cost economics another contract oriented approach to understanding the agroindustrialization process emerged. In addressing the importance of contract design in tightly coordinated and owner–manager separated agrifood systems, principal-agent concepts gained popularity because of their ability to analyze and formulate efficient contract terms. Principal-agent theory examines the tradeoff between the cost of measuring behavior and the cost of measuring outcomes and transferring risk to the agent. Applied studies of moral hazard and adverse selection problems represented by Sappington (1991), Lajili et al. (1997), Hayami (1998), and Shirley and Xu (1998) demonstrate the breadth of applicability of this microanalytical "getting contracts right" approach to the issue of agroindustrialization.

By the 1990s a new concept, supply chain management (SCM), surfaced as an alternative paradigm. First put forth by logistics scientists as a method to improve technical efficiency in procurement and inventory control management processes, SCM soon developed a following among food system and agribusiness specialists. Defined as an integrative philosophy to manage the total flow of a distribution channel from supplier to ultimate user, SCM is expanding into a more comprehensive coordination analysis approach. The unit of analysis is the coordinated chain, not the firm. A case supported basic assumption is that rivalry is not company against company, but supply chain against supply chain (Christopher, 1992). Beers et al. (1998) summarize the origins and conceptual background of the "getting agrichain performance right" approach, while Hamdar (1999) is an example of the application of an array of complementary institutional arrangements transforming the food chain of a developing country.

Increased liberalization of market policies, privatization initiatives, and globalization phenomena during

the 1990s heightened the agribusiness researchers' quest for understanding the causes and consequences of exogenous and endogenous inputs on food chain participants. Simultaneously, adaptation of information and bio-genetic technologies accelerated inter- and intra-industry and firm structural and organization shifts as agroindustrialization paradigms would predict. Food system participants in developing and developed economies continue their pursuit of efficiency and risk ameliorating strategies and structures. Yet, economizing on transaction costs is not the only factor under analysis. Quality, screening, animal safety, traceability, community development, and other food system sensitive social, environmental, and behavioral objectives are emerging (Van Hoek, 1999). To analyze these more complex objective functions, new frameworks such as networking models, system simulation, ecological footprinting, and reverse logistics are being advanced. Similar to the development economists' challenges in the study of agroindustrialization, the agribusiness systems analysts are developing more microanalytical oriented paradigms and tools.

3.2. Agribusiness management

For this discussion, we define agribusiness management as the study of intra-firm coordination and motivation as compared to the study of inter-firm coordination by agribusiness economics. The evolution of this field has been sporadic with bursts of research activity and then periods of little or no activity.

Notwithstanding farm management/economics "get farm enterprise mix right", the first intra-firm analysis in off-farm processing plants were the 1950–1960s cost and efficiency studies (French, 1977). Later, this firm efficiency work was broadened to examination of optimum size and location of plants. "Getting technical efficiencies right" was not broad enough according to Shaffer (1973), as he argued to study a more holistic system from input to final consumer. This vertical system approach, or as it was called later subsector analysis, was heavily influenced by industrial organization theory and therefore became public policy oriented. This shift in the early 1970s to inter-firm rather than intra-firm analysis left an agribusiness management void with the notable exception of innovative theoretical cooperative work during the 1980s (Royer, 1987).

With the birth of several agribusiness journals and the International Agribusiness Management Association (IAMA), intra-firm work in the agrifood sector re-emerged. This time, however, it evolved into two directions: the strategic management direction of "getting strategy right" and the new institutional economics direction of "getting organizational design right".

The strategic management literature identifies a number of paradigms relevant to the study of agroindustrialization. For this piece we review only one, resource base theory (RBT), based upon the recognition that tangible and intangible assets — called resources — in an organization generate quasi-rents over a sustained period of time. The central construct of this theory is based on the resources of the firm: physical, financial, human and organizational capital. Thus, the emphasis is on "getting resources right". Westgren (1995) in applying the RBT to a number of agribusiness management examples obtained results consistent with Barney's (1991) conclusion that sustained competitive advantage requires firm resource heterogeneity.

The second area of research informing agribusiness management is new institutional economics. This "getting organizational design right" framework is usually divided into three fields: agency theory (AT), transaction cost (TCE), and incomplete contracts (IC). The concept that team effort in organizations gives rise to intra-firm (or managerial) transaction costs, including measurement costs and the free rider problem, emerged from the influential paper by Alchian and Demsetz (1972). Subsequent principal-agent theoretic work addresses intra-firm incentive and risk sharing problems with particular emphasis on the agency problem between managers and residual claimants. Intra-firm transaction cost economics core premise is that contracts are expensive to write, monitor and enforce. This suggests that most, if not all, contracts are incomplete. Contractual incompleteness matters because renegotiation imposes ex post and ex ante costs leading to potential hold-up situations and the consequent reluctance to invest in relationship-specific investments. Therefore, under-investment ensues and profits are foregone not only to the organization, but also to the coffers of the nation state. The intra-firm incomplete contracts subfield addresses the issue of ownership of non-human assets when contracts are

incomplete. Given that contracts fail to specify all aspects of asset usage, then the optimal firm ownership structure should align residual claimant with residual control rights (Hart, 1995).

Cook and Iliopoulos (2000) provide an example of agribusiness management applied research focusing on the transaction costs of equity capital acquisition in agricultural cooperatives. They estimate a structural equation model to measure organizational design effects on members' investment incentives. Such intra-firm microanalytic approaches create the framework for public and private decision-makers to design more efficient organizations — elements critical to the agroindustrialization issues of income development and quality of life improvement.

4. General observations

This brief review of the microanalytical approaches of development economics, agribusiness economics, and agribusiness management proffers but a glimpse of theoretical and empirical analysis relevant in the attempt to understand and inform the phenomenon of agroindustrialization. In this section, we endeavor to sift and winnow from this stock of multidisciplinary output a set of general observations which might serve as a platform for further discussion among scholars, policymakers, practitioners, and managers in their quest to understand and affect the agroindustrialization process.

4.1. Observation 1 — farm economic interdependence

The Reardon–Barrett definition of the agroindustrialization process is comprised of three related sets of changes. In the initial set, "growth of non-farm activities such as agroprocessing, distribution, and farm input provision" is denoted. This growing interdependence between the farm production sector and the pre- and post-farmgate economic activities is documented empirically by both development and agribusiness researchers. Representing the development economics literature, Haggblade et al. (1989) conclude their findings on African farm households and non-farm enterprises by identifying three collaborating phenomena: increasing non-farm share of rural employment, growing participation of non-farm sources of income, and diversification of household expenditures. The field of agribusiness research was created from the findings published by Davis and Goldberg (1957). In their Leontieff input–output intersectoral dependence study of the pre- and post-WWII farm structure they documented a pattern of increasing economic interdependence between farm and non-farm economic sectors in the U.S..

Therefore, our first observation — both fields, development economics and agribusiness research, originate at the same point with the recognition that farm production value added decreases relative to value added by non-farm food system participants.

4.2. Observation 2 — institutional and organizational change

The second set of changes in the Reardon–Barrett definition suggests "institutional and organizational change in the relation between agrifood firms and farms, such as a marked increase in vertical coordination". The market channel school of the development economics literature analyzes how markets actually work in developing countries, focusing on a variety of alternative institutional arrangements used to effect exchanges in conditions of pervasive risks, information constraints, moral hazard, and imperfect contract enforceability. Institutional arrangements are designed to substitute for missing markets or emerge as a response to imperfect information in less than competitive markets. In general, development economists seek to understand the efficiency and equity implications brought about by institutional and organizational changes in the interface between farms and agribusiness firms. Stage two of the agroindustrialization definition is arguably the raison d'être of the agribusiness research agenda, as the previous agribusiness economics section documents. Most analytical frameworks related to agribusiness research deal directly or indirectly with vertical coordination issues applying a diverse set of theories with emphasis on overall agribusiness system efficiency.

Our second observation is — development economists and agribusiness researchers generally agree that the growing number of complex contractual arrangements replacing spot markets is a defining characteristic of the agroindustrialization phenomenon.

4.3. Observation 3 — differing scopes of interest

The third set of changes identified in the Reardon–Barrett agroindustrialization process definition relates to "concomitant changes in the farm sector, such as the changes in product composition, technology, and sectoral and market structure". Development economists observe that self-sufficient production units tend to have more exposure to markets as they diversify their production scope to cash or nontraditional crops. The contract farming literature analyzes the impacts on farm units as they integrate with the non-farm sector by means of production contracts. Such outgrower schemes are not standardized across developing regions, but normally a contract with a downstream firm enables the farmer to have access to credit, production inputs, modern technologies, and extension services. However, the farmer is bound by contract to deliver a certain amount of product at a future date under strict quality and safety standards. The literature also examines relations between large and small businesses given the observed bimodal distribution of business size and asset concentration in most developing countries. The power relation characterizing such transactions evolves from the asymmetric relative size, hence bargaining power, between buyers ("agroindustry") and suppliers (farmers). This feature of outgrower contracts raises efficiency and equity issues.

Agribusiness scholars, on the other hand, generally focus on issues faced by remaining farm enterprises or pre- and post-farmgate firms — particularly the coordination and motivation costs resulting from the consequent increased economic specialization accompanying the agroindustrialization process. These transaction costs are more difficult to measure than the traditional production costs and encompass activities such as compiling and transmitting information, time delays caused by more centralized decision-making, maladaption costs created by inaccurate information, and imperfect commitment costs.

Our third observation is — we detect a difference in scope between development and agribusiness economists' research agendas. The development economist's scope of interest includes both successful and displaced resources during the agroindustrialization process, while agribusiness researchers more narrowly focus their interest on the efficiency and competitive issues of the remaining participants and organizations.

4.4. Observation 4 — what causes agroindustrialization?

Development and agribusiness economists appear to observe similar phenomena related to the industrialization of the global agrifood economy. Increasingly they utilize concepts drawn from microanalytical economic paradigms explaining institutions and institutional arrangements. However, differences exist. The major difference observed by the authors appears to be the lack of agreement concerning the direction of causality as to what factors drive agroindustrialization.

Generally speaking, development economists believe that agroindustrialization is private firm driven. That is, intra-firm organization design and coordination strategies influence the nature, form, and rate of agroindustrialization. Implied in their work is the presumption that vertical coordination strategies of agribusiness firms, particularly the contractual relation with the farmer, have effects on quality, equity and efficiency outcomes, thereby influencing sector competitiveness and consumer choice. Hence, intra-firm decision-making influences producer and consumer welfare. On the other hand, agribusiness researchers tend to hold the viewpoint that private firm and commodity system governance structure and strategy decisions are responses to technological, demographic and social changes occurring at the institutional environment level. In other words, agribusiness firms react to changes in the rules of the game fostered by exogenous forces. However, agribusiness scholars generally agree that the choice of strategies and structures at the firm level affects market performance and thus social welfare.

Hence, our fourth observation — development economists suggest the cause of agroindustrialization is private firm market power behavior implemented through strategic and structural design decisions, whereas agribusiness scholars start with the premise that agroindustrialization is exogeneously determined and exchanges are organized by means of transaction cost minimizing governance structures.

4.5. Observation 5 — choice of microanalytic tools

Possibly such differing perspectives regarding the nature of the agroindustrialization process may be due to the analytical tools of choice of develop-

ment and agribusiness economists. The former tend to favor the ex ante contract design approach of the Stiglitz–Bardhan vintage, which postulates institutional arrangements emerge as a response to missing markets and information constraints. The latter seem to be more at ease with new institutional economics subfields such as transaction cost economics, agency theory, and property rights theory, which emphasize transaction cost minimizing organizational arrangement design. It remains to be seen whether both strands of non-Walrasian institutional economics might substitute or complement each other in informing the ongoing industrialization of agriculture.

The fifth observation is — development and agribusiness researchers are increasingly applying microanalytic tools to examine agroindustrialization phenomena, but the choice of approach may significantly affect their applicable output results.

4.6. Observation 6 — choice of terminology

The issue of semantics also may hinder proper communication between development and agribusiness economists. There is a need to clarify some basic concepts as they relate to the three major segments of Reardon and Barrett's agroindustrialization definition. For instance, the term "institution" clearly receives different connotations in both bodies of literature. In the economics of rural organization tradition an institution may refer to a contract, organization, market regulation or social norm, whereas in the new institutional economics there is a distinction between institutional environment and institutional or contractual arrangements, as in North's analogy of rules of the game and players. Terminology matters, because one might suppose that "institutions" are formally endogenized in rigorous economic models, when in fact it is the design of a contractual arrangement that is actually explained. Moreover, a careful examination of the definition of agroindustrialization may reveal that institutional arrangements, but not the institutional environment, need to be explained.[8]

[8] A theoretical framework treating the institutional environment as an exogenous variable influencing the characteristics of transactions, and hence institutional arrangements, is offered by Williamson (1996b).

Our sixth observation is — terminology is extremely important in addressing complex issues and phenomena, especially in a multidisciplinary subfield-oriented environment.

4.7. Observation 7 — multitude of units of analysis

New institutional research is at an embryonic stage, particularly from an empirical point of view. In development economics and agribusiness fields, a multitude of methodological approaches, each requiring different points of reference, has evolved. When utilizing the neoclassical theoretical paradigm, empiricists had access to well-maintained, current, and centralized data files. In exploring microanalytical and new institutional concepts, applied researchers struggle with defining measurable units of analysis. In our brief review of the microanalytic agroindustrialization literature, we encountered a plethora of alternatives ranging from linkages to contracts and transactions, to subsectors, to chains, to networks, to size of enterprise, to generic strategies and intra-firm organizational structures.

Thus, our seventh observation — the lack of conformity as to a common unit of analysis creates a disincentive for policymakers, public and private, to incorporate this informative but less orthodox output into their decision-making processes.

4.8. Observation 8 — two ships passing in the night

Our final observation is one of astonishment — how can two fields of applied social science, development economics and agribusiness research, utilizing microanalytic approaches in the study of the same socioeconomic phenomenon — agroindustrialization — pass quietly through the night without noticing each other? Our review identified significant referencing by both groups of the same theoretical sources, but almost no cross-referencing of applied works. There appears to be little cross fertilization, a scarcity of lateral communication, nonexistence of research coordination, and minimal motivation to learn and improve upon each other's endeavors. Perhaps this mutual indifference is justifiable with numerous reasons explaining such behavior: (a) the concept of agroindustrialization is not new, but the concentrated study of its origins, processes, and impacts is

relatively recent; (b) both fields are at early stages of empiricizing the new microanalytical paradigms; (c) the two fields debate quite different aspects of the agroindustrialization process, one group concentrating on poverty alleviation, local food and farming systems, and income distribution issues, while the other emphasizing competition, efficient agrifood system coordination, and governance structure strategies; (d) the clientele groups served, development economics serving a public and quasi-public clientele and the agribusiness group in general assumed to be serving a more private clientele; (e) since both fields are relatively new, energies are focused on understanding intra-field heterogeneity, therefore augmenting opportunity costs of adventuring beyond paradigmatic borders; (f) research outputs are disseminated through different publication outlets; (g) different socioeconomic sectors of the global agrifood system being evaluated.

This is an impressive list of hurdles, disincentives, and disconnects, yet we need to explore whether it is sufficient to deter future collaboration. We begin to address this challenge in the final section.

5. Prospects for the future

Our review of the development and agribusiness research literature not only documents constraints to "bridging the gap" but also identifies commonalities and potential complementarities including (a) distinct recognition of the importance of a radical transformation occurring within the global agrifood system; (b) agroindustrialization literature generated by well-trained applied social scientists and economists; (c) growing awareness of the potential for multidisciplinary approaches to the complex set of challenges observed in the agroindustrialization process; (d) evidence of an experienced group of scholars familiar with horizontal and vertical coordination empirical research questions; (e) growing application of microanalytical institutional approaches in examining the contractual nature of agroindustrialization; (f) increasing awareness of the importance and relevance of rigorous descriptive analytical work, especially research case methods, when doing microanalytical institutional work; (g) considerable overlap in the public policy orientation of development and agribusiness economics research in contrast to the agribusiness management school; (h) an embryonic but strongly rooted recognition that the fields might inform each other regarding the agroindustrialization issue.

Given these observations we argue that potential for strong complementarity exists. That is, increased levels of microanalytical development work on the agroindustrialization process has the potential to significantly increase the marginal return to agroindustrialization oriented output of agribusiness researchers and vice versa. How might this potential complementarity be exploited so as to enhance the quantity and quality of agroindustrialization research?

The current agroindustrialization research environment may be described as a set of decentralized scholars working in an uncoordinated and asymmetric information-laden setting. We also know that coordination challenges with strong complementarities involve design and innovation attribute problems (Milgrom and Roberts, 1992). Given the decentralized nature of agroindustrialization research, it is unlikely that the more centralized design solution of synchronization and assignment adds much to the discussion. Nevertheless, when asymmetric, nonexistent, or misaligned information problems arise in decentralized decision-making environments, we recognize this coordination challenge as having innovation attributes. Innovation attribute problems are simply solved by gathering or developing information sets and then communicating them to affected decentralized participants. The core issues in innovation attribute problems are *who* initiates the gathering, developing, and communicating of relevant information and *what* information is subject to this activity.

This set of coordination problems associated with the potential existence of strong complementarities among development economists and agribusiness researchers, especially in the current decentralized environment, could be ameliorated by initiating efforts to (a) eliminate the confusion and miscommunication caused by a nonstandardized set of terminology; (b) create an improved understanding of the commonalities and differences among the two groups; (c) establish a more institutionalized platform for these many consequent issues to be addressed. This brief review concludes that bridging the perceived chasm between development and agribusiness economists merits serious attention if improving understanding

of causes and solutions to the global agroindustrialization process is a socially desirable objective.

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The Future of U.S. Agricultural Cooperatives: A Neo-Institutional Approach

Michael L. Cook

Thirty years ago Helmberger speculated that industrialization of agriculture would lead to the demise of farmer cooperatives (Helmberger 1966, p. 1434). In responding to Helmberger's prediction, Abrahamsen countered by suggesting that as industrialization of agriculture evolved, cooperatives would increasingly become the "farmer's integrating agency" (Abrahamsen, p. 1442).

In this paper I examine these two divergent opinions by (*a*) briefly describing the structural and strategic evolution of U.S. farmer cooperatives since the Helmberger and Abrahamsen (H&A) forecasts, (*b*) utilizing recent developments in neo-institutional economic (organizational economic) theory to generate hypotheses regarding structural and strategic shifts in U.S. agricultural cooperatives, and (*c*) further applying neo-institutional economics to speculate what the future might hold for U.S. producer-owned and -controlled agricultural cooperatives.

Evolution of U.S. Agricultural Cooperatives

Most U.S. agricultural cooperatives originated in the early 1900s because of a combination of economic, farm organization, and public policy factors. During the ensuing forty years, U.S. farmer cooperatives slowly but consistently increased their aggregate market shares of inputs handled, farm marketings, and services provided. By the time H&A made their predictions, cooperative market shares had grown to 24% of farm marketings and 15% of purchased inputs (table 1).[1]

In the twenty years following the H&A forecasts, cooperative market shares for farm marketings and purchased inputs continued to increase until they reached 30% and 28%, respectively, in 1982. The subsequent farm depression saw a reversal of market share growth; a decline to 25% in both farm marketings and input supplies by 1987–88. Since this recent nadir, cooperative market shares have again increased each year until they reached 1982 levels of 30% and 28% in 1993.

Aggregate market share numbers indicate general increases and decreases in producer collective action, but specific commodity market shares provide more information in analyzing structural change. Cooperative market shares in farm marketings vary by commodity—from 10% in livestock to 85% in milk (table 2). Over the forty-year period, cooperative farm marketings of livestock declined slightly, fruits and vegetable marketings remained steady, grains and oilseed marketings increased slightly, and milk and cotton marketings increased significantly.

Figures in table 3 represent cooperative market shares of production inputs from 1951 through 1993. Cooperative market shares in seed sales decreased, feed market shares remained steady, and agricultural chemical, petroleum, and fertilizer market shares increased dramatically.

Market share trends at the farmgate and first-handler levels suggest that, except in the capital intensive livestock processing subsector and the research and development intensive seed subsector, cooperatives have increasingly become what Abrahamsen calls farmers' integrating agency.

What about the degree of forward or backward integration into the food or input chain? Helmberger states that "cooperatives have made little headway in invading the industrial

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[1] Marketing share estimates represent cooperative activity at the farmgate or first-handler level. Farm supply share estimates represent cooperative activity in selling farm supplies to farmers for use in production. For a detailed explanation of how these aggregated market shares are estimated, see *USDA Farmer Cooperatives*, Vol. 61, No. 11, February 1995, pp. 4–5.

Amer. J. Agr. Econ. 77 (December 1995): 1153–1159

Table 1. U.S. Farmer Cooperatives' Shares of Farm Marketings and Farm Production Expenditures, 1950–93, in Percentages

	1951	1961	1971	1982	1988	1993
Percentage of cash receipts of marketings	19	24	26	30	25	30
Percentage of farm production expenditures	13	14	16	28	25	28

Source: USDA-ACS, *Farmer Cooperatives; Cooperative Historical Statistics*, Cir. 1; and USDA-ACS Research Report 37.

Table 2. U.S. Farmer Cooperatives' Shares of Farm Marketings, 1951–93, Selected Commodities, in Percentages

Commodity/Year	1951	1961	1971	1982	1988	1993
Milk	46	58	70	77	76	85
Cotton products	10	19	25	36	41	35
Grains/oil seeds	35	33	34	36	30	42
Fruit/vegetables	20	22	25	20	24	21
Livestock	13	13	11	11	7	10

Source: USDA-ACS, *Farmer Cooperatives; Cooperative Historical Statistics*, Cir. 1; and USDA-ACS Research Report 37.

Table 3. U.S. Farmer Cooperatives Shares of Farm Input Sales, 1951–93, Selected Input Products, in Percentages

Product/Year	1951	1961	1971	1982	1988	1993
Fertilizer	16	26	30	42	40	42
Petroleum	19	25	35	36	39	48
Ag chemicals	12	16	20	30	28	31
Feed	18	18	17	18	18	21
Seed	17	16	15	17	17	11

Source: USDA-ACS, *Farmer Cooperatives; Cooperative Historical Statistics*, Cir. 1; and USDA-ACS Research Report 37.

sectors which serve agriculture" (1966, p. 1429). Twenty-five years later Rogers and Marion verify Helmberger's concern. Their study found that the 100 largest agricultural marketing cooperatives accounted for 6.9% of the total value of shipments, up from 5.7% five years earlier. Based on value added, these same cooperatives held only a 3.6% share, up from 3.1%. These figures suggest that cooperatives tend to operate in the low value-added, first-stage food manufacturing industries. No studies were found that analyzed the degree of backward integration by supply cooperatives, although, according to industry sources, fertilizer cooperatives control 25% to 40% of the manufacturing capacity.

Why Aren't Cooperatives the Dominant Form of Agribusiness in the United States?

Even though cooperatives made considerable advances in market shares at the farmgate and first-handler levels and minor progress in food manufacturing during the past thirty-five years, they have not become the dominant form of business organization in the agri-food chain.

A better conceptual understanding of the genesis, growth, decline, and demise of the cooperative business organization would serve us well in examining this question and in the exercise of speculating about the role of the cooperative form of business in the future of the U.S. agri-food chain. This understanding

should be dynamic in nature. Unfortunately, no formal "life cycle" theory exists. LeVay, in his seminal article, stresses the need to formulate a workable paradigm. He also brings to our attention several embryonic notions that might complement a theory of the evolution of cooperatives. These include

1. "Wave" Theory—First enunciated by Helmberger: "we should not be surprised to see waves of cooperative organization, especially in depressed times, followed by waves of cooperative failures" (Helmberger 1966, p. 1430).
2. "Wind-It-Up" Theory—Suggested by LeVay, building on Nourses's 1942 comments: "Once they have secured the terms they require, competitors may adjust their prices or improve their services such that the group (i.e., the cooperative) becomes redundant. The cooperative has achieved its purpose and members, considering that it is now obsolete, may wind it up" (LeVay, p. 28).
3. "Pacemaker" Theory—Articulated by LeVay in his analysis of Helmberger's 1964 piece on cooperative structure: "the very existence of a successful cooperative makes for greater efficiency amongst the competitors, so that even when price and service adjustments have been effected, the organization is kept in being to fulfill a pacemaker role" (LeVay, p. 28).

In addition, Staatz suggests a fourth complement to a potential dynamic paradigm of cooperative evolution:

4. "Mop-Up" Theory—Staatz suggests that "in static or declining markets, I.O.F.s may have little to lose by acting opportunistically. Such behavior may therefore create incentives for farmers to integrate forward via cooperatives in these markets" (Staatz 1987a, p. 89).

Given these four notions as a starting point, I propose the following five-stage crude model of cooperative genesis, growth, and demise. This introduces the transaction and agency cost groundwork for the subsequent section on speculating about the future of agricultural cooperatives.

Stage One

The two economic justifications for forming cooperatives are (*a*) individual producers need institutional mechanisms to bring economic balance under their control, usually because of excess supply-induced prices; and (*b*) individual producers need institutional mechanisms to countervail opportunism and holdup situations encountered when markets fail. Depressed prices or market failures create incentives for producers to react collectively. Generally, the first stage in the formation of a cooperative is viewed as defensive in nature. In analyzing the six traditional types of U.S. agricultural cooperatives, it becomes obvious that their collective entrepreneurial energy originated in survival-defensive roots. These six include the following.

1. Farm Credit System. Twelve federal land banks were the first components of the Farm Credit System when it was chartered by Congress under the Federal Farm Loan Act of 1916. Subsequently, the Federal Intermediate Credit Banks were created in 1923 to provide short- and intermediate-term credit: the Production Credit Association in 1933, the Banks for Cooperatives in 1933, and the regulator—the Farm Credit Administration. The motivating forces behind the efforts to organize the systems came from concerns about the unavailability of agricultural and real estate loans, extremely high rates, and the length of terms (federal law prohibited national banks from making loans with maturities beyond five years).
2. Rural Utilities. The rural electric and telephone cooperatives were formed in 1936 and 1949, respectively, to provide a service that was missing because of the high per unit cost of serving a low-density customer base.
3. Nourse I: Local Cooperatives. These multipurpose local cooperatives are economic units operating in a geographical space where achieving scale and scope economies in commodity assembly (usually grains or oilseeds) and input retailing might dictate the presence of a spatial monopolist/monopsonist. Founded to provide a missing service, to avoid monopoly power, to reduce risk, or to achieve economies of scale, they epitomize the Nourse philosophy of cooperation—that of a "competitive yardstick" with the objective of keeping investor-oriented firms competitive.
4. Nourse II: Multifunctional Regional Cooperatives. Competitive yardstick-driven regional cooperatives usually perform a combination of input procurement, service provision, and/or marketing. Many integrate forward or backward beyond the first-handler or wholesaling levels. They might be organizationally structured as federated,

centralized, or a combination of both. They differ from Nourse I local cooperatives in that there is little probability of their being spatial monopolists/monopsonists in their geographic markets.

5. Sapiro I Cooperatives: Bargaining Cooperatives. Bargaining cooperatives address market failures through horizontal integration. Producers organize these Sapiro-inspired associations in an attempt to affect the terms of trade in favor of members when negotiating with first handlers. The functions of bargaining cooperatives can be described as twofold: (*a*) to enhance margins, and (*b*) to guarantee a market. These types of associations are found most often serving perishable commodity producers, where temporal asset specificity creates a situation of potential postcontractual opportunism.
6. Sapiro II Cooperatives: Marketing Cooperatives. Marketing cooperatives are a form of producer vertical integration that circumvent and compete with proprietary handlers. They usually can be categorized in one of two ways, single or multiple commodity. The objectives are similar—to bypass the investor-owned firm, enhance prices, and in general pursue the Sapiro goals of increasing margin and avoiding market power. (For more details on this taxonomy, see Cook 1993.)

Stage Two

Cooperatives founded for the economic balance-excess supply-induced prices reasons are usually short-lived and have little economic impact on their members' livelihoods.[2] These are the types of cooperatives that Helmberger most likely refers to in his wave theory. On the other hand, cooperatives formed to confront market failures usually could market or deliver inputs at more favorable prices than I.O.F. oligopolists/oligopsonists. Therefore, since benefit usually outweighs cost, they survive past the infant stage.

Stage Three

Cooperatives surviving stage two become successful in correcting, or at least ameliorating, the negative economic impacts of market failures. Consequently, the strategic behaviors of competitors begin to modify. At this stage, prices now differ little among I.O.F. competitors and the cooperative. Progressively, the short-run costs of transacting with a cooperative become more scrutinized by members. These transaction costs, seldom recognized in the fervor of "combating a monopolist/monopsonist," now become important. These costs are generated by a vaguely defined "user versus investor" set of property rights. These vaguely defined property rights lead to conflicts over residual claims and decision control—especially as cooperatives become increasingly complex in their organizational structure. For this paper, conflicts over residual claims and decision control caused by the unique user-driven characteristics of cooperatives are categorized into five general problem sets.

1. Free Rider Problem. When property rights are untradeable, insecure, or unassigned, the free rider problem emerges. This is a situation in which current members or nonmembers use a resource for their individual benefit and property rights are not sufficiently well suited and enforced to ensure that current member-patrons or current nonmember-patrons bear the full costs of the actions and/or receive the full benefits they create. This situation occurs particularly in open membership cooperatives. An example would be when a pear producer refuses to join the membership of a pear bargaining association but captures the benefits of the negotiated terms of trade. A more complex type of free rider problem occurs when dealing with the common property problem (or insider free rider problem). This occurs when new members obtain the same patronage and residual rights as existing members and are entitled to the same payment per unit of patronage. This set of equally distributed rights combined with the lack of a market to establish a price for residual claims that reflects accrued and present equivalents of future earnings potential creates an intergenerational conflict. Because of the dilution of the rate of return to existing members, a disincentive is created for them to invest in their cooperative.
2. Horizon Problem. The horizon problem occurs when a member's residual claim on the net income generated by an asset is shorter than the productive life of that asset

[2] Cotterill masterfully addresses the genesis and performance of these species of U.S. agricultural cooperative.

Table 4. Degree of Residual Claimant and Decision Control Problems in U.S. Agricultural Cooperatives

Property Right Constraint/ Cooperative Type	Nourse I	Nourse II	Sapiro I	Sapiro II	Sapiro III
Free rider problem	major	minor	major	minor	minimal
Horizon problem	major	major	none	minor	minimal
Portfolio problem	minor	major	none	major	minimal
Control problem	minor	major	minor	major	minor
Influence costs problem	major	major	minimal	minor	minor

Note: Range is none to minimal to minor to major.

(Porter and Scully). This problem is caused by restrictions on transferability of residual claimant rights and the lack of liquidity through a secondary market for the transfer of such rights. The horizon problem creates an investment environment in which there is a disincentive for members to contribute to growth opportunities. The severity of this problem intensifies when considering investment in research and development, advertisement, and other intangible assets. Consequently, there is pressure on the board of directors and management to (*a*) increase the proportion of the cooperative's cash flow devoted to current payments to members relative to investment, and (*b*) accelerate equity redemptions at the expense of retained earnings.

3. Portfolio Problem. The portfolio issue can be viewed from the cooperative firm's point of view as another equity acquisition problem. The lack of transferability, liquidity, and appreciation mechanisms for exchange of residual claims prevents members from adjusting their cooperative asset portfolios to match their personal risk preferences. The cause of this problem is again the tied-equity issue—the investment decision is "tied" to the patronage decision. Therefore, members hold suboptimal portfolios, and those who are forced to accept more risk than they prefer will pressure cooperative decision makers to rearrange the cooperative's investment portfolio, even if the reduced risk portfolio means lower expected returns.
4. Control Problem. The agency costs associated with trying to prevent the divergence of interests between the membership and their representative board of directors (principal) and management (agent) in a cooperative introduce the control problem. Because of incomplete search and monitoring information devices, governance bodies operate with a handicap. The information provided and external pressure exerted by publicly traded equity instruments is not present in agricultural cooperatives. This problem becomes further exaggerated as the size and complexity of a cooperative increases (Staatz 1987b, p. 51).
5. Influence Costs Problem. If a cooperative's charter permits it to engage in a wide range of activities, then diverse objectives among its members can lead to damaging influence activities. Influence activities arise in organizations when organizational decisions affect the distribution of wealth or other benefits among members or constituent groups of the organization and when in pursuit of their selfish interests, the affected individuals or groups attempt to influence the decision to their benefit. The magnitude of influence costs depends on (*a*) the existence of a central authority, (*b*) the kinds of procedures that govern decision making, and (*c*) the degree of homogeneity or conflict in the interests of cooperative members (Milgrom and Roberts).

The first four columns in table 4 are my subjective ranking of how constraining these property rights factors are on the strategies and structures of Nourse I and II and Sapiro I and II cooperatives.

Stage Four

As cooperative decision makers become aware of these unique property rights issues, there is a growing awareness of the positive quasi-rents that might be forfeited if the cooperative were to decide to exit. Sunk costs, competitive yardstick arguments, pacemaker reasons—all become major components of strategic decision

making during this period. Managing cooperatives during this stage is exceedingly challenging (Cook 1994). But near the end of this period of increasingly complex analysis of tradeoffs between vaguely defined property rights hurdles and unique opportunities, cooperatives conclude that their options are narrowed to three: (1) exit, (2) continue, or (3) transition.

Stage Five

In stage five the cooperative leadership chooses between the three aforementioned strategic choices of exit, continue, or transition.

1. Exit. Within the exit option, two generic alternatives exist: (*a*) to liquidate or (*b*) to restructure as an investor-oriented firm. Schrader suggests that low performance cooperatives opt to liquidate or merge with other cooperatives, whereas high-performance cooperatives opt to restructure as investor-oriented firms.
2. Continue. A number of the property rights constraints described in stage three result in members having tendencies to undercapitalize their cooperatives. During this stage, cooperatives appear to follow one of two generic alternatives: (*a*) to seek outside equity capital without restructuring as an I.O.F. or (*b*) to pursue a proportionality strategy of internally generated capital. The external approach results in publicly held subsidiaries, joint ventures with other cooperatives, joint ventures with noncooperatives, and limited liability companies with sundry partners. In other words, strategic alliances are utilized as equity capital-seeking strategies. The proportionality strategy structures the cooperative to be disciplined in the pursuance of the principle that "the financial responsibility will be shared on a proportional basis." This results in policies and strategies such as base capital plans, proportional voting, narrowing product scopes, pooling on a business unit basis, and capital acquisition on a business unit basis. Royer (pp. 92–95) goes on to introduce a new model under the proportionality option named the patron-owned firm (POF), which is currently being considered by a number of U.S. cooperatives.
3. Shifting. A third option considered is that of shifting to a New Generation cooperative Sapiro III structure. A Sapiro III organization is a value-added marketing cooperative that tempers the disincentives of the five property rights constraints described in stage three. This structure attempts to ameliorate the aforementioned disincentives by developing asset appreciation mechanisms, increasing share liquidity by creating delivery right clearing houses, base equity capital plans, and membership policies that eliminate the external free rider. Several Sapiro II marketing and processing cooperatives have already made this shift.

Outlook for U.S. Cooperatives

Currently two phenomena are occurring in agricultural cooperative organizations in the United States. Traditional cooperatives are adjusting to the property-right constraints by exiting, restructuring, and shifting. These adjustments appear to have had positive impacts on cooperative market share growth since 1988. The second post-1990 phenomenon that is taking place is a dramatic birth of Sapiro III New Generation cooperatives described in stage five. According to Egerstrom, more than $1.2 billion has been invested in this type of cooperative in the past three years. Both of these phenomena suggest that cooperative strategies are becoming more offensive in nature. Although noneconomic causes for forming cooperatives should not be taken lightly, in this paper the argument is limited to what economics says about the potential of the cooperative organization in the future. The property rights discussion, transaction cost, and incomplete contracting approaches might suggest that collective action in U.S. agriculture will exist if

1. there is a new market in which existing preferences are unknown. The cooperative may be the most efficient way of combining the market and political preference articulation to produce desired products;
2. a situation has transaction specific investments on both sides of the exchange but with widely different economies of scale;
3. shared risk through relational contracts can be accomplished;
4. high-frequency transactions requiring long-term commitment in an uncertain environment exist;
5. they continue to prevent transformation of large number exchange in bilateral exchange in high-frequency exchange situations;

6. difficult-to-exchange multidimensional goods that possess the properties of both private and public goods is efficient;
7. declining markets exist. In declining markets, long-term consequences to farmers' trading partners of acting opportunistically are less severe than in expanding markets (Staatz 1987a);
8. producers recognize asset-specificity-driven opportunism in the early stages of technology adaptation;
9. farmers continue vertically integrating via cooperative firms to internalize externalities imposed on them by their trading partners, particularly where reputation and quality assurance are concerned;
10. cooperatives assist in the redistribution of property rights (political action) in farmers' favor;
11. producers recognize that for intermediate levels of asset specificity in markets characterized by shortages, marketing cooperatives are an efficient, even superior, governance structure (Hendrikse and Veerman); and
12. if property rights constraints are ameliorated producers are more likely to invest in cooperatives.

In summary, the future for market failure-correcting cooperatives that shift or restructure toward more offensive strategies and structures looks promising but challenging. Additionally, producers who organize new cooperatives that avoid the constraints of vaguely defined property rights have bright futures if current state and federal public policy does not change.

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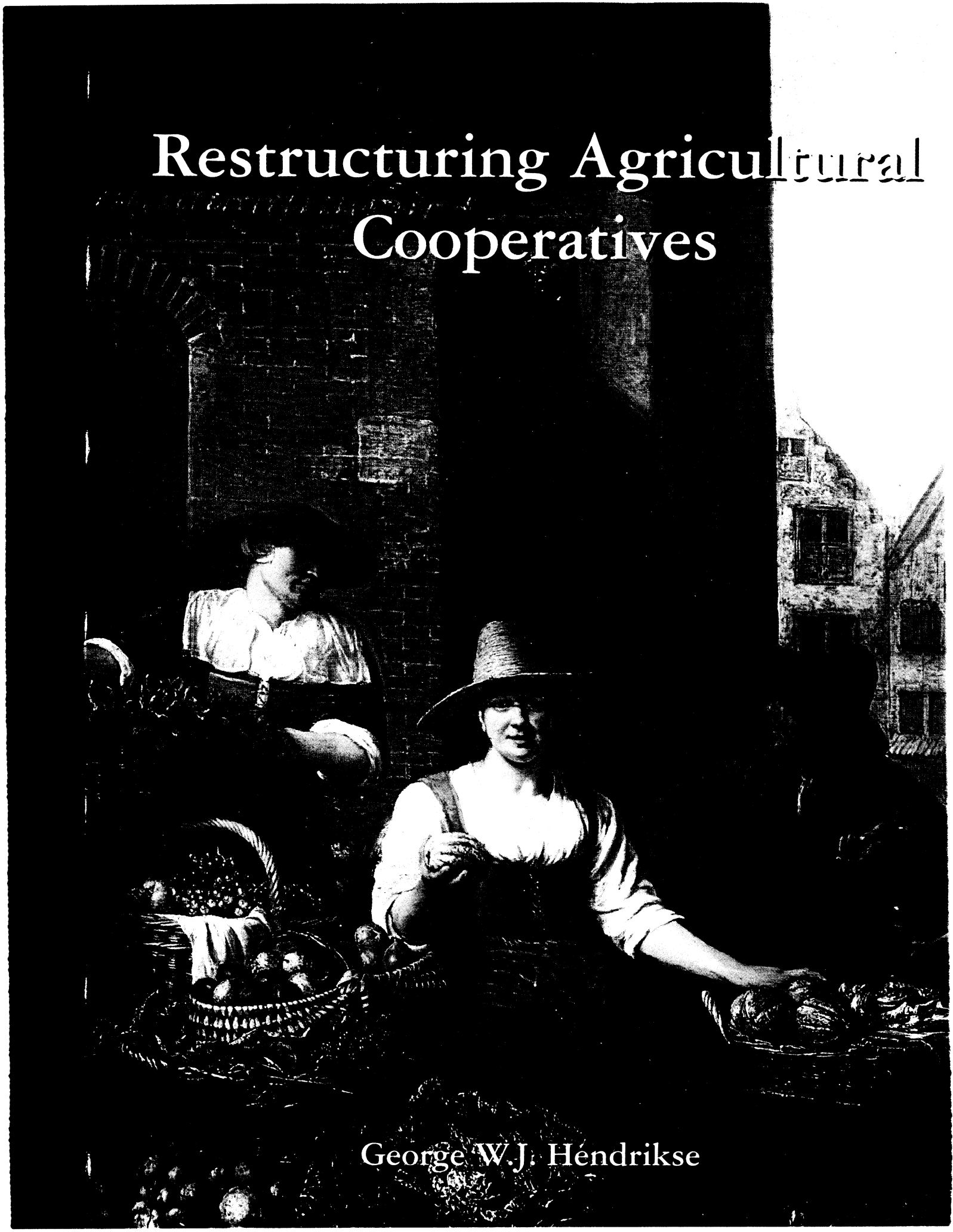
Restructuring Agricultural Cooperatives



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Erasmus University Rotterdam
Rotterdam School of Management
ISBN 90-5892-057-7

Coverdesign: © Hendrick Martenszoon Sorgh, De Groentemarkt, 1662, Rijksmuseum, Amsterdam. (Suggested by Kees Goossens)

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Advances in Cooperative Theory since 1990: A Review of Agricultural Economics Literature

Michael L. Cook[1]

Fabio R. Chaddad[2]

Constantine Iliopoulos[3]

Summary

This article reviews the advances in neoclassical, coalition-game theoretic, and new institutional-nexus of contracts applications of economic theory to agricultural cooperative literature published in English language academic journals since 1990. The article complements the Staatz framework developed to analyze the pre-1990 cooperative theory literature.

Key Words: Cooperatives, cooperative theory
JEL Codes: D2, G3, L2

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1 Introduction

This paper analyzes the post 1990 English language contributions of economists toward the advancement of economic theory addressing agricultural cooperatives. The paper reviews only theoretical — mainly deductive works. Thought pieces, empirical studies, non-agricultural theoretical/empirical papers are not included. Our efforts are partially guided by the framework utilized by Staatz in his 1989 review of the 1970's and 80's theoretical literature. Our objective is to assist the interested reader in gaining not only an understanding of the current work, but to place it in the context of a historical evolution. Articles reviewed in this paper were selected from the ABI-Inform database using the keyword "cooperative" and also from a list of indexed journals. See the Appendix for a list of journals searched.

2 Evolution of Cooperative Theory

Formal economic modeling of the farmer cooperative did not begin until the 1940s. In the first forty years of modeling, economists viewed the cooperative in one of three ways: a) as a form of vertical integration — often called the "extension of the farm" approach; b) as an independent firm — often named the "cooperative as a firm" view; and c) as a coalition of firms which act in a collective or collaboration manner — often called the "coalition" approach. Staatz (1989) reviews the first thirty years of these three distinct theoretical approaches in detail. He credits Emelianoff (1942), Robotka (1957), and Philips (1953) as the original formal modelers viewing the cooperatives as a form of vertical integration. They argued that the principle "service at cost" implied that only the members incurred profits or losses. Consequently each member determined his optimal level of output by equating the sum of the marginal costs in all plants (farm and cooperative) with the marginal revenue in the plant from which the product was marketed. The heroic Cournot-Nash assumption implied in the model has been the major criticism of this "multiplant firm modeling" approach. This approach analyzed only marketing cooperatives.

The cooperative as a firm approach drew heavily on Enke's (1945) work on consumer cooperatives. This analysis consequently was applied to input supply cooperatives. Enke's theory posited that the welfare of cooperative members and society was maximized if a cooperative maximized the sum of the cooperative's producer surplus and the members' consumer surplus. This approach needs a hierarchical decision maker or coordinator — similar to the role played by the CEO or general manager of an investor owned firm.

The major criticism of this approach was that it would not lead to a stable equilibrium. Helmberger and Hoos (1962) analyzing Enke's work converted the logic to explain marketing cooperatives' behavior. This work dominated much of the North American theoretical research during the 1960's and 70's. Based on the assumptions of known net revenue function, price taking, and zero surplus objective function, the Helmberger Hoos marketing "cooperative as a firm" suffered from the same equilibrium shortcomings.

The impracticality of the "equilibrium" assumptions led a group of researchers — mostly Europeans (Kaarlehto, Ohm, and Trifon) to introduce the issue of heterogeneity and its implications for cooperative behavior. Conflicts — whether temporal, spatial, intergenerational, or principal-agent — led to the conclusion that there existed coalitions within the cooperative and that bargaining was an integral part of collective action. The solutions to these conflicts and the consequent bargaining became known in the cooperative theoretical literature as the "coalition" approach.

By the 1980's new economic theories and decision models were emerging. The risk and decision-making differences in inter versus intra firm coordination were becoming more distinguished. New approaches such as agency theory, behavioral theories of the firm, transaction cost theory, contestable market theory, game theory, and property rights theory began to emerge. Staatz (1989) systematically reviews how these approaches contributed to the previous theoretical work.

The 1990's witnessed considerable output in the area of theoretical research on the economics of agricultural cooperatives. After reviewing abstracts of several hundred published articles, we chose to review 21 theoretical pieces. These 21 were chosen after eliminating all empirical research and "thought" pieces. In addition to the criteria stated in the introduction, we utilized subjective criteria such as non-duplication, additivity, issue importance, and clarity of arguments. The articles were categorized into three of the four9 categories identified by Staatz in his seminal review. This approach is not without criticism, but it appeared to minimize the overlap other typology and taxonomic approaches offered.

This paper extends Staatz's work and categorizes post 1990 theoretical research on agricultural cooperatives into three major streams of output: a) extensions of the "coopera-

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9 We eliminated the use of "Analyses of Cooperatives in the Planning Sector" because of scarcity of output in the searched journals.

tive as a firm"; b) the cooperative as a "coalition"; and c) the cooperative as a "nexus of contracts". The next sections expand on these three streams of output in greater detail.

3 Post 1990 Extensions of the "Cooperative as a Firm" Approach

During the 1990s, economists refined and reworked advances accomplished in the 1980s. The following articles present theoretical work built around the assumption that the cooperative as a separate firm seeks to maximize a single objective function.

Sexton (1990) uses neoclassical theory to develop a model of spatial competition in agricultural marketing industries. The model derives price-output equilibria for investor-oriented firms (IOF) and cooperative processors in oligopsonistic, spatial markets, focusing on the pro-competitive effects of cooperatives. Sexton computes and compares equilibrium processor-farm price spreads under alternative market structures and modes of firm behavior by means of the conjectural variations approach.

Previous models of marketing cooperatives examined the pricing behavior of cooperatives in isolation as if they were a monopsonistic processor (see surveys by LeVay, Sexton [1984] or Staatz). This literature failed to consider the spatial dimension of market structure in the analysis of firm conduct and performance. Sexton formally establishes the conditions and magnitude of the cooperative yardstick effect in oligopsonistic markets. He states that a cooperative, which follows net marginal revenue product (NMRP) pricing behavior, generates less competitive effects than an equivalent cooperative following net average revenue product (NARP) pricing behavior. The author elucidates the pro-competitive role of open membership cooperatives in such market structures. The extent to which a cooperative plays a yardstick role in oligopsonistic markets depends on its membership policy, pricing policy, and whether the cooperative operates in the upward or downward sloping portion of the NARP curve.

The paper has interesting and controversial public policy implications. Its findings support favorable public policy towards open-membership cooperatives but similar pro-competitive effects cannot be claimed for restricted membership cooperatives.

Feinerman and Falkovitz (1991) extend neoclassical theory to a situation in which both producer and consumer services are supplied by the cooperative and members' production decisions and consumption behavior are determined simultaneously. The producer services offered by the cooperative enter members' production function and affect members' productivity and net income. Members' net income, in turn, enters as an argument —

i.e., a composite private good — in their utility function in combination with the utility derived from the cooperative's consumer services. The goal of the cooperative — in this case, the moshav in Israel — is to maximize members' total welfare given by the representative member's utility function. In other words, the model assumes a homogeneous membership with identical utility and production functions.

The paper derives the necessary conditions for Pareto optimality by solving the members' utility maximization problem subject to constraints. The authors also derive the set of prices and taxes that induce the representative member to behave so as to achieve the optimal welfare solution. In other words, prices and taxes are decision variables to the cooperative. The cooperative chooses prices and taxes so as to induce the representative member to select Pareto optimal activity levels. In addition, the authors examine the optimal cooperative size (i.e., number of members) in the long run.

The results of this paper shed light on the internal operations of an agricultural multipurpose service cooperative. The analysis shows that the cooperative can establish a mode of operation (set of prices and taxes charged for its services) that induces members to behave in welfare optimal way. But the authors point out that the economic stability of the cooperative is not guaranteed when external conditions change and the cooperative cannot adjust accordingly. The paper also determines the optimal long run size of the cooperative when the "cooperative exactly covers its costs by collecting user charges and a lump sum tax that equals the land rent plus marginal congestion costs." In reaching these results, strong assumptions are utilized.

Choi and Feinerman (1993) extend Feinerman and Falkovitz's (1991) neoclassical analysis of the Israeli moshav by investigating the impact of membership heterogeneity on optimal pricing rules for cooperative services. In this model, the moshav has two groups of farmers producing different outputs. The moshav supplies its members with two inputs: a publicly provided private good (water) and a local public good (road services). Based on the theory of local public goods and club goods, the authors derive Pareto-optimal pricing rules for the moshav's inputs. The model assumes the cooperative chooses optimal pricing rules by maximizing the profits of one group (the incumbent group) subject to a constraint on the profit of the other group. The authors obtain the Pareto optimal pricing schemes under different conditions.

The paper sheds light into the operation of an agricultural multipurpose service cooperative with heterogeneous membership. In particular, the paper contributes to our understanding of how to set optimal pricing schemes for cooperative services under different

input allocation and membership policy conditions. Despite the authors' focus on the Israeli moshav, "the theory can be extended to producer cooperatives with more than two types of producers using multiple local public inputs and divisible and chargeable inputs" (p. 243).

Royer and Bhuyan (1995) offer a neoclassical analysis of the incentives for and impacts of forward integration into downstream processing stages in the marketing chain by both an IOF and an agricultural marketing cooperative. They develop a three-stage model of a vertical market structure consisting of farmers, an assembler and a processor, with two behavioral assumptions for the cooperative assembler: active versus passive cooperative. The active cooperative is able to control raw product supply (possibly by restricting membership), whereas the passive cooperative takes the quantity of raw product delivered by members as given. The authors compare equilibrium post-integration price-output solutions for the IOF and for the active and the passive cooperative. In doing so, the article complements and supports the Sexton (1990) results.

The authors discuss the economic incentives for forward integration by a cooperative assembler with an emphasis on market power incentives. More specifically, they argue that active cooperatives have an incentive to integrate forward into processing stages because vertical integration allows them to generate monopoly profits in processed product markets. Passive cooperatives, however, behave like a competitive firm and may not have a market power incentive to vertically integrate downstream in the marketing chain. Their market power interpretation of the incentives for cooperative vertical integration complements transaction cost and incomplete contracting approaches which are examined in a subsequent section.

Tennbakk (1995) utilizes standard industrial organization theory to study the performance of oligopolistic markets with three alternative structures: pure private duopoly, mixed duopoly with cooperative and mixed duopoly with public firm. The performance of alternative market structures is compared to the first best (perfect competition) solution. In doing so, the author contributes to the literature examining the pro-competitive effects of cooperatives in concentrated industries.

Tennbakk observes that the extant literature has focused on the justification for favorable public policy towards cooperatives, both in terms of ameliorating market inefficiencies and providing better terms of trade to producers. He compares agricultural cooperatives with public firms as alternative policy mechanisms both in terms of total welfare and distributional effects.

This paper contributes to the literature by focusing on an alternative public policy instrument to ameliorate market failures in concentrated markets. The results are not novel, neither is the model approach (Cournot competition in a duopoly). However, Tennbakk raises the issue of the cooperative not being a unique public policy instrument to achieve market efficiency. In fact, he concludes, that from a welfare maximizing point of view, nationalization is preferred to the mixed market structure with a cooperative.

Albaek and Schultz (1998) use standard industrial organization theory to develop a model of competition between a cooperative and an IOF in a Cournot duopoly setting. The authors derive conditions in which the cooperative will gain a very high market share and will drive the IOF out of the market. Previous models of the behavior of cooperative firms in oligopolistic markets have assumed that a cooperative maximizes the total profits of its members. Albaek and Schultz view the cooperative as a commitment device for pushing the reaction function of the cooperative outwards. The authors formalize this assumption and derive the resulting theory of market dominance of cooperatives over IOFs.

This article advances our understanding of why cooperatives have been so successful even though they have been in competition with profit-maximizing firms. The authors also show that the members of the cooperative will earn more than the vertically integrated profit per farmer generated in the IOF. However, the applicability of these results is limited by the strength of their assumptions.

4 Post 1990 Extensions of the "Cooperative as a Coalition" Approach

Significant advances were made in the 1990s whereby the modelers viewed the cooperative as a coalition of utility maximizing subgroups. This recognition and formalization of the heterogeneous makeup of a cooperative organization is an important contribution to the literature on group choice. Included in this section is a subset of papers utilizing the game theoretical framework. This approach analyzes situations in which there are gains from joint action by a potential coalition of members but where members must bargain among themselves about how benefits are to be distributed. Following is a review of a number of the coalition theory contributions.

Zusman (1992) uses contract theory to model the constitutional selection of collective-choice rules in a cooperative firm. The model explains how cooperatives design their bylaws and select their collective-choice rules under imperfect information, uncertainty, bounded rationality and bargaining cost economizing conditions. In game-theoretic terms, Zusman's model unfolds in two stages. The first is the 'constitutional phase,' while the lat-

ter is the 'operational phase.' Previous single-stage models of cooperative decision-making focused primarily on particular problems (e.g., pricing rules) and the corresponding inefficiencies. Instead, Zusman provides a more general framework that deals with selection of collective-choice rules, and thus can be applied to a number of situations. Furthermore, he models explicitly transaction cost and member risk premia minimization. Additionally, a major contribution of his model is that it formalizes Vitaliano's (1983) work on the cooperative as a "nexus of contracts" (see Section V).

This article advances our understanding of how cooperatives design their bylaws and select their collective-choice rules when facing groups of heterogeneous members. The choice of collective-choice rules is based on the joint minimization of transaction costs and individual members' risk premia, and depends upon the relative importance of the group-choice problem. The conceptual approach employed by Zusman is general in nature and flexible enough that it can be extended to other constitutional choice problems. Examples include the optimal membership size and the internal tax and cost-allocation rules.

Zusman and Rausser (1994) adopt a contracting approach in constructing a bargaining game among the various participants in a collective action organization. They view a collective action organization as an n+1 person bargaining game and derive a cooperative solution reflecting social power and influence of various interest groups. They apply the Nash-Harsanyi solution concept and suggest an influence equilibrium structure, which reflects the underlying bargaining power of the various organizational participants and determines all major group choices. The authors calculate the socially optimal level of the provision of a public good and compare it to the one provided through collective action. In their analysis they also incorporate the planning horizon of the central decision maker and calculate its impact on the attained efficiency.

Previous bargaining models of cooperative decision-making have viewed the cooperative as an all-channel network. Accordingly, these models portrayed collective decision-making as an n-person prisoner's dilemma, which leads to suboptimal decisions whenever the number of participants is large. Instead, Zusman and Rausser model the cooperative as a wheel network consisting of a center and various participants. By adopting this view, the authors transform the prisoner's dilemma into an n+1 person bargaining game played by the center and the n-peripheral participants where the bilateral relationship between the center and each of the other players is especially important. The authors also incorporate explicitly the horizon problem facing the central decision-maker of the collective action network, something that previous models failed to do.

This article advances our understanding of how organizational inefficiencies in co-operatives are generated through the influence activities of socially powerful groups of participants. Although under market failure collective action yields efficiency improvements over uncoordinated private action, an overall group optimum should not be expected. It should be noted that the externalization of social costs and benefits by narrowly-rational, self-interested, peripheral participants; the internalization of group goals by the center; and the social power of the peripheral participants over the center are crucial assumptions for this conclusion. The theory presented by Zusman and Rausser points out that the efficiency attained by collective action schemes crucially depends on the relative bargaining power of the various groups of members and the planning horizon of the central decision-maker.

This article has significant implications for the efficient design of collective action organizations in particular. It justifies the use of incentive structures for ameliorating the influence costs and horizon problems. However, the authors fail to justify some of their assumptions on grounds other than the simplicity of mathematical calculations (e.g., the peripheral participants planning horizon is assumed to be infinite, or they assumed to be identical).

Fulton and Vercammen (1995) use neoclassical theory to develop a model of non-uniform pricing schemes which, when adopted by a supply cooperative would mitigate the economic inefficiencies arising from average cost pricing. The authors derive the resulting stable equilibrium and the distributional effects of simple non-uniform pricing schemes when members are heterogeneous. Thus they are able to suggest under what conditions non-uniform pricing schemes should be adopted by cooperatives. Previous models of the pricing behavior of cooperatives have identified the inefficiencies arising from average cost pricing, but have failed to suggest alternative stable equilibria. For example, Sexton (1986) modeled the pricing behavior of cooperatives and identified pricing mechanisms that at the theoretical level would lead to a stable equilibrium, albeit difficult to implement. Fulton and Vercammen's results show that a relatively easy to adopt mechanism does exist. Furthermore, the authors move away from the usual objective attributed to cooperatives, namely the maximization of the sum of members' and cooperative profits. According to their formal model, the goal of the cooperative is to choose a contract schedule that satisfies four constraints (economic rationality, incentive compatibility, individual rationality, and equity/fairness).

This article advances our understanding of the impact of non-uniform pricing schemes in agricultural cooperatives. More specifically, it adds to our knowledge on how

non-uniform pricing schemes ameliorate the economic inefficiencies associated with uniform pricing methods. Furthermore, this work sheds light on how alternative equity/fairness mechanisms lead to various distributional results and provide reasonably easy to implement non-uniform pricing schemes in alternative settings. An example would be the pooling of revenues, which is a form of uniform pricing. The resulting average price can distort the decisions made by the farmer members. Non-uniform pricing offers an alternative to this pooling payment arrangement. However, the use of this alternative is likely to have distributional consequences that the cooperative should consider.

A number of strong assumptions are needed to generate their results, such as: a) side deals between members do not take place, otherwise the non-uniform pricing scheme is ineffective, and b) their use of median voter theory to model the choice of method for distributing profits to members.

Vercammen, Fulton, and Hyde (1996) use standard neoclassical theory to develop a model of nonlinear pricing in a marketing cooperative. They derive a pricing scheme for a constant-cost marketing cooperative that maximizes member surplus, allows the organization to cover fixed costs, and explicitly addresses the constraints of member heterogeneity and asymmetric information regarding the appropriate membership fee. Previous models of the pricing behavior of cooperatives have identified the constraints of member heterogeneity and asymmetric information regarding the appropriate membership fee, but have not dealt with them. Another constraint incorporated in this model is that no member is to be worse off with the proposed scheme than with standard cooperative (average-cost) pricing.

This article further advances our understanding of the impact of non-uniform pricing schemes in agricultural cooperatives. More specifically, it adds to our knowledge on how non-uniform pricing schemes ameliorate the economic inefficiencies associated with uniform pricing methods. However, the authors underemphasize the impact of alternative governance structures and voting methods on the adoption of a particular pricing scheme.

Albaek and Schultz (1997) use neoclassical microeconomic theory and voting theory to develop a stylized model of investment, in order to study investment decisions in agricultural marketing cooperatives. The authors derive voting and cost allocation rules under which agricultural marketing cooperatives tend to make efficient investment decisions. The article extends previous work on the voting behavior and cost sharing practices of cooperatives. Results suggest that the democratic voting of one-member/one-vote may not contradict efficiency and distort the investment decisions of marketing cooperatives.

This article advances our understanding of under what voting and cost sharing rules marketing cooperatives tend to make efficient decisions. When members' contributions to cover the cost of an investment are independent of production, whether the cooperative will invest efficiently depends on the adopted cost sharing rule, the voting rule, and the size distribution of farmers. According to their analysis, cost sharing according to "size" is the most efficient method, irrespective of the adopted voting rule. Financing an investment by retained earnings will lead to efficiency distortions, unless the investment is small relative to the cooperative's total revenue. The authors assume in their model constant returns to scale for the cooperative plant and thus do not account for the negative impact of no control over supply (free rider problem). They also fail to mention the horizon problem facing cooperative members, especially with respect to investments in intangible assets. Another assumption being made by the authors is that of rational farmers who know each other's cost functions and can easily figure out their best responses.

Hendrikse (1998) constructs a game-theoretic model of investment decisions in which the choice of organizational form (cooperative vs. IOF) is the key strategic variable. The game unfolds in three stages and is solved for its supergame perfect Nash equilibrium by the method of backward induction. Conditions are derived under which cooperatives become efficient organizational forms. Hendrikse also shows under what circumstances IOFs and cooperatives can coexist in a sustainable equilibrium. Finally, circumstances are identified in which competition results in a prisoner's dilemma faced by IOFs alone.

This article enriches previous models of decision-making in cooperatives, which have focused on the cooperative as a single entity or as a form of vertical integration, by perceiving organizations as collections of decision units. According to this point of view, a cooperative consists of two units with each having the power of veto, whereas an IOF consists of only one decision unit. Necessarily, the model abstracts from reality by not incorporating other, at least equally important, organizational aspects of cooperatives. Another innovative aspect, relative to previous work, is that it distinguishes cooperatives and IOFs with respect to the probability each organizational form has of accepting/rejecting good and bad projects. Finally, Hendrikse's model contributes to the economic theory of the cooperative firm by formally establishing the conditions under which favorable public policy toward cooperatives is desirable.

The author derives several hypotheses that may inform empirical research: a) a switch from a cooperative to an IOF does not occur when the attractiveness of an industry is reduced; b) an IOF accepts a larger percentage of projects than a cooperative. Conse-

quently, it is shown that an IOF has a relative advantage in accepting good projects, whereas the cooperative is preferred when the rejection of bad projects is more important; c) an increase in the difference between the acceptance probabilities of good projects of an IOF vs. a cooperative favors the choice of an IOF in both a monopoly and a duopoly market structure (the opposite is also true); d) an increase in the benefits associated with a good project, an improvement in the portfolio, and a decrease in the costs associated with a bad project increase the range of parameters for which an IOF is chosen, in a monopolistic market; e) in duopoly, a higher prize of winning the game (lower costs, improved portfolio) will increase the expected pay-off of a project and therefore increases the range of parameters for which an IOF is chosen; f) a duopoly consisting of two cooperatives is predicted for a larger set of parameter values than the choice of a cooperative by a duopolist; and g) two different organizational structures may coexist in equilibrium — an IOF is sustained in such equilibrium because it faces a higher expected revenue of good projects in either a monopoly or a duopoly, — a cooperative is sustained because of lower expected costs of accepting bad projects outweighs the reduction in the expected revenue of accepting a good project in either a monopoly or a duopoly.

This article advances our understanding of how the uniqueness of cooperatives, in terms of decision-making, may lead to an industry equilibrium in which cooperatives and IOFs coexist. Furthermore, the article derives conditions under which favorable public policy toward cooperatives is justified so that efficiency is improved upon. A limiting assumption in the model is that there is no conflict of interest between decision makers, i.e. all decision makers are assumed to maximize the same utility function.

Bourgeon and Chambers (1999) develop a two-stage game theoretical model of cooperative pricing under asymmetric information. They derive pricing rules for an agricultural marketing cooperative with heterogeneous members who differ by their cost efficiency and their bargaining power within the cooperative. In the first stage of the game, the cooperative induces farmers to produce their myopic output in order to generate potential monopoly rents. In the second stage, the cooperative must distribute the revenues realized to its members in a way that leads to a stable equilibrium. Previous models of cooperative pricing rules (e.g., Vercammen, Fulton, and Hyde 1996) have assumed a continuum of producers' types and a nondiscriminating management board. These models seem to suggest that the first-best solution is not attainable. This model extends previous work by assuming that farmers constitute different groups with asymmetric bargaining powers. Bourgeon and Chambers formally establish the conditions under which a nonlinear pricing

scheme may be implemented by offering two two-part schedules. If the first-best production levels are implementable, the optimal pricing rule can be implemented by a quantity-dependent, two-part pricing scheme or by a combination of nonlinear cost recovery and two-part pricing. The first-best will typically occur when the bargaining powers of the producer groups reflect their percentage of the total producer population. When their bargaining powers diverge from their proportional representation, the first-best may not be implementable. In those cases, the optimal cooperative pricing scheme also can be implemented by a combination of quantity-dependent, two-part pricing and nonlinear cost recovery.

This article advances our understanding of how a heterogeneous cooperative membership affects the efficiency attained by various alternative pricing schemes, under asymmetric information. The extent to which efficient pricing can be implemented depends crucially upon the relative bargaining power of the various member groups in the cooperative. The paper has important implications for the organizational design of agricultural marketing cooperatives. When the membership of a cooperative cannot be assumed to be homogeneous, organizational and governance structures that address the resulting inefficiencies should be adopted.

Fulton and Giannakas (2000) examine the issue of member commitment in the context of a mixed oligopoly where cooperatives and IOFs compete with each other in supplying a consumer good. They develop a two-stage game-theoretical model of price competition between a consumer cooperative and an IOF that provide the same product/service to consumers. Different scenarios concerning the objectives of the cooperative and the nature of the pricing competition are examined within this framework. All formulations of the game are solved using backward induction. The problem of consumers is considered first, followed by the derivation of the Nash equilibrium prices which, in turn, determine quantities, market shares, and the welfare of the groups involved. The authors provide a generalization of Cotterill's (1987) model of mixed oligopoly equilibrium. They also extend previous models by incorporating member commitment into their game and studying how it affects the basic model parameters in the computed Nash equilibrium.

This article advances our understanding of how member commitment affects prices, quantities, market shares, and the welfare of consumers in a mixed oligopoly where a cooperative and an IOF compete. The demand faced by the cooperative and the market share it commands in a Bertrand type of oligopolistic market not only depend on the price of the product but also on the degree of member commitment. When the cooperative's goal is the maximization of its members' surplus, its pricing strategy is independent of its rival's pric-

ing strategy. Cooperatives can maximize member surplus by maximizing their sales. However, when the cooperative maximizes its profits, its price and the IOF's price and quantity will increase, while the cooperative's sold quantity and consumer welfare will decrease.

Karantininis and Zago (2001) develop a game-theoretical model in order to study the effects of endogenous membership and heterogeneity on members' and cooperatives' behavior. An IOF and a cooperative compete in a Cournot-like fashion. The authors derive the conditions under which a farmer will join the cooperative in a mixed duopsony setting, the optimal membership size of the cooperative, and the impact of member heterogeneity on the optimal membership size. Previous models of cooperatives have primarily studied under what conditions there is a departure from efficient resource allocation and thus failed to model explicitly the possibility for outside opportunities to members. Also, previous models have typically assumed homogeneous members. Karantininis and Zago model explicitly the decision of farmers to join the cooperative versus the IOF, and the optimal membership size of the cooperative under an open and a closed membership structure. They also provide preliminary results regarding the tendency of inefficient producers to prefer the cooperative instead of the IOF. Hypotheses generated from their model include: a) when members of the cooperative adopt a decentralized decision-making behavior, with an open membership policy, the relative advantage of the cooperative vanishes and the optimal size is lower compared to a closed membership; b) total profits and quantity produced will be higher in a mixed duopsony (coop and IOF) than in a pure duopsony (two IOFs); c) in a mixed duopsony, the cooperative produces more than the IOF, but, at the individual level, farmers delivering to the cooperative produce less than those selling to the IOF; and d) when farmers are heterogeneous in terms of efficiency, the cooperative will tend to attract more inefficient producers.

The authors advance our understanding of how farmers choose between alternative marketing channels. They also provide insights into how farmer heterogeneity may affect the efficiency of cooperatives. Open membership cooperatives may have a disadvantage relative to closed membership ones. The decision of members to join a cooperative is primarily determined by the profits the cooperative can secure for its members. When farmers in an industry are characterized by diverse efficiency levels, the cooperative should provide incentives to the more efficient farmers, otherwise it will end up attracting only the less efficient.

Banerjee et al. (2001), by incorporating insights from New Institutional Economics, construct a theoretical model of rent-seeking within agricultural cooperatives. In their

model, inequality of asset ownership affects relative control rights of different groups of members (large vs. small). Under the assumptions of (i) constraints on lumpsum transfers from poorer to wealthier members, and (ii) disproportionate control rights wielded by wealthier members, the model predicts that increased heterogeneity of landholdings in the local area causes increased inefficiencies, by inducing a lower input price and lower level of installed plant capacity. The authors enrich previous models of decision-making in agricultural marketing cooperatives by explicitly and formally incorporating the efficiency implications of intra-cooperative bargaining power allocation, which results from restrictions on lumpsum transfers across different farmer groups. They also extend previous models by establishing conditions in which favorable public policy treatment of cooperatives is desirable. The article also contributes significantly to the empirical studies on cooperative decision-making and rent-seeking.

The authors derive several hypotheses that may inform empirical research: a) the product price selected by the cooperative is a function of the percentage of small farmers in its membership; b) rent extraction by large farmers is not an issue either when the cooperative contains no small growers, or when almost no large grower with any residual control right; c) if an increase in the relative number of small members does not increase their relative control rights at all, then the price selected by the cooperative must decline. In contrast, if their control rights increase faster than membership does, then the price must increase; and d) if control rights of small growers is smooth and strictly convex in their size, then the price function is U-shaped.

This article advances our understanding of how wealth constraints and heterogeneity of members distort efficiency in a spatial monopsonistic context, in a regulated industry. The authors show that the rent-seeking they identify in the cooperatives is a weaker form of the standard monopsony distortion, which suggests that an IOF in the same situation is likely to set lower prices and have lower productivity than these cooperatives. Also, where the distribution of land is unequal, the cooperatives may not function much better than a monopsony.

5 Post 1990 Extensions of the "Cooperative as a Nexus of Contracts" Approach

A third view gained substantial interest in the 1990's — that of positing the cooperative as a "nexus of contracts". This approach views business relationships among coop-

erative stakeholders as contractual relationships. The nexus of contracts approach is really a loose coordination of agency theoretical analysis, transaction cost economics, and property rights-incomplete contract theory. As the name suggests, their commonality is contractual in nature. Authors in the early 1990's produced numerous thought pieces positing a more complex framework than the more formal 1980's models but little new advanced theoretical work emerged. The 1990's also produced the beginning of interesting empirical work from a contractual point of view. But it wasn't until the end of the decade that more formal advances to the nexus of contracts work became evident. Five articles were selected to demonstrate this evolution.

Eilers and Hanf (1999) address the issue of optimality of contract design in agricultural cooperatives utilizing principal-agent theory. The authors provide an enlightening discussion of a major question in cooperative control and organizational design — who is the principal and who is the agent in an agricultural marketing cooperative. The paper explores and offers solutions in situations where the manager, acting as agent or principal, offers a contract to a farmer and where the farmer, acting as agent or principal, offers a contract to the cooperative. Positing strong utility function and risk preference assumptions, their results generate interesting hypotheses regarding which actor benefits most in which position and implications of alternative incentive terms.

The concepts of opportunistic behavior, conflicts of interest, asymmetric information and stochastic conditions are explicitly addressed in this paper. The authors' conclusions suggest that principal-agent approaches offer a useful tool in analyzing incentive problems in cooperatives. However, they warn that the researcher must have a thorough understanding of the unique organizational and institutional aspects of farmer cooperatives. It is the authors' deep understanding of those aspects demonstrated by their penetrating discussion of who really is the principal in an agricultural cooperative that makes this paper informative to the theoretical researcher.

Hendrikse and Veerman (2001a) use a property rights form of incomplete-contract theory to address an increasingly significant issue for agricultural marketing cooperatives — what governance structure most captures the benefits of member investment. The authors provide a succinct but clear introduction to incomplete contract theory and the resultant hold-up problems. The introduction is an excellent clarification of the importance of ex ante-ex post reasoning in the study of incomplete contracts. Additionally, the authors identify potential hold-up solutions for producers when transacting with marketing cooperatives and with investor owned firms.

Utilizing a three-stage, non-cooperative game theory approach, the paper informs the governance choice and investment decisions. The paper clearly defines the dual investment decision conflict for the producer when transacting with a marketing cooperative versus an IOF. The authors specifically address two of the most important hold-up issues in marketing cooperatives, the temporal asset specificity issue and the site and physical asset specificity hold-up situation. Their results suggest the latter is the most complex to solve. This paper contributes to our understanding of the recent emergence of new forms of producer governance structures, new capital formation programs, and new selective incentive regimes in producer owned marketing firms.

Hendrikse and Veerman (2001b) use another new institutional economics approach — transaction cost theory — to study the relationships between investment constraints and control constraints within an agricultural marketing cooperative. This article complements the (2001a) Hendrikse and Veerman article. A major contribution of this article is its clearly articulated description of transaction costs theory, governance structure concepts, and financial governance theory, and how they are related to agricultural cooperatives. The article also describes the control and investment decision differences between an IOF and a cooperative using a new institutional economics framework and vocabulary. Employing the transaction cost framework the authors develop a logical sequencing for members in deciding on the optimal form of governance structure subject to financial constraints. The paper analyzes the same two hold-up issues of temporal and physical site asset specificity and concludes that the first is easily solvable and the solution to the second set of hold-ups depends upon the degree of asset specificity and the degree of product heterogeneity.

This paper, along with the (2001a) paper, makes for an excellent primer on nexus of contract theory applied to agricultural marketing cooperatives. Both papers provide suggestions for more advanced theoretical work and empirical verification.

The Hendrikse and Bijman (2002) article expands on the Hendrikse and Veerman (2001a) work, addressing producer governance structure choices. The authors analyze the impact of ownership structure on investments in a multiple tier netchain utilizing a property rights-incomplete contract framework. The authors continue the quest to determine under what market and incentive structures is it beneficial for producers to integrate downstream through their own investment. Employing game theoretic models and analyzing scenarios with distribution of bargaining power as the variant, the authors generate first-best efficient ownership structures given alternate investment situations. Then using com-

parative statics with the incorporation of residual claim levels, optimal ownership structures are derived.

This paper provides a more detailed analysis of the complex decision making process when relatively specific investments generate opportunistic hold-up situations. The contribution of the incomplete contract approach to governance structure choices is evident. The cooperative as a "black box" firm continues to disappear with the advance of this theoretical work.

6 Observations

What have we gleaned from this exercise of reviewing cooperative theoretical literature? Following is a brief and incomplete listing of observations identified during this sifting and winnowing process.

OBSERVATION 1

The first observation is the rapid advance in the application of coalition and nexus of contracts approaches to understanding business collective action or, more specifically, agricultural cooperatives. The coalition literature emerged a bit earlier and is becoming a common approach to dealing with the increasing non-homogeneity of traditional collective action organizations. As cooperative problems are increasingly defined in bargaining, negotiation or agency terms, subgroup objective functions are observed. Consequently, the methodological approach deemed most appropriate was some form of game theoretical model. The number of theoretical nexus of contracts articles (and especially conceptual papers that were not reviewed because they were classified in the search as thought pieces) has been increasing at a very rapid rate, particularly since 1995. As the coalition and nexus of contracts approaches become more popular, we note that the public policy oriented extension of the firm analytics and its companion neoclassical theory appear to be increasing at a decreasing rate.

OBSERVATION 2

We note an increased uneasiness with the tradeoffs between formalism and realism. Over the period studied, we observe an increase in the number of more institutionally friendly theoretical developments, namely the coalition and nexus of contracts approaches. Cooperative researchers became increasingly interested in complex organizational issues

including heterogeneity of member interests, investment incentives and the design of decision-making rules. Interestingly enough, the degree of formalism – i.e., mathematical rigor – has not necessarily decreased. This might be a consequence of the fact that we used "percentage of economics" as one criterion to select articles to be included in the review.

OBSERVATION 3

The impact of heterogeneous stakeholder interests on organizational efficiency has been recognized as an important research topic. The formalization of membership heterogeneity was introduced in the 1980's with the advent of the coalition approach. Since 1990, all three analytical approaches have contributed to the understanding of the cooperative heterogeneity issue. Consequently, a plethora of suggested solutions to internal free rider, portfolio and influence costs constraints and other heterogeneity-related problems has appeared.

OBSERVATION 4

The post-1990 period is characterized by an increasing emphasis on research related to governance structures. Particularly, the rationale behind the choice of a cooperative governance structure among alternatives appears now more often in the literature. The emergence of transaction cost, incomplete contract, agency and game theoretic approaches have facilitated more in-depth analysis of the aforementioned topic.

OBSERVATION 5

There is an increasing recognition that management matters in the study of agricultural cooperatives. One of the major schools of thought in cooperative theory, the extended Emelianoff approach, did not recognize management or agents as important or even actual participants in cooperative organizational behavior. With advances in agency theory and their application to many of the behavioral and structural issues faced by cooperative organizations, the importance of the role of management – the traditional agent but not always as observed in the Eilers and Hanf article – becomes increasingly obvious. In all three of the theoretical approaches the behavior or existence of agents are modeled. Examination of their role generates renewed interest in the role of the principal and the consequent control and influence costs issues.

OBSERVATION 6

Following from the observation of the growing role of agency theory and the importance of the agent in cooperative decision-making and organizational behavior is recognition of the increasing role in the research agenda of the principal. The combined study of principal and agent and their interface in the development of constitutional guidelines and organizational decision-making is the general area of corporate governance. From Zusman's work on constitutional decisions to Hendrikse and coauthors on the organizational structure and decision-making, these papers increasingly begin to highlight the importance of corporate governance issues. This complex area, often addressed in anecdotal form and thought piece outlets, is surfacing as an increasingly interesting theoretical research area.

OBSERVATION 7

All three general approaches to conceptualizing and modeling agricultural cooperatives inform the issue of whether it is socially desirable public policy to permit or encourage collective action within the agri-food system. In particular, hypotheses were developed to inform under what conditions the cooperative might be considered the most efficient governance structure. More recent research output builds on the traditional competitive yardstick argument by suggesting potential contractual and organizational inefficiencies of the traditional cooperative structure. In doing so, it provides decision makers with tools to ameliorate hypothesized inefficiencies.

Summary

This brief review identifies twenty-one "important" economic theoretical articles analyzing agricultural cooperatives published since 1990. These twenty-one articles were selected from several hundred journal articles appearing in academic economic journals. The articles were classified by dominant theoretical approach into three distinct categories: firm extension, coalition, and nexus of contracts. We identified the theoretical approach utilized by the researcher, the theoretical contribution of the article, hypotheses generated, and applicability of the research output. The article concludes with seven general observations sifted and winnowed from the exercise by the authors during the reviewing process. The major observation was the shift in methodological approaches utilized by agricultural

cooperative theorists — from the more formal neoclassical models to the more behavioral assumption friendly contractual and coalition schools of economic thought.

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Appendix

LIST OF JOURNALS SEARCHED

Agribusiness: An International Journal

Agricultural and Resource Economics Review

Agricultural Economics

Agricultural Finance Review

American Economic Review

American Journal of Agricultural Economics

Annals of Public and Cooperative Economics

Canadian Journal of Agricultural Economics

Economic Letters

European Review of Agricultural Economics

Finnish Journal of Business Economics

Industrial and Corporate Change

International Food and Agribusiness Management Review

Journal of Agribusiness

Journal of Agricultural and Applied Economics

Journal of Agricultural and Resource Economics (Western J. of Agricultural Economics)

Journal of Agricultural Economics

Journal of Chain and Network Science

Journal of Comparative Economics

Journal of Cooperatives

Journal of Economic Behavior and Organization

Journal of Economic Literature

Journal of Economic Perspectives

Journal of Food Distribution Research

Journal of Institutional and Theoretical Economics

Journal of Political Economy

Oxford Review of Economic Policy

Quarterly Journal of Economics

Review of Agricultural Economics

Scandinavian Journal of Economics

Institutions, Contracts and Organizations

Perspectives from New Institutional Economics

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Edward Elgar
Cheltenham, UK • Northampton, MA, USA

Published by
Edward Elgar Publishing Limited
Glensanda House
Montpellier Parade
Cheltenham
Glos GL50 1UA
UK

Edward Elgar Publishing, Inc.
136 West Street
Suite 202
Northampton
Massachusetts 01060
USA

A catalogue record for this book
is available from the British Library

Library of Congress Cataloguing in Publication Data
Institutions, contracts, and organizations : perspectives from new institutional economics / edited by Claude Ménard.
Includes index.
1. Institutional economics. 2. Contracts. I. Ménard, Claude, 1944–

HB99.5.I587 2000
330—dc21 99–049365

ISBN 1 84064 225 4 (cased)

Typeset by Manton Typesetters, Louth, Lincolnshire, UK.
Printed in the United Kingdom at the University Press, Cambridge.

Contents

22. Ill-defined property rights in collective action: the case of US agricultural cooperatives

Michael L. Cook and Constantine Iliopoulos

THE COOPERATIVE INVESTMENT PROBLEM

Cooperatives are a prominent business organizational form in the world agri-food system. In Europe, cooperatives in most countries control market shares often exceeding 50 percent in numerous agri-food categories. In the United States, cooperatives market 32 percent of the commodities and products produced and processed in the agri-food chain – equivalent to more than US$100 billion annually.

Currently, firms including cooperatives operating in the US agricultural and food industries and chains are experiencing (i) price and risk augmenting deregulation, (ii) more contractually complete vertical coordination, (iii) accelerated horizontal and vertical rationalization, and (iv) increased capital/knowledge factor intensity.

It is this increased need for equity capital that is complicating cooperative growth plans. Equity capital acquisition has long been cited as a problem for cooperatives (Hansmann 1996; Hart and Moore 1998; Olson 1971; Cook 1995). In cooperatives, member–patrons usually contribute equity capital through patronage methods rather than explicit investment methods. In the USA the actual capital acquisition method utilized is determined by the type and function of the cooperative.

Equity capital acquisition in cooperatives is viewed as a constraint because of the existence of the free-rider, horizon and portfolio problems.[1] These problems emerge because in most traditional cooperatives, ownership *per se* conveys no benefit; instead benefit is obtained only when members patronize the cooperative. Each of these three cooperative investment problems involve opportunistic behavior by member–patrons and their evaluation of the set of cooperative property rights adopted to address residual claim and residual rights of central issues.

The free-rider problem emerges in cooperatives in two forms: external and internal. The external free-rider constraint is a common-resource problem occurring when property rights are non-tradable, insecure, or unassigned. Cooperative property rights are not well suited and enforced to ensure that current member–patrons, or current non-member–patrons, bear the full costs of their actions and/or receive the full benefits they create. This situation occurs particularly in open membership cooperatives. An example would be when a pear producer refuses to join the membership of a pear bargaining association but captures the benefits of the negotiated terms of trade. A more complex type of free-rider problem occurs when dealing with the common property problem (or insider free-rider problem). This occurs when new members obtain the same patronage and residual rights as existing members and are entitled to the same payment per unit of patronage. This set of equally distributed rights combined with the lack of a market to establish a price for residual claims reflecting accrued and present equivalents of future earnings potential creates an intergenerational conflict. Because of the dilution of the rate of return to existing members, a disincentive is created to invest in their cooperative.

The horizon problem refers to the disincentive for cooperative members to invest in long-term projects. Benefits flowing to the patron instead of the investor is also the genesis of this cooperative investment problem. Specifically, the horizon problem occurs when a member's residual claim on the net income generated by an asset is shorter than the productive life of that asset (Porter and Scully 1987). This problem is caused by restrictions on transferability of residual claimant rights and the lack of liquidity through a secondary market for the transfer of such rights. The horizon problem creates an investment environment in which there is a disincentive for members to contribute to growth opportunities. The severity of this problem intensifies when considering investment in research and development, advertising, and other intangible assets. Consequently, there is pressure on the board of directors and management to (i) increase the proportion of the cooperative's cash flow devoted to current payments to members relative to investment, and (ii) accelerate equity redemptions at the expense of retained earnings.

We call the third cooperative investment problem the portfolio problem. The portfolio issue can be viewed from the cooperative firm's point of view as another equity acquisition problem. The lack of transferability, liquidity and appreciation mechanisms for exchange of residual claims prevents members from adjusting their cooperative asset portfolios to match their personal risk preferences. The cause of this problem is again the tied-equity issue – the investment decision is 'tied' to the patronage decision. Therefore, members hold suboptimal portfolios, and those who are forced to accept more risk than they prefer will pressure cooperative decision makers to rearrange the coop-

erative's investment portfolio, even if the reduced risk portfolio means lower expected returns.

Traditionally cooperatives have attempted to mitigate the investment problems by retaining earnings as member equity. But in US agricultural cooperatives, members demand that earnings retained for investment must eventually be returned to the member–patrons. Consequently, cooperative equity capital might be viewed as a form of debt. The redemption of this equity-quasi debt eventually places a burden on the cooperative's asset base and leads to slower growth. For members, this equity is usually returned at book value regardless of the value of the cooperative business itself. Hence, members do not receive a return on their investment reflecting firm growth value unless the cooperative is dissolved or sold.

PROPOSED SOLUTIONS TO THE COOPERATIVE INVESTMENT PROBLEM

Several remedies have been proposed in the literature for solving the cooperative investment property rights problems. A closed membership policy complemented with marketing agreements[2] has been proposed as a solution to the free-rider issue, particularly the insider free-rider constraint (Condon 1990; Staatz 1987; Vitaliano 1983; Porter and Scully 1987). A second solution for the free-rider problem is the establishment of a secondary market for cooperative shares. Transferable and appreciable shares would ensure existing members of the ability to capture the full value of their investment in the cooperative and, thus, create an incentive to invest in their organizations, since the fear that new members would also share future earnings associated with their investment is eliminated.

The existence of a secondary market for cooperative shares has also been proposed as an important prerequisite in dealing with the horizon and portfolio problems. When shares are transferable and appreciable, inactive members and members near the end of their patronage horizon possess the ability to retrieve a portion of their equity capital through the sale of their equity stock. That is, the present value of the cooperative's estimated future income stream becomes capitalized into the value of the stock[3] or delivery right.

Additionally, transferability and appreciability of cooperative shares enables members to match their individual risk preferences to the risk associated with the cooperative investment portfolio and thus ameliorate the portfolio constraint. The adoption of an equity redemption plan[4] with short revolving periods has also been suggested as a remedy to the horizon problem (Cook 1995; Staatz 1987). Finally, separate capital pools,[5] adopted by multipurpose cooperatives, allow members to assume a level of risk as close to what they

prefer as possible and thus are hypothesized to correct for the portfolio problem.

Since 1990 a new form of agricultural cooperative has been emerging, whose growth has been explosive (Harris et al. 1996). The difference between the 'new generation' cooperative and the traditional cooperative is in the property rights structure. The new generation cooperative has a more clearly defined membership policy (closed, or well defined), a secondary market for members' residual claims, patronage and residual claimant status restrictions, and enforceable member precommitment mechanisms. This is in contrast to the traditional cooperatives described above, whose property rights structure is characterized by open membership, capital generated by earnings from patronage, and illiquid ownership rights.

Our empirical objective is to explore the impacts that property rights modifications might have on the incentive for a member–patron to invest in his/her cooperative. The hypothesis tested in the empirical model is:

> Characteristics in a well-defined property rights structured cooperative such as closed membership, obligatory member commitment, and transferable and appreciable equity instruments would result in greater incentives to invest in a cooperative than ill-defined property right policies such as traditional cooperatives characterized by open membership, voluntary member commitment, non-transferable and non-appreciable equity instruments, and no formal short-term equity redemption plan.

EMPIRICAL TESTING – METHODOLOGY

To identify which of the aforementioned policies have a significant impact on the investment incentives of members, a structural equation model was estimated based on Figure 22.1, which summarizes the main hypothesis.

The independent exogenous variables on the left-hand side of the figure are: (i) membership policy (*MEMBPOL*): whether the cooperative has an open or defined membership policy; (ii) marketing agreement (*MKTGAGR*): whether members sign a marketing agreement or not; (iii) transferable delivery rights (*TRANSFER*); (iv) appreciable delivery rights (*APPREC*); (v) equity redemption plan (*EQREDPL*): whether the cooperative returns members' equity capital in a structured program; and (vi) separate capital pools (*SEPKPOOL*): whether the equity capital of the various subgroups of members is allotted to non-netting separate control and monitoring accounts.

'Members' investment incentives' is a latent variable measured by two solvency ratios: (i) *IPM* indicates investment per member defined as a modified ratio of members' equity to the number of members, and (ii) *OWNERS*,

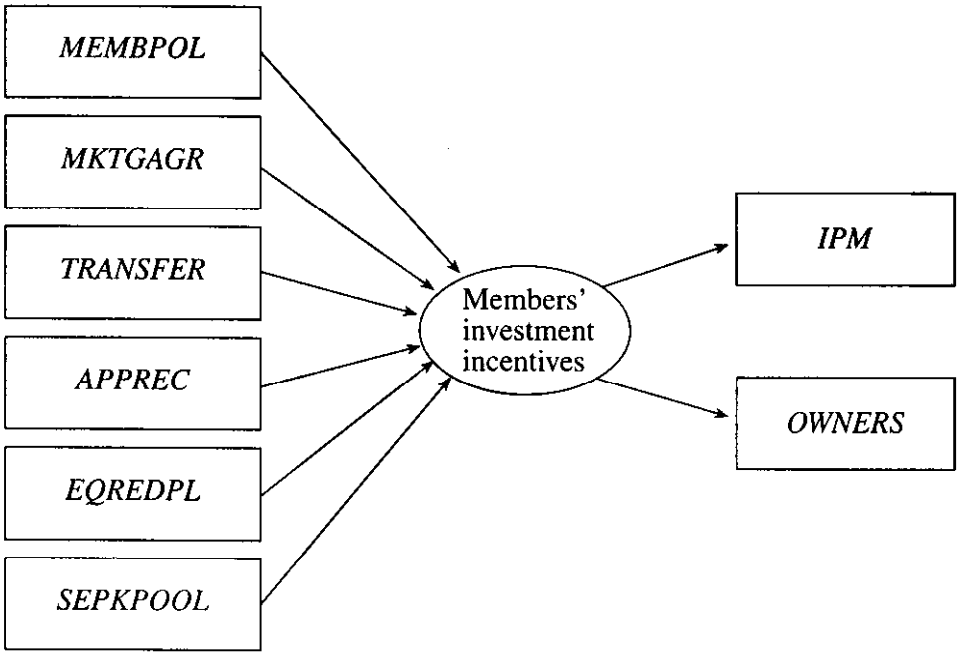

Figure 22.1 Investment property rights constraints in US agricultural cooperatives: the path diagram

indicates the ownership ratio, calculated by dividing members' equity by total cooperative assets. These ratios were calculated by the officially audited financial reports of 127 cooperatives representing more than 75 percent of the total 1996 gross sales by US agricultural cooperatives (Farmer Cooperative Statistics). The other relevant solvency ratio examined was the term debt to fixed assets ratio[6] (CoBank). However, none of the calculated correlations between this ratio and the observed variables exceeded ±0.002. Hence only *IPM* and *OWNERS* are used as indicators of members' investment incentives. Since the data analysed focus exclusively on internally generated risk capital, the problem of accounting for investment incentives provided to outside investors is not considered to be serious.[7]

A dual-response[8] mail survey was used to gather data on cooperative organizational characteristics and policies. The targetted sample of US agricultural cooperatives included the population of Sapiro II, Sapiro III and Nourse II cooperatives and one hundred Nourse I cooperatives.[9] As mentioned earlier, the chosen sample represented more than 75 percent of the total 1996 gross sales by US agricultural cooperatives. The choice of this sample was based on three criteria: (i) it is representative of US agricultural cooperatives; (ii) it includes both traditional and new forms of collective action; and (iii) it is substantial, so that statistical inference is accommodated.

Of the 200 cooperatives meeting the aforementioned set of criteria, the dual response rate was 63.5 percent (127 cooperatives) when both respondents participated completely.

Before constructing the path diagram, the nature of causality between the variables was determined. The approach to satisfying the three necessary conditions for establishing causality (i) pseudo-isolation, (ii) association, and (iii) direction of causality was to include in the model all exogenous variables theoretically justified and then test for association and direction of causality. During this process, the data indicated that only those cooperatives allowing transferability of delivery rights had delivery rights with the potential to appreciate/depreciate. Therefore, these two variables were treated as a single variable (*TRANSFER*) to minimize multicollinearity problems. Also, since it was expected that the errors in independent variables would be highly correlated, a structural equation model was preferred to simple regression techniques because of its ability to deal with the existence of such correlation and provide robust estimates of the underlying relationships.

The associations between independent and dependent variables were tested by means of calculating the tetrachoric correlations between dichotomous variables and biserial correlation between dichotomous and continuous (*IPM*, *OWNERS*) variables (Bollen 1989). The obtained correlation matrix indicated a very weak association between *EQREDPL* and all other variables in the model. *SEPKPOOL* was significant, but only at the 0.1 level.

Direction of causality was established based on temporal priority. That is, all exogenous independent variables (X's) are cause indicators of the latent variable, members' investment incentives, rather than effect indicators.

Subsequently, the path diagram of causal relationships was converted into the following equations:

$$\eta = \Gamma x + \zeta \tag{22.1}$$

$$\gamma = \Lambda_\gamma \eta + \varepsilon \tag{22.2}$$

where η is the 1×1 matrix of endogenous dependent latent variables (members' investment incentives); Γ is the 1×4 matrix of coefficients linking the exogenous observed variables to the latent variable; x is the 4×1 matrix of exogenous observed variables; ζ is the 1×1 matrix of the error in latent variable; γ is the 1×2 matrix of endogenous observed indicators (*IPM* and *OWNERS*) of the latent variable η; Λ_γ is the 1×2 matrix that contains the coefficients linking the latent variable to its indicators; and ε is the 1×2 matrix of the errors in measuring the observed endogenous variables.

Four additional matrices needed to be defined before the model was fully specified. Θ_ε is the 2×2 matrix of prediction errors for indicators of endog-

enous constructs, with only one non-zero element in this case. Θ_σ is the 4×4 matrix of prediction errors for the cause indicators of the latent variable. Φ is the matrix of correlations among exogenous latent variables, which in this model has all its elements equal to zero, since no exogenous latent variable is included in the model. Finally, Ψ is the 1×1 matrix of correlations between endogenous latent variables; in this case, it has only one element, $\Psi = \text{Var}(\zeta)$. This model was used to estimate all coefficients.[10]

The software PRELIS 2.0® was used to inspect continuous variables for outliers and no outliers were found.[11] Furthermore, the data on the continuous variables (*IPM* and *OWNERS*) were inspected for divergence from normality, and excessive kurtosis and skewness. Both *IPM* and *OWNERS* were found to have negative skewness and kurtosis. In such cases, a logarithmic transformation of the variable may solve the problem. After the transformation both variables approximated the normal distribution; *IPM* at the 0.05 level of significance, and *OWNERS* at the 0.1 level of significance.

The correlation matrix of all observed variables was used as input for estimating the model. However, since all exogenous observed variables (*X*'s) are dichotomous variables, the Pearson product-moment correlation is inappropriate (Hair et al. 1995) To allow for incorporation of the non-metric measures into the structural model, different types of correlations were calculated. When both variables were dichotomous (for example *MEMBPOL* and *TRANSFER*), the tetrachoric correlation between these variables was calculated. When one variable was dichotomous, while the other was continuous, the biserial correlation of the variables was computed.

LISREL 8.0, Interactive for Windows®was the software used for estimating the model. When non-normality threatens the validity of the widely used maximum likelihood estimator, it is more appropriate to employ an alternative estimator that allows for non-normality and is asymptotically efficient (Bollen 1989). The weighted least squares (WLS) estimator was used. The major advantage of the WLS estimator is that it does not assume that variables are multinormally distributed, a condition necessary for using any of the maximum likelihood, generalized least squares, or unweighted least squares.

The model was then identified (that is, examined for positive degrees of freedom):

$$\text{d.f.} = \tfrac{1}{2}(p+q)(p+q+1) - t = \tfrac{1}{2}(4+2)(4+2+1) - 16 = 5,$$

where, p and q are the number of independent and dependent observed variables, respectively, and t is the number of parameters to be estimated.[12] The paths from the latent variable to its indicators have been set to one, under the assumption that the two dependent observed variables are reasonably

accurate indicators of members' investment incentives. All other parameters were estimated within the model. The obtained results are shown in the path diagram (Figure 22.2). A more detailed presentation of the estimates is included in Table 22.1; no offending estimates were obtained from the model estimation.

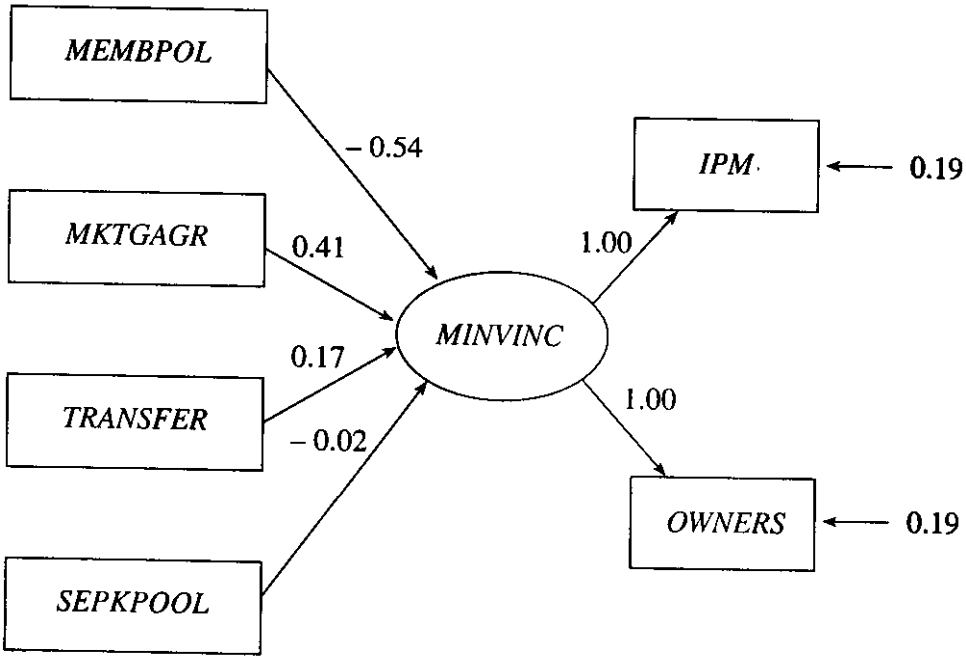

Figure 22.2 *Investment property rights constraints in US agricultural cooperatives: path diagram with estimated coefficients*

Table 22.1 *Investment property rights constraints model (WLS estimates)*

Parameter	Coefficient estimate	Std error	*t*-value
γ_{11}	–0.54	0.13	–4.18
γ_{12}	0.41	0.15	2.81
γ_{13}	0.17	0.11	1.52
γ_{14}	–0.02	0.07	–0.36
γ_{11}	1.00*	–	–
γ_{12}	1.00*	–	–

Notes:
$X^2 = 9.38$, X^2 Critical = 11.070 (5%); d.f. = 5; P = 0.09467; RMSEA = 0.083.
* Parameters constrained through normalization.

Table 22.2 Goodness-of-fit measures for investment property rights constraints model (H_1)

Goodness-of-fit measures	Acceptable range
Measures of absolute fit	
Chi-square (χ^2) statistic = 9.38 (5 d.f.)	Less than 11.07 (at 0.05 level of significance)
Goodness-of-fit index (GFI) = 0.9972	As close to 1.00 as possible
Adjusted GFI = 0.9883	As close to 1.00 as possible
RMSEA = 0.08	0.05–0.08
Measures of incremental fit	
AGFI = 0.9883	As close to 1.00 as possible
Normed fit index = 0.9972	As close to 1.00 as possible

Measures of absolute and incremental fit for the estimated model are reported in Table 22.2.

Interpretation of the Results

The obtained results[13] and the assessment of the fit of the model suggest that the property rights structure of US agricultural cooperatives significantly affects members' incentive to invest in their organizations. The adopted membership policy has the most influence on members' investment incentives. The dichotomous variable *MEMBPOL* takes the value zero for cooperatives with a defined, or closed, membership policy, and the value 1.0 for cooperatives with an open membership policy. The estimated coefficient of –0.54, connecting *MEMBPOL* to *MINVINC*, indicates that, *ceteris paribus*, 54 percent of the variation in members' investment incentives can be attributed to variation in *MEMBPOL*. Consequently, variation in the measurable indicators of members' investment incentives can also be explained, since their coefficients have been normalized, and no indirect effects between variables have been assumed. Similarly, 41 percent of the variation in members' investment incentives is attributable to variation in members' commitment to the cooperative through an enforceable marketing agreement. As can be seen in Table 22.1, the estimates for *MEMBPOL* (adopted membership policy) and *MKTGAGR* (adoption of marketing agreements between the cooperative and its members) are highly significant at the 0.05 level. However, *TRANSFER* (whether the cooperative has transferable and appreciable shares or delivery rights) is significant only at the 0.1 level.

The relatively high percentage of variance in members' investment incentives attributed to variance in the adopted membership policy justifies further discussion of this result. The single most important aspect of a closed membership cooperative is that its Board of Directors[14] has a high degree of control over the volume of the commodity supplied by members.[15] Control of supply has been discussed in the cooperative literature as an important determinant of success in management's ability to develop and implement an effective strategic plan that would increase the profitability of the cooperative firm (for example, Hansmann 1996; Cook and Iliopoulos 1998). Additionally, control of supply has been proposed as a significant determinant of success in cooperative operational policies' effort to coordinate the combined productive endeavors of the cooperative and its members' individual businesses (for example, van Wassenaer 1989).

Marketing agreements are also an important means of achieving the aforementioned goals of control of supply and coordination. The difference between the estimates of these two property rights characteristics may arise because of their different natures. That is, a closed membership policy does not require the commitment of members' resources to the cooperative goal,[16] at least to the extent of a marketing agreement. Marketing agreements usually require that a member supply the cooperative for one or more seasons with a specific quantity of a commodity. Cooperatives that use marketing agreements also use severe penalties for members unable or unwilling to fulfill the prespecified terms of the agreement. Therefore, members may prefer closed membership to a marketing agreement as a mechanism for controlling supply and thus ameliorating the negative impact of the free-rider constraint. Additionally, marketing agreements, especially in cooperatives with a small number of members, can seriously threaten trust between members and the cooperative and, thus, some cooperatives may not use marketing agreements, even if they are effective mechanisms for achieving control of supply and coordination (Hansmann 1996).

While membership policy and marketing agreements refer to members' commitment, the third independent variable (*TRANSFER*) is associated with another important issue. Transferability and appreciability of cooperative equity shares, or delivery rights, are responsible for creating a semi-liquid secondary market for the cooperative's stock. In the empirical analysis, these two property rights characteristics are also proved to be important tools for ameliorating the horizon problem. On the other hand, equity redemption plans do not significantly affect members' investment incentives probably because while they may succeed in aligning user and benefactor rights for investments that pay back within the membership horizons of current members, they fail to do so for long-term investments (for example, in intangible assets). Additionally, the effectiveness of equity redemption plans is deter-

mined by conditions highly dependent upon exogenous events such as changes in the macroeconomic environment and the particular characteristics of an industry which may seriously affect a cooperative's ability to return members' equity in good time.

An alternative explanation of the low importance of equity redemption plans in the model is derived from the nature of the horizon constraint, which does not arise for investments that pay off in the period in which their costs are incurred. For such investments, an ownership structure characterized by benefits accruing to members in proportion to patronage and revolving equity is optimal.[17] Equity redemption plans, however, may fail to be part of the solution for investments that pay off after their costs have been incurred (for example, investments in intangible assets such as advertising or R&D). In this case members, especially if they plan to reduce their share of the cooperative's patronage (for example, they plan to retire) before the investment in an asset has paid off, are faced with an investment disincentive. On the other hand, transferable and appreciable shares provide a more effective solution to the horizon problem, since members can capture in the market the value of any type of investment they made in the cooperative (van Wassenaer 1989, p. III-6).

Additionally, transferable and appreciable shares offer another way to deal with the portfolio problem. Members' incentives to invest in their cooperative are enhanced when they can choose the level of risk they assume. Therefore, the importance of this variable in the model reveals not only its relevance in solving the free-rider and horizon problems but also in ameliorating the portfolio constraint. Another hypothesized solution to the portfolio constraint was the adoption of separate capital pools. However, the impact of this variable was found insignificant. Since only a few cooperatives in the sample had adopted separate capital pools, their positive effects might not have been detected in the model. Alternatively, another explanation may involve the fact that separate capital pools are a relatively new accounting method for enhancing balance among users, owners and benefactors in cooperatives. Thus it could be assumed that, as a new method, it has not yet demonstrated its positive impact on members' investment incentives or that cooperatives do not make full use of its inherent advantages. Further investigation of the issues pertaining to the portfolio constraint, and more specifically to the adoption of separate capital pools, is fully justified and is reported in forthcoming publications.

CONCLUSION

We could simplistically summarize our results in the following manner. Suppose that cooperatives in the sample had to choose either to invest in a new,

highly rational, project or not. Suppose further that the members' investment incentive takes only two values: they are either *willing* to invest, or *not willing* to invest. Then, members of those cooperatives which have a closed membership policy, use marketing agreements, and have transferable and appreciable delivery rights, would choose to invest in the project. The members of open membership cooperatives, with no marketing agreements and, non-transferable and non-appreciable shares would not invest in the new project, or would be much less so inclined. Consequently, the transaction costs of equity acquisition would be significantly higher for the latter type of cooperatives. In other words, clarifying property rights leads to the increased probability of creating investment incentives. And while the significance of clearly defined property rights is well established for investor-oriented firms, the point of our chapter is that the same holds true for the alternative ownership structures examined in this study.

NOTES

1. For an in-depth theoretical and empirical analysis of the three vaguely defined property rights, the reader is referred to Constantine Iliopoulos (1998), 'A study of the property rights constraints in US agricultural cooperatives: theory and evidence', Unpublished PhD Dissertation, University of Missouri-Columbia.
2. Marketing agreements are contracts between individual members and the cooperative, used in marketing cooperatives, to specify the volume and the quality of the commodity supplied by each member to the cooperative.
3. In the emerging new form of cooperatives (new generation cooperatives) stock and delivery rights are used interchangeably.
4. Equity redemption plans are ways in which the cooperative returns to its members the amount they have invested. While several methods for evolving members' equity exist, the base capital plan method is the most effective in returning members' equity in good time. Cooperatives adopting a base capital plan determine a member's equity obligation annually based on the cooperative's need for capital and on the member's use of the cooperative. Underinvested members continue to invest, while overinvested members generally begin to receive redemption of their excess investment.
5. In multipurpose cooperatives adopting a single capital pool, members' equity and leverage (debt) capacity are pooled together. This results in some members' equity used to subsidize investments that do not benefit them. As a result, members' willingness to invest in the cooperative is decreased.
6. The term debt to assets ratio measures the relationship between long-term debt and fixed assets. It indicates whether term debt has been repaid in accordance with the expected life of fixed assets.
7. Another abstraction from reality is the implicit assumption that cooperative members are relatively homogeneous and thus IPM accurately represents the average of members' investment in the cooperative.
8. Two questionnaires were mailed to each cooperative firm: one to be answered by the Chief Executive Officer and the other by the Chief Financial Officer. The former provided information on organizational and policy issues while the latter answered questions regarding the financial policies of the cooperative.
9. Cook describes a taxonomy of cooperatives, of which four types are of relevance for this study: (i) the Nourse I local multipurpose cooperatives, (ii) the Nourse II regional multi-

purpose cooperatives formed by local cooperatives, (iii) Sapiro II processing and/or marketing cooperatives, and (iv) Sapiro III, or new generation marketing cooperatives. The names of these cooperatives were chosen in order to indicate their founding motive. Nourse cooperatives were founded by farmers adapting Nourse's philosophy of ameliorating market failures – often called the 'competitive yardstick' school of cooperation. On the other hand, Sapiro cooperatives adapted the organizational strategies proposed by Sapiro – in order to extract rents downstream in the food chain.

10. In this step the validity and reliability of indicators were also established. Space considerations preclude the discussion of these issues.
11. PRELIS 2.0 was used to create a scatterplot of *IPM* against *OWNERS*, and visual inspection for outliers was performed.
12. The parameters to be estimated include the correlations between the measurement errors of the observed independent variables but do not include the coefficients that have been normalized.
13. It should be noted that the obtained results are not deterministic; they indicate trends and causal directions, rather than accurate measurements of the strength of relationships.
14. Or the founding coalition of members in the case of emerging Sapiro III cooperatives.
15. While the discussion focusses on marketing cooperatives, it can easily be extended to supply cooperatives. In supply cooperatives, it is rather an issue of control of members' demand for one or more agricultural supplies, than an issue of supply control.
16. Unless, of course, a significant up-front equity capital investment is required.
17. In the sense that it does not create investment disincentives for members.

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Contracting and Organizations Research Institute

Working Paper No. 2001-04 September 2001

A New Institutional Economics Approach to Contracts and Cooperatives

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A NEW INSTITUTIONAL ECONOMICS APPROACH TO CONTRACTS AND COOPERATIVES

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Forthcoming in
American Journal of Agricultural Economics
Vol. 83, No. 5, 2001

Key words: contracting, cooperatives, organizational structure, new institutional economics

Abstract

Our purpose in this paper is to highlight the role of organizational structure and incentives in the design of contracts between buyers and sellers of agricultural products. In particular, we consider how differences between investor-owned (IOF) and producer-oriented (POF) firms, and differences between alternate types of POFs, may affect the types of contract terms those respective organizations are likely to prefer in their contracts with agricultural producers. New institutional economics theories of contracting, agency and property rights allocation suggest that cooperative contractors may be able to design contracts that enhance economic efficiency that IOFs cannot easily replicate

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A New Institutional Economics Approach to Contracts and Cooperatives

Consolidation and increased coordination throughout the agri-food sector are rapidly reshaping the role of cooperative organizations in agriculture. Increased concentration, both up and downstream, raises the specter of the traditional cooperative role of counter-balancing market power. However, increasing demands for coordination among players throughout the agri-food system point to a different role in which cooperative organizations may have a unique advantage.

Particularly at the producer level, where large-scale vertical integration of productive resources is relatively impractical, contracting plays a critical role in coordinating the activities and interests of trading parties in agriculture. The structure of these myriad contractual arrangements is only beginning to be explored (Sykuta and Parcell). While some researchers have studied the effects of differentiated producer characteristics on contract performance (e.g., Goodhue), little attention has been paid to the identity or nature of the contracting organization when examining the structure of agricultural contracts.

However, one might think it reasonable to suggest that a producer-owned contractor should be better able to contract with (owner-member) producers than would an investor owned firm (IOF). Indeed, Balbach found that contracts between sugar beet producers and producer-owned refiners were not only structured differently than those with investor-owned refiners, but they were different in a manner that improved both processing efficiency and producer returns. This is but one example of one particular dimension of contract design (namely, the interface between quality-attribute measurement and organizational structure), but it is suggestive of a broader implication.

The purpose of this paper is to proffer a comparative conceptual framework that examines efficiency implications for contracting parties depending on the ownership structure of the contractor. New institutional economics theories of contracting, agency and property rights allocation suggest that cooperative contractors may be able to design contracts that enhance economic efficiency that IOFs cannot easily replicate. Moreover, issues of vaguely defined property rights characteristic of traditional cooperative structures (Cook) also affect the viable contractual forms, suggesting certain producer owned and controlled organizations may have additional advantages in certain types of contracting arrangements that will be more attractive to member/producers.

In this paper, we focus on potential contractual design differences between IOFs, traditional marketing cooperatives, and new forms of cooperation including closed membership cooperatives. Beginning with a brief overview of the fundamental dimensions of the economics of transactions, we go on to discuss how differences in organizational structure (property rights allocations, incentives, and performance measures) affect the incentives of the contracting parties and the likely contractual design response. We conclude with a summary of testable implications that form the basis of a continued research agenda.

Fundamental Elements of Contract Design

Every transaction relationship involves three basic economic components: the allocation of value (or the distribution of gains from trade), the allocation of uncertainty (and any associated financial risks), and the allocation of property rights to decisions bearing on the relationship. These three dimensions are inherently interdependent; each

one is likely to have implications for the others. For instance, a producer may demand a higher price for assuming the uncertainty of growing a new product or variety. A buyer may offer a price premium on the product in return for the right to assert certain terms with respect to production decisions (e.g., handling/segregation). A fixed price contract eliminates nominal price uncertainty, but may create financial risks for either side as relative market prices change, for either inputs or related products. A fixed price contract may also affect either party's incentives and the way they exercise their respective decision rights, particularly with regard to product quality.

Traditional neoclassical economics offers little insight into how such economic relationships should be structured. By focusing on a frictionless market as the unit of analysis, where price and quantity are the variables of primary interest, the multidimensional nature of an individual transaction is necessarily overlooked. To the extent that "extraneous" factors come into play (e.g., risks from price uncertainty), market solutions such as a futures market are assumed effective solutions.

New institutional economic theories of agency, property rights, incomplete contracting and Williamson's transaction cost economics have been advanced to provide a finer theoretical focus by which to analyze the structure of transactions and their governing institutions.[1] These theories suggest how the rights and responsibilities incumbent to the transaction are allocated will depend on the characteristics of the transaction, the costs of monitoring and enforcement, the relationship of the trading parties, and their respective negotiating skills or bargaining position (which might be influenced by control rights over complementary assets).[2]

Agency theory addresses information asymmetry and incentive incompatibility between trading parties. Although commonly considered in the context of the employer-employee or principal-agent relationship (Fama, Jensen and Meckling), it applies as well in all cases wherein one party has an informational advantage over another that can be exploited to the benefit of the advantaged party at the expense of her trading partner (Salanié). Implicit in that statement is the assumption that the information asymmetry is costly to correct. Those costs may include *ex ante* search costs (associated with adverse selection (hidden information) problems) and/or *ex post* monitoring and enforcement costs (associated with moral hazard (hidden action) problems).

The resulting focus is on developing contracts that align incentives (i.e., encourage truthful information revelation) while at the same time addressing measurement (or monitoring) issues. While Jensen and Meckling focus on the combination of value and risk allocations in designing effective incentive systems, the delegation of decision rights also plays a significant role. Indeed, an agency problem exists only because the agent is assigned decision (or control) rights that affect the principal's wealth or utility function (typically, his claims to the residual income generated by the asset). To the extent that contracting organizations embody different incentive systems, a greater degree of information asymmetry, or more costly monitoring, one would expect that contractual relations would also differ among the organizations.

Since Coase's 1960 classic, "The Problem of Social Cost," economists have become concerned with how the assignment of and costs of transferring property rights affect incentives and economic outcomes. Recognizing that most assets or products are characterized by multiple attributes, and that property rights to these various attributes

may belong to different people, points to the importance of organizational form in mitigating property rights issues, particularly commons property (Barzel, De Alessi). The separation of residual claim rights and control rights in modern corporations, though dating back to Berle and Means, is perhaps the best noted example in the work tying property rights to organizational form.[3]

This property rights perspective forms the basis of the arguments Cook makes regarding the evolution of cooperatives and the rise of the "new generation" cooperative structure. He defines five "vaguely defined property rights" problems devolving from the traditional cooperative organization's division of residual claims and control rights: Free Rider Problem, Horizon Problem, Portfolio Problem, Control Problem, and Influence Costs Problem. The Free Rider Problem results when gains from cooperative action can be accessed by individuals that did not fully invest in developing the gains, whether those individuals are new(er) members or non-members. The Horizon Problem results from residual claims that do not extend as far as the economic life of the underlying asset. Like the Horizon Problem, the Portfolio Problem stems from the tied nature of the equity in the cooperative; the organization's investment portfolio may not reflect the interests or risk attitudes of any given investor/member, but members cannot withdraw and reallocate their investments. The Control Problem is similar in nature to the shareholder-manager problem in IOFs, but is compounded by the lack of external competitive market pressures (e.g., equity markets and the market for corporate control) that help discipline managers in IOFs. Influence Costs are incumbent to all organizations where decisions affect wealth distribution among members. These costs are greater when there is a wider variety of interests among group members and when the potential gains are greater.

Cook asserts that these different incentive problems increase the transaction costs of managing the cooperative organization. He goes on to conjecture how different cooperative types, reflecting different property right constraints, may be more or less affected by each of these five types of problems. Cook and Iliopoulos later demonstrate that these vaguely defined property rights problems affect members' incentives to invest in the organization and the organization's overall ability to generate equity capital. Specifically, they find that members are more willing to invest equity when the cooperative is characterized by structures such as closed membership, marketing agreements, and transferable and appreciable equity shares; structures that tend to reduce the free rider, horizon, and portfolio problems.

Incomplete contract theory builds on property right themes in attempt to prescribe optimal asset ownership based on residual control rights of an asset (Hart, Hart and Moore). Residual control rights are defined as the right or ability to control access to or use of an asset in any circumstance not otherwise prescribed under contract. In legal parlance, these residual control rights are the effective default rules that apply when the terms of the formal contract are incomplete. Given contractual incompleteness, the story goes, ownership of assets should be arranged to maximize investment incentives and returns.[4] More important to this paper is the corollary: given asset ownership, the degree of completeness in a contract, i.e., the degree to which contingencies are more fully specified will depend on the allocation of residual control rights over the related asset.

Transaction cost economics (TCE), as popularized by Williamson, also tends to focus on firm boundary issues—under what conditions an activity will be organized in an integrated, hierarchical manner versus in a more arms-length contractual manner.

However, governance mechanisms can be viewed in a continuum ranging from anonymous spot market transacting to an autocratic hierarchy, with a range of varying degrees (sometimes called hybrids) in between. TCE analysis tends to focus particularly on the roles of asset specificity and bounded rationality, in the context of opportunistic decision behavior, as the key determinants of organizational form. Three other transaction attributes, complexity, uncertainty and frequency, are also discussed by Williamson, but tend to be de-emphasized in the final analysis. The general implications are that as assets involved in a transaction are more specific to the transaction, as the potential for opportunistic behavior increases, and as the need for coordination between parties increases, the more likely hierarchical mechanisms will be used to govern the transaction. In the context of contractual governance mechanisms, this suggests more fully specified terms with more decision rights vested in the contractor.

A common theme across all of these approaches is that transaction costs are positive; information is imperfect, costly, and frequently asymmetric; the allocation of decision rights (or property rights more generally) affects performance; and governance structures are designed to mitigate the hazards, or minimize the costs, involved in effecting economic transactions. While the frequent focus is on firm boundary questions, the concepts also directly apply to alternative contractual governance forms.

Coordination, Contracting and Organizational Structure

The agri-food system is increasingly characterized by demand for greater coordination between players at every level. Demand for extra-sensory attributes by consumers, realization of processing production efficiencies from using more consistent

inputs, and the increasing trait specialization of agricultural products all push toward greater control and coordination. Particularly at the producer level, the most practical coordination mechanism is contracting. The central premise of this paper is that contractors with different organizational structures may use different contract forms even when contracting for the same product from the same set of agricultural producers. Moreover, the differences in contract form will be a directly related to the nature of the contractors' organizational structures and the incentives they create.[5]

That IOFs and producer-owned cooperatives are different is generally understood. For most IOFs, a diverse and diffuse set of equity investors shares proportional (and perhaps atomistic) ownership rights to the residual income of the organization. Few investors have any other business ties to the organization than their equity investment (and perhaps managerial control), and all residual income is distributed based solely on equity shares. These rights are fully transferable and appreciable, allowing investors to alter their own investment portfolio to meet their personal investment objectives at relatively low cost while being able to capture the fully capitalized value of their investment.

The relationship between the IOF and its input suppliers can be characterized as a zero-sum game: any increase in payments to inputs is a decrease in residual income for investors. The IOF has no inherent interest in the welfare of its input suppliers. Because of this zero-sum nature of the IOF-supplier relationship, there is an inherent element of distrust between parties. Both sides recognize the incentive to withhold private information that may provide its owner greater returns. As a result, at least a perception, if not a reality, of greater information asymmetry prevails.

Producer-owned cooperatives (traditionally speaking) have a very different property rights structure. In this context, ownership of the organization takes on a very different meaning. While producer-owners have equity investments in the organization, residual income is distributed based not on equity investment, but on the patronage of or business dealings with the organization. Here the relationship between the cooperative and its input suppliers is not necessarily a zero-sum game, since a higher price to inputs represents an equivalent payment to (some) investors; the residual income is simply paid in the form of higher prices to the producer (or in the case of a supply cooperative, in the form of discounts to the producer).

Given their producer-owned and producer-governed nature, cooperatives have an inherent producer orientation. Moreover, because producers are involved in the governance of the organization, there is a lesser degree of perceived information asymmetry—the incentive to withhold information is lower since producers are involved on both sides of the transaction. Both of these suggest a greater degree of trust between producers and the organization than in the IOF-producer relationship.[6]

This simple dichotomous scenario already suggests differences in the ways contracts may be structured based on the different property rights structures, information asymmetries, and trust levels associated with IOFs and traditional producer oriented firms (POFs). In particular, we suggest that:

1. Because of the lower level of trust and greater information asymmetry, IOF contracts will rely on more transparent and easily verified measurement and pricing mechanisms.

2. For similar reasons, IOF contracts will be more likely to incorporate third-party verification or mediation.
3. Again, due to more poorly aligned incentives and lower trust, negotiated contracts with IOFs will be more complete in specifying rights and responsibilities over a broader range of contingencies, thereby reducing the importance of residual control right issues.
4. Along the same lines, IOF contractors will likely exert more decision rights control over the more easily specified and verifiable producer activities.
5. The value paid to producers in IOF contracts will be less-directly correlated with the IOF's net operating revenues.

The first of these is particularly relevant to the current trends in agricultural specialization. To the extent that the value source (e.g., embedded trait) in a particular product becomes more difficult to assess in a transparent way, IOFs are less likely to be able to implement pricing strategies that provide the most efficient incentives to producers.

Alternative Producer Organizational Structures

The above discussion considers the stereotype polar cases of an IOF and a traditional producer-owned cooperative. However, not all POFs are characterized by the same property rights and governance structures; there is a spectrum of hybrid producer-owned organizational forms designed to mitigate the costs and hazards associated with the five vaguely defined property rights problems identified by Cook.[7] Cook and Iliopoulos demonstrate that the ability of these different cooperative forms to reduce

some of those hazards affects producers' investment incentives. The broader implication is that different cooperative forms engender different types of relations with producers that are likely to be manifested in more than just equity investment decisions.

Open versus closed membership cooperatives typically encounter greater external free-rider problems. One source of those problems is that the cooperative must purchase whatever volume and quality of product the producer chooses to deliver. However, as the food system moves toward greater specialization and segregation of agricultural products, more coordination is required—something open-membership coops do not easily accommodate. Therefore, POFs with more clearly delineated and specific delivery rights will be more effective in contracting with producers for high valued specialty products.

POFs with appreciable and transferable equity shares provide their producer-owners with an alternative means of capturing value from the cooperative's activities. Producers can either capture their equity returns through traditional patronage or usage-based means, or through equity capital appreciation. This creates a tension in the decision to reinvest earnings into the organization or to pay them out in patronage (not unlike the IOF's decision to either reinvest earnings or pay dividends), particularly since taxes on capital appreciation are deferred until the producer liquidates her investment. This suggests POF's with appreciable and transferable shares will reinvest a greater proportion of the value created through the POF and pay out a smaller portion of the value under the producer contracts (i.e., contract prices will be less-directly correlated with the POF's net revenues).

Multi-purpose cooperatives, where producer-owners have more heterogeneous investment interests, are subject to the portfolio problem—investments from the common

resource pool may benefit one group of owners more than, or at the expense of, another. Value premiums to producers of one commodity may be perceived as windfall by producers of other commodities. Moreover, producers involved in different commodity production may not fully understand or appreciate the value and costs associated with the production of products with which they have little experience. Therefore, POFs with multiple products and/or with a more heterogeneous group of producers will be less effective in offering contracts that accurately compensate producers for product-specific investments (either tangible such as equipment or intangible such as value or production uncertainties). In addition, a smaller proportion of the residual income from the business line will be paid to producers in patronage form via the contract. Finally, more transparent pricing and measurement tools will be used.

POFs differ in the amount and type of up-front capital producers are required to invest in order to obtain delivery rights. At first blush, one might suggest that producers that are not required to put up a hostage in the form of collateral investment are more likely to shirk in their production relations with the firm, thus calling for greater contractual controls. However, the value of delivery rights will be determined in large part by the expected returns on the delivery contracts and on the equity investment itself. Both depend on the nature of the product being produced. Those products offering the highest returns are likely going to be ones that require higher degrees of managerial effort by producers, coordination between producers and the contractor, and product specificity on the side of the contractor. All of these suggest the contract with the producers will be more complete and specific in its requirements. While this is ultimately an empirical question, the corollary seems more clear: POFs that require less up-front investment from

producers are less likely to contract for specialized products that require specific investments from either party.

Summary

Our objective in the above discussion is to advance a conceptual framework using new institutional economics theories that draws attention to the importance of the organizational structure of contractors for the design of the proliferation of contracts increasingly governing agricultural production. Understanding the interplay between organizational form and contract structure is a necessary step in understanding why and how contracting is occurring, where and when it does. The next step is to begin systematically examining actual contracts to empirically evaluate these theoretical conjectures—a process we have begun by initiating a collection of contract forms.[8]

No doubt, competitive forces shape the structure of contracts—contractors can offer more appealing contract terms as well as higher prices when competing for a common pool of producers. In fact, legal scholarship suggests contracts are likely to converge over time (e.g., the evolution of boilerplate). However, few industries if any outside of agriculture have the breadth of distinctly different organizational forms involved in similar contracting activities. The dramatically different incentives inherent in those organizational forms, both of the contracting organization itself and of the producer in relation to the contractor, suggest key contractual differences are likely to persist. To the extent that those differences have economic consequences in the coordination efficiencies they facilitate, cooperatives may find a special niche in a more highly coordinated agri-food system.

Notes

[1] While asymmetric information and externalities are not themselves new to traditional neoclassical economics, agency theory and related models are based on the concept of positive transaction costs, which distinguishes these new institutional theories from neoclassical theory. The broad application of the principal-agent model in particular is evidence of how new institutional economics is integrating into the mainstream literature.

[2] This notion of complementary asset ownership includes concepts of market power as traditionally argued in the economics literature, particularly the monopsonistic market structure asserted to face most agricultural producers. One could well consider a dominant market share as ownership of access rights to a downstream market. Producers are faced with acquiring those access rights from the monopsonist (in the form of reduced prices) or purchasing alternative access rights through investment in a cooperative.

[3] This also provided grist for the aforementioned agency theory mill, the shareholder-manager relationship characteristic of the separation of residual claims and asset control being a pre-eminent example of a principal-agent relationship.

[4] The incomplete contracting approach is more directed toward vertical integration issues than contract structure. It may be a useful framework to consider integration as a mechanism to enhance coordination in the agriculture sector, but that leads more to the decision to form a cooperative (producers integrating downstream to capture more of the gains from coordination, for instance). Hendrikse and Bijman address this very issue.

[5] Because the focus of this paper is on the ability of the contractor to improve coordination through contracting, our discussion and analysis is primarily related to downstream cooperatives (e.g., marketing coops) as opposed to upstream, or supply-type,

cooperatives. While the value transfer works in the other direction, we suggest that the underlying issues would be similar in supply cooperative-producer relationships; however, we leave that as a question for future research.

[6] Balbach argues that trust was a key factor enabling the cooperative sugar processors to implement sugar-content pricing of beets whereas the IOF processors could not.

[7] It is for this reason we have introduced the term "producer-oriented firms (POFs)." The defining characteristic for these firms is not so much their adherence to the traditional definition of a cooperative, but their orientation toward the producer rather than to independent investors. For instance, we would consider a producer-owned and operated LLC a hybrid form of POF. Indeed, an IOF whose shareholders are predominantly producers for the organization would also be a POF. Employee-owned corporations would be a good example from outside agriculture, although most tend to suffer from a portfolio problem when dealing with employees from several different unions or professional strata.

[8] The Contracting and Organizations Research Initiative (CORI, http://cori.missouri.edu) at the University of Missouri is already engaged in developing a collection of agricultural production contracts (among many other types of contracts both in and out of agriculture) specifically to facilitate empirical research on contract structure and the effects of organizational and institutional structures surrounding the contracting activity.

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