

Tinkering and Reinventing: Economic Adaptation by Farmer Cooperatives

Abstract: The property rights structure of the traditional farmer cooperative is often claimed to be suboptimal or inefficient, thus facilitating equity and agency problems. Past research is ambiguous and inconclusive on the precise interpretation of the equity and agency problems as well as its various solutions in context of the cooperative equilibrium. Therefore, the present article elaborates on past research by adopting the economic adaptation interpretations of Barnard (1938) and Hayek (1945) for a superior conceptualization of the constrained input-output process in farmer cooperatives. The combined consideration of internal and external economic adaptation highlights the necessary balance of member objectives and cooperative actions at the very foundation of all successful farmer cooperatives. Introduced are the concept of tinkering, defined as the adaptation of operational and constitutional rights, policies, and procedures to adjust member interests and preferences, and the concept of reinventing, defined as the adaptation of organizational scope or purpose to align actions and strategies to member interests and preferences. Secondary case study material on U.S. and European farmer cooperatives is used to identify specific solutions to the equity and agency problems, thus illustrating how farmer cooperatives tinker and reinvent to survive and succeed in the current economic environment.

Keywords: agricultural cooperative, property rights, economic adaptation.

JEL Classifications: Q13, Q14.

INTRODUCTION

When transaction cost is positive, the ability to define and maintain partitions of rights to assets and resources is suboptimal (Foss and Foss, 2005). Consequently, the income stream to the assets and resources is susceptible to ex post rent appropriation by the other transactional party (Mahoney, 2005). If ex post rent protection is suboptimal or inefficient, so is ex ante investment. Put differently, the former is a necessary condition for the latter, because a rational individual is not incentivized to make a specific investment if less than 100% of the income stream is appropriable. Ex post rent protection, and thereby ex ante investment, is optimized by bundling and allocating the partitions of rights to attributes to the party which has the ability and incentive to maximize its value appropriation or minimize its value dissipation (Foss and Foss, 2005). Considering the dual optimization of ex ante investment and ex post rent protection, the asset owner is thus assumed to be the transaction cost minimizer (Hart and Moore, 1990; Williamson, 1991).

Often, control and ownership of rights to farm assets and resources is bundled in a cooperative. Historically, the foremost reason for the formation of such hybrid organizations is some type of market failure (Sexton and Iskow, 1988; Sexton, 1990). Subjected to the holdup problem by input sellers or output buyers, individual farm producers have incentive to engage in group action as value allocation is suboptimal (Valentinov, 2007). Such group action may or may not involve forward or backward integration, which implies two conditions: (i) input supply or output processing is most valuable to the organized farm producers, and (ii) the cooperative is the cost minimizer for the given transaction. However, despite its past or current relative optimality, its future optimality is by no means guaranteed. For the cooperative mode of organization, suboptimality is believed to be caused by the inefficiency or incompleteness of its property rights structure. Put differently, its property rights are ill-defined or ambiguous (Jensen and Meckling, 1979; Porter and Scully, 1987; Cook, 1995; Cook and Iliopoulos,

2000). The ill-defined or ambiguous nature of property rights can imply inefficiency or incompleteness in terms of assignment or rationality in the dynamic economic environment:

1. claim rights holders may not be the best persons to hold claim rights
2. claim rights holders may not be the best persons to hold control rights
3. control rights holders may not be the best persons to hold control rights
4. claim rights and control rights may not be transferable
5. claim rights may not be appreciable
6. claim rights and control rights may not be excludable
7. claim rights and control rights may not be enforceable
8. actual and potential uses of assets and resources may not be known or defined

Following contributions by Jensen and Meckling (1979), Vittaliano (1983), Staatz (1987), and Porter and Scully (1987) regarding the ownership of member-owned organizations, Cook (1995) identified five property rights problems for farmer cooperatives: (i) the free rider problem, (ii) the horizon problem, (iii) the portfolio problem, (iv) the control problem, and (v) the influence problem (see Table 1).¹ The common thread is heterogeneity of interests and objectives, or unbalanced intra-cooperative relationships. Heterogeneity at the member level is likely to be present already at the beginning, but homogeneity of economic intent to correct or develop the market pushes all differences to the background, at least temporarily.² However, as the market is corrected or developed, internal differences become more apparent as time advances. If so, individuals do not always bear or receive the marginal cost or benefit, respectively, of each action, thus jeopardizing the cooperative equilibrium (Lopez and Spreen, 1985; Staatz, 1989).

¹ The first three problems relate to the equity problem, while the latter two relate to the agency problem.

² Hansmann (1999) discussed the importance of homogeneity, as well as the danger of heterogeneity, though not in the context of market correction or market development.

Generally, property rights problems arise in response to internal or external change, thus affecting the compatibility of the organizational form to the internal and external environment. Specifically, change facilitates a rise in transaction cost as coordination of the constrained input-output process has become different. By extension, the increase in transaction cost implies a reduction in the relative optimality or efficiency of the cooperative mode of organization (Williamson, 1991). Comparatively, however, its optimality or efficiency may or may not continue to be superior relative to alternative modes of organization. Regardless, in order to remain optimal or efficient in the future, the cooperative mode of organization must address each problem appropriately to reduce transaction cost.

The primary purpose of the present article is to introduce the concept of tinkering, defined as the adaptation of operational and constitutional rights, policies, and practices to adjust member interests and objectives, and the concept of reinventing, defined as the adaptation of organizational scope or purpose to align actions (coordination) to interests (cooperation). Together, tinkering and reinventing help explain how farmer cooperatives survive and succeed in the economic environment. The article advances important and complicated work by Cook (1995), who first connected all five property rights problems in farmer cooperatives, as well as Cook and Iliopoulos (1998), who discussed both generic and specific solutions to the five property rights problems. As compared to past work, the present article (i) elaborates by better separating and connecting internal and external adaptation in the context of the cooperative equilibrium, (ii) expands by considering not only the adaptation of policies and procedures, but also the adaptation of constitutional rights, and (iii) enlightens by using secondary case study evidence for each proposed solution.

ECONOMIC ADAPTATION

First-order economizing, or effective adaptation to the economic environment, is what Williamson (1991) considered to be the primary objective of economic organization. He referred to both Barnard (1938) and

Hayek (1945), who placed emphasis on two different types of economic adaptation. To Barnard (1938), the purpose of non-market arrangements is internal adaptation to differences in interpretations of and reactions to market signals. The consequence is failure of input coordination, which implies economic inefficiency or suboptimality. By contrast, Hayek (1945) focused on external adaptation, the processing of supply and demand changes in order to efficiently use the price mechanism. In the context of the economic organization, the two definitions or interpretations of economic adaptation are interrelated as imperfect alignment or coordination of inputs has a negative impact on the ability to collectively react to market conditions. Gulati et al. (2005) also regarded adaptation as the core theme of economic organization, defining the adaptive capacity of non-market arrangements as “the ability to generate coordinated and cooperative responses across procuring and supplying units to changes in exchange conditions”. The interrelationship of internal and external adaptation is obvious: every organization must have alignment of interests (cooperation) and actions (coordination).

Three types of adaptation exist for the cooperative mode of organization. The first type is tinkering, which is defined as the adaptation of operational and constitutional rights, policies, and practices to adjust member interests and objectives. The second type is reinventing, which is defined as the adaptation of organizational scope or purpose to align actions (coordination) to interests (cooperation). The third type is exit, which entails bankruptcy, liquidation, or conversion. The optimal type of adaptation is informed by economic efficiency, which mandates the chosen mode of organization to be the transaction cost minimizer, just as before. Thus, tinkering and reinventing are two types of adaptation to improve or restore optimality of the cooperative mode of organization by addressing the alignment of interests and actions, which corresponds to the interpretations of economic adaptation by Barnard (1938) and Hayek (1945), respectively. Moreover, both tinkering and reinventing relate to the property rights problems as outlined in the previous section. Meanwhile, exit implies an alternative mode of organization is characterized by greater relative optimality.

FREE RIDER PROBLEM

According to rational choice theory, individuals have no incentive to participate in the provision of a collective good (Olson, 1965). However, the “zero contribution thesis”, which mirrors the Nash equilibrium of the Prisoners’ Dilemma, is contradicted by many real-life examples of group action (Ostrom, 2000). But even when individuals have come together to pursue a common interest, there is no reason to assume the collective good is produced in an optimal or efficient manner. Indeed, a collective good is often non-rivalrous and non-excludable, which makes the good susceptible to free riders, individuals who consume but do not produce or provide.

Free riding also applies to collective action in agriculture (Vitaliano, 1983; Cook, 1995; Royer, 1999). For agricultural cooperatives, free riding can occur internally and externally. External free riding applies when non-members pay or receive the same price as members. Similarly, internal free riding applies when all members pay or receive the same price. Specifically, there are three variations of internal free riding. First, when new members pay or receive the same price as older members, so new members free ride on past investments.³ Second, when relatively small members pay or receive the same price as relatively large members, so small members free ride on large investments.⁴ Third, when single-purpose members of a multi-purpose cooperative pay or receive the same price as other single-purpose members.⁵ In each case the production of the collective good is suboptimal. A supply cooperative is not minimizing its input cost, and a marketing cooperative is not maximizing its output return. Consequently, member

³ For example, when the price received for one bushel of corn in the year 2015 is the same for the producer who joined in 2014 as for the producer who co-founded the cooperative in 2000 and has 15 years’ worth of investment in the organization.

⁴ For example, when the price per one liter of petroleum is the same for the member patron who purchases 100 liters as for the member patron who purchases 1,000 liters. Similarly, when the price per bushel is the same for the member patron who delivers 500 bushels of corn as for the member patron who delivers 5,000 bushels of corn.

patrons face disincentive to invest because returns are diluted by the noninvestment or relative underinvestment of internal and external free riders (Cook and Iliopoulos, 2000; Sykuta and Cook, 2001).

HORIZON PROBLEM

The agricultural cooperative is susceptible to two types of horizon problems: (i) the investment horizon problem, and (ii) the residual horizon problem (Ellerman, 1986). The first concerns the return of capital, which is the recovery of initial investments, and the second concerns the return on capital, which is the appreciation of initial investments. The next analysis emphasizes the residual horizon problem.

A residual horizon problem is applicable if the residual claim of a member patron on the income stream of an asset is shorter than the lifespan of the income stream (Porter and Scully, 1987). The member producer will have disincentive to invest because part of the return on investment is beyond the claim right. For example, a hog producer cooperative may invest in product development. The income stream of the new product is projected to have a ten-year lifespan, but the member patron will only patronize the cooperative for five more years. Part of the return on investment will therefore be reaped by other member patrons from years six through ten. The horizon problem breeds a preference for “current cash flow at the expense of future earnings” (Staatz, 1987). Member patrons who have retirement on the horizon will be relatively uninterested in investing in long-term growth opportunities, in particular such activities as research and development (Cook, 1995). In efforts to extract member equity, exiting member producers may pursue an increase in patronage refund or even full dissolution of the cooperative.

Of course, the residual horizon problem is theoretically most applicable to relatively old member patrons. Discrepancies in the claims and life spans of income streams are problematic for the cooperative if the

⁵ For example, when the return on equity is the same for milk producers and coffee producers who patronize a multi-purpose cooperative with a single patronage pool.

majority of equity or control is held by relatively old member patrons. However, age is not the only factor of relevance. According to Staatz (1987), the horizon problem is exacerbated by five conditions: “1) the per-member capital invested in the cooperative is large, 2) the cooperative has a closed membership, 3) few of the member firms are legally incorporated, 4) the intergenerational transfer of membership within families is prohibited, and 5) the cooperative has a large, diverse membership.”

PORFOLIO PROBLEM

When ownership is tied to patronage, the risk attitude of a member patron may not correspond to the risk attitude of the cooperative, which is problematic if ownership is non-transferable and tied to patronage (Jensen and Meckling, 1979; Vitalicano, 1983; Porter and Scully, 1987; Cook, 1995). The portfolio problem ensues because a liquid secondary market for ownership is nonexistent. For most cooperative modes of organization, member patrons cannot sell or trade ownership to align risk at the farm level and the cooperative level. Under- or overinvestment is often reality for member patrons. If underinvested, a member patron likely has a preference for risky activities for which the return and the variance is relatively high, and if overinvested, a member patron likely has a preference for safe activities for which the return and the variance is relatively low.

As argued by Plunkett (2005), the matter of risk attitudes and risk preferences has close relation to the matter of specialization at the farm level and diversification at the cooperative level. When member patrons of one commodity prefer to not invest in another commodity, a cooperative has a lateral portfolio problem, which is rooted in the perception the investment is an off-farm investment. In such case, diversification is perceived to have no direct positive impact on the farm, which typically is the greatest asset to member patrons. Of importance here is the cooperative purpose: defense or offense. A defense-oriented cooperative is owned and controlled to protect the farm assets of member producers (Plunkett and Cook, 2006). As such, diversification at the cooperative level is deemed incompatible with asset

protection or asset development at the farm level. However, when a market is corrected or developed and becomes competitive, the return on farm assets may decrease. Consequently, increasing the return on cooperative assets is perhaps desirable in the future economic environment.

When member producers prefer not to make investments in the value chain of the same commodity, a cooperative has a vertical portfolio problem (Plunkett, 2005). Similar to the lateral portfolio problem, a member patron may not desire forward integration as the investment is used to benefit the co-operative and not the farm. For example, vertical integration by a soybean cooperative allows access to the processing margin or the distribution margin or the retail margin. However, assets and resources at the processing level (conditioners, extractors, hoisters), the distribution level (containers, trucks, warehouses), and the retail level (stores, brands, designs) are likely to be owned by the cooperative, which implies the return on investment only reaches the member patron via future refunds. As such, the vertical portfolio problem is likely more applicable to relatively large member producers who generate a higher return on farm assets than cooperative assets. By contrast, the financial flexibility of relatively small member producers is low, which facilitates a preference for cooperative asset investments over farm asset investments.

The portfolio problem is obvious in comparison to the stock market, where wealth holders can align asset portfolios to risk preferences. Relatively risk averse investors choose portfolios with a relatively low yet stable return, while relatively risk neutral investors choose portfolios with a relatively high yet volatile return. Hence, a wealth holder is theoretically never under- or overinvested. The return-variance combination of the optimal portfolio is always tangent to the indifference curve. By comparison, the situation of the member patron is different as the portfolio is given and not chosen. In case of member under- or overinvestment, a cooperative must adjust its assortment of assets and resources so the return-variance combination of its portfolio is tangent to the indifference curve of its member patrons.

Altogether, if ownership is non-transferable and tied to patronage, the investment decision is not truly a decision as the member patron has no choice to invest or not to invest.

CONTROL PROBLEM

The control problem, as described by Jensen and Meckling (1979), Staatz (1987), and Cook (1995), is almost analogous to the agency problem, which concerns the principal-agent relationship (Jensen and Meckling, 1976). The agency relationship, which involves the separation of finance and management or the separation of control and ownership by transferring at least part of effective control to the agent, has two dimensions in the cooperative: (i) between the members and the board of directors, and (ii) between the members (or board of directors) and the managers.

At the essence of the agency relationship, asset control is delegated by the asset owner to the non-asset owner, who contractually agrees to pursue maximization of some sort for the asset owned. However, assuming bounded rationality and contractual incompleteness, the principal is constrained by hidden information as well as hidden action. Ex ante, the principal faces the adverse selection problem as the maximization objective of the principal may not correspond to the maximization objective of the agent. Ex post, the principal faces the moral hazard problem as the maximizing action of the agent may not correspond to the maximizing action for the principal.

INFLUENCE PROBLEM

Another growth-related problem for the agricultural cooperative is the influence problem, which arises when decision making is inefficient in terms of distributing costs and benefits to members (Milgrom and Roberts, 1990; Cook, 1995). Bogetoft and Olesen (2007) argued the influence problem is caused by sales decisions in cooperatives whose member producers are heterogeneous in terms of interests and activities.

When the distribution of costs and benefits is believed to be unfair or disproportional, member producers will, if possible, engage in influence activities to change the thinking and acting of board members, as well as the thinking and acting of other member patrons. Pozzobon et al. (2012) characterized such activities as part of the decision making process. Examples are when member patrons lobby for the return of allocated equity, the divestment of a subsidiary, or the segregation of capital.

The range of influence activities, which give rise to influence cost or political cost, can also be interpreted as intrafirm rent seeking (Milgrom and Roberts, 1992; Meyer et al., 1992).⁶ Overall, influence costs can be placed in five categories: “(1) opportunity costs of cooperative stakeholders’ time, (2) costs of monitoring and enforcing decisions that create quasi-rents, (3) coordination and measurement costs associated with delayed decisions, (4) costs of wrong or no decisions, and (5) costs associated with policies designed and implemented to avoid influence costs” (Milgrom and Roberts, 1992). This definition implies a strong correlation with the control problem, which may or may not be a necessary condition for the influence problem to exist. Overall, assuming optimality or efficiency in the first state, influence cost renders the provision of the collective good suboptimal or inefficient.⁷

TINKERING

Property rights problems in cooperative modes of organization are inevitable. Changes in the internal and external environment expose and exacerbate the incompleteness of property rights to bundles of assets and resources, thus decreasing the relative optimality or efficiency of the ownership structure and the governance structure. The success and survival of the cooperative is jeopardized by the rising agency and transaction cost. The formal response is tinkering, which is here defined as the adaptation of operational

⁶ The influence problem is related to the cost of diversity, as discussed by Rajan et al. (2000).

⁷ See Iliopoulos and Hendrikse (2009) for a meta-analysis of case studies on the influence problem in agricultural cooperatives.

or constitutional rights, policies, and practices to adjust member interests and objectives. Another interpretation of tinkering is the adjustment of intra-cooperative relationships, or the adjustment of member interrelationships so as to promote the cooperative equilibrium (Lopez and Spreen, 1985). Thus, to be clear, the objective of tinkering is to adjust member interests and objectives within the parameters of common interests or objectives, as manifested in the actions and strategies of the cooperative. The implied mechanism of tinkering is the decrease in the incompleteness of property rights to bundles of assets and resources, which facilitates *ex ante* investment and *ex post* rent protection to be improved simultaneously. Operational and constitutional rights, policies, and practices are often specified in the bylaws and articles of incorporation. However, relevant detailed information is often contained or added in the supply or marketing agreement. As discussed in detail hereafter, tinkering can take many forms and shapes (see Table 2). For clarification, the adjustment of rights and the adjustment of policies and practices are discussed separately.

TINKERING: ADJUSTMENT OF OPERATIONAL AND CONSTITUTIONAL RIGHTS

The primary motivation for the adjustment of operational and constitutional rights is the equity constraint (Richards and Manfredo, 2003; Chaddad and Cook, 2004; Van der Krogt et al., 2007). To be competitive in the economic environment, cooperatives need financial flexibility to cover short- and long-term liabilities, to make short- and long-term investments in assets and resources, and to withstand market volatility and uncertainty. The equity constraint is particularly relevant to the long-term growth of the cooperative. Given the equity constraint, a cooperative can only purchase so many inputs and produce so many outputs. Hence, to improve its growth potential, there are two possibilities to loosen the equity constraint in relation to its structure: (i) adaptation of the ownership structure via the reconfiguration of

claim rights (Chaddad and Cook, 2004; Cook and Chaddad, 2004), and (ii) adaptation of the governance structure via the reconfiguration of control rights (Bijman et al., 2013; Chaddad and Iliopoulos, 2013).⁸

To reconfigure claim rights, a cooperative must consider the following claim rights characteristics: ownership of common stock, proportionality of equity and patronage, share transferability among members, share transferability among members and non-members, share appreciability, equity redeemability, subsidiary organization(s), ownership in subsidiary organization(s), upfront capital contribution, and membership openness. As summarized by Chaddad and Cook (2004) and Cook and Chaddad (2004), there exist multiple ownership structures with various configurations of such characteristics. For example, while the classical cooperative has a rigid ownership structure in which share transferability and appreciability are inhibited (Chaddad and Cook, 2004; Van Bekkum and Bijman, 2006), the proportional investment cooperative, the member investor cooperative, and the new generation cooperative have share characteristics which allow greater financial flexibility (see Figure 1). In particular the new generation cooperative, which is characterized by appreciable as well as non-redeemable equity, gained much academic attention in the mid- and late 1990s (Harris et al., 1996; Cook and Iliopoulos, 1999; Nilsson, 1999). As compared to the classical cooperative, its property rights structure is hypothesized to be better defined (Holland and King, 2004). One example of a new generation cooperative is U.S. Premium Beef, which began in 1997 with approximately 400 beef producers purchasing 691,845 common stock shares at \$55 per share (Carlberg et al., 2006).

Theoretically, financial flexibility is further improved in cooperative modes of organization for which ownership is not restricted to member patrons. One example is the participation shares cooperative or the investor-share cooperative, featuring a combination of members who receive net earnings on the basis of usage and investors who receive net earnings on the basis of shares (Nilsson, 1999; Chaddad and Cook,

⁸ Oftentimes, control is considered to be synonymous to ownership. In fact, Hansmann (1996) combined claim and control rights in his definition of ownership, which is not adopted in this article so as to better isolate the two types of organizational design adaptation.

2004). The addition of subsidiary joint-stock entities is common to so-called co-maker or subsidiary cooperatives (Nilsson, 1999; 2001). The subsidiary entity, whose ownership is a mixture of members and investors, is primarily used for value-added or non-member business.⁹ Contrary to the investor-share cooperative, non-member equity is not held inside the cooperative but instead in the subsidiary entity, which may be a joint venture, a trust company, or even a public company (Chaddad and Cook, 2004). If part of the cooperative or the subsidiary entity is traded on the public market, the cooperative is considered a hybrid listed cooperative (Van Bekkum and Bijman, 2006). In 1995, Pro-Fac became the first farmer cooperative with securities listed on the stock exchange (Henehan and Schmit, 2009). Class A cumulative preferred stock traded on NASDAQ until 2010 to increase liquidity of member equity. Similarly, in 1996 Saskatchewan Wheat Pool implemented a dual A-B share structure with the B shares listed on the Toronto Stock Exchange (Fulton and Larson, 2009). Each member patron received one A share worth C\$25. At C\$12 per share, the B shares represented the remainder of member equity. Arguably the best current example is CHS, which first issued preferred stock with a par value of \$25 per share on NASDAQ in 2003 (Goldberg and Preble, 2011).

For the cooperative mode of organization, the governance structure is most often conceptualized in terms of how real or effective control is allocated between member patrons, board directors, and senior managers. Chaddad and Iliopoulos (2013) and Bijman et al. (2013) discussed the few existing configurations of control rights in farmer cooperatives (see Figure 2). The traditional model is characterized by minimal separation of control and ownership as effective control is delegated to the board of directors, likely composed of member patrons with homogeneous opinions and interests. The interrelationship of the members, board members, and managers is different in the extended traditional model, the managerial model, and the corporate model, where each model is defined by greater separation

⁹ Subsidiary formation is not exclusive to the co-maker structure. However, the defining characteristic of the co-maker cooperative is combined member and investor ownership, not full member ownership as is applicable to other structures with vertical investment (Cook and Chaddad, 2004).

of decision management and risk bearing (Bijman et al., 2013).¹⁰ Reconfiguration of control rights is accomplished when real or effective control is reallocated between member patrons, board directors, and senior managers. One prime example of governance structure adaptation is given by Filippi et al. (2012) in the context of Süddeutsche Zuckerrüben-Verwertungsgenossenschaft (SZVG), which introduced a dual system of Class A and Class B shares, including the right to one and ten votes, respectively, in order to assign member control of Südzucker, the largest European sugar producer.¹¹ As the majority shareholder of the public Südzucker, SZVG thus ensured a minimal discrepancy in member and manager objectives.

TINKERING: ADJUSTMENT OF OPERATIONAL AND CONSTITUTIONAL POLICIES AND PRACTICES

Free Rider Problem

In response to the free rider problem, the cooperative can implement closed membership to prevent collective good consumption by producers who over-consume and under-produce (Cook and Iliopoulos, 1999; Sykuta and Cook, 2001).¹² However, a restrictive access policy may cause excessive taxation and under-inclusion of newcomers (Rey and Tirole, 2007). One example of closed membership is Organic Valley, which only accepted new membership applications in times of increased demand (Su and Cook, 2015). Free riding in multi-purpose cooperatives is addressed by means of separate base capital pools. The inability to implement a base capital pool for each separate activity or commodity is detrimental at the farm level and the cooperative level, as illustrated by Tri-Valley Growers, a Californian fruit canner which filed for bankruptcy in July 2000 in part because its fruit growers suffered long-term losses

¹⁰ In reality, governance is not quite as one- or two-dimensional as is portrayed in the literature. In addition to the aforementioned three dimensions, one can consider the proportionality of voting and patronage, board size, director independence, CEO independence, senior management team size, and board committees. However, such detailed conceptualization of the governance structure is not of primary interest here.

¹¹ Süddeutsche Zuckerrüben-Verwertungsgenossenschaft stands for South German Sugar Processing Cooperative.

¹² Closed membership is arguably the key characteristic of the new generation cooperative, as discussed by Cook and Iliopoulos (1999) and Nilsson (1999). Because of its closed membership, the new generation cooperative is hypothesized to offer greater incentive to invest member equity.

incurred in value-added tomato processing (Hariyoga and Sexton, 2009). Barton (2004) noted how separate base capital pools also address the intra-cooperative relationship of new and old member patrons. Following a merger with three local cooperatives in the 1991-2003 period, Mid-Kansas Cooperative implemented three pools designated as Class B, Class C, and Class D common stock to preserve the existing fund of equity allocated to old members. A special or variable patronage structure may also alleviate free riding behavior by new member patrons. For example, after becoming the newest member of Producers Cooperative Oil Mill, an oilseed processing cooperative in Oklahoma, Plains Oilseed Products Cooperative only received retained patronage (stock) in lieu of cash patronage until its equity investment reached the same level as old member patrons (Kenkel and Holcomb, 2011). Other measures to combat the free rider problem are (i) dynamic upfront payments, which facilitate a threshold for newcomers (Rey and Tirole, 2007), (ii) delivery rights and obligations, which stipulate a minimum percentage of farm production to be delivered to the cooperative, (iii) intergroup competition, which spurs effort and cooperation (Van Dijk et al., 2001), and (iv) selective incentives, which reward cooperation and punish non-cooperation (Ertan et al., 2009). A good example of the latter method is provided by Reynolds (2010), who described how the California Pear Growers Association used a trigger strategy of collective bargaining termination if member deliveries fell below a specified threshold.

Horizon Problem

Addressing the horizon problem is complicated as age is not something to be circumvented. Enticing member patrons to invest in assets and resources for which the income stream is likely to extend beyond the residual claim is accomplished by facilitating exit payment or equity redemption (Fahlbeck, 2007; Olesen, 2007; Rey and Tirole, 2007).¹³ However, exit payment or equity redemption is not in the interest

¹³ Interestingly, Olesen (2007) went against the literature, using a formal framework to conclude the horizon problem is likely to cause over-investment and not under-investment if exit payment is facilitated. Also, Fahlbeck (2007) used survey data to determine the horizon problem is non-existent in Swedish cooperatives.

of existing or continuing member patrons, which is why “even the largest, most successful, and most financially sophisticated of American cooperatives often do not redeem equity in full upon retirement” (Hansmann, 1999). Furthermore, Hansmann (1999) cautioned full equity redemption may facilitate a slippery slope if the exit payment is more valuable than continued membership in the cooperative. Equity redemption in practice is discussed by Chaddad and Boland (2007) for Cooxupe, a Brazilian coffee cooperative which stipulated equity to be redeemed in full within 36 months of exit or retirement. However, equity redemption is not necessarily straightforward. For example, Cenex Harvest States (CHS) demonstrated creativity in its equity redemption plan by allowing equity to be redeemed in the form of transferable and appreciable shares of preferred stock, thus appeasing both continuing and discontinuing member patrons (Goldberg and Preble, 2011).

Portfolio Problem

Regarding the portfolio problem, facilitating a better alignment of risk attitudes at the farm level and the cooperative level is accomplished by various methods. At the farm level, member producers can pursue risk diversification by means of crop or commodity diversification. However, because investment at the farm level is typically constrained, risk diversification is more logical and practical at the cooperative level. First, the cooperative can form subsidiaries, joint ventures, alliances, or partnerships to construct a diverse portfolio of assets and resources.¹⁴ For example, Henehan and Schmit (2009) discussed how Pro-Fac facilitated opportunities for its member patrons to become investors in a separate legal entity formed to finance and organize the processing of its raw member supplies. Another example is Horizon Milling, a flour milling joint venture created by CHS and Cargill in 2001 (Goldberg and Preble, 2011). The joint venture facilitated risk diversification for the member patrons, who supplied 50% of the wheat and 95% of the durum purchased by Horizon Milling. Hedging and price forwarding are two other methods of risk

¹⁴ However, such activity or formation may constitute reinventing and not tinkering if the organizational scope or purpose is adapted.

management (Cook and Iliopoulos, 1998). Regardless, any form of tinkering cannot hope to facilitate a perfect alignment as member patrons have dynamic, heterogeneous risk attitudes.

Control Problem

There is much literature on the solving of the control problem, or more commonly the agency problem in relation to the firm. There are two stylized approaches to facilitating a better alignment of interests in the principal-agent relationship. First, the principal can reduce the degree of bounded rationality or imperfect information by designing a more complete contract.¹⁵ Under uncertainty, there is no shortage of formal solutions with fee schedules and incentive schemes in optimal input and output-based contracts (Ross, 2004; Coles et al., 2006; Frydman and Saks, 2010). Second, the principal can improve interest alignment by monitoring the agent, including such activities as measuring output performance, apportioning rewards, observing input behavior, giving assignments or instructions, and revising and terminating contracts.

Confronted by the increasing size and spread of its member producers, New Zealand dairy cooperative Fonterra formed a shareholders' council to better monitor performance (Goldberg and Porraz, 2003). The council, which counted 45 councilors elected by the shareholders, appointed the valuer and the milk commissioner to ensure full independent member representation. However, sometimes a single change is not sufficient to address the control problem, as described by Park and Siebert (2010) in the context of Pedernales Electric Cooperative (PEC). Facing the negative scrutiny of its member patrons and even Texas state legislators, PEC implemented significant reform to its governance system during the 2007-2009 period by reducing the board size from 17 to seven, eliminating the nomination committee, adopting an open records and meetings policy, implementing live streaming of board meetings, and adopting a

¹⁵ A contract is optimal where the marginal benefit of adding a contingency is equal to the marginal cost of the contingency times its likelihood.

whistleblower policy, all in efforts to improve interest alignment in the member-director and member-manager relationships.

Influence Problem

How the adapting of operational or constitutional practices and policies can reduce the severity of influence activities is relatively unexplored in the literature. The cooperative can reduce influence activities by changing the channels of communication between member patrons and board directors, as well as between member patrons and managers. Milgrom and Roberts (1988; 1990) discussed the feasibility of closing or limiting communication by decentralizing the process of decision making, which is accomplished by the addition of committees or hierarchies (Inderst et al., 2007), as in federated cooperatives. Another possibility is to encourage influence activities during annual meetings or via member relations departments.

Generally, as explained at the beginning of the section, tinkering is used to adjust member interests and objectives. More specifically, tinkering has two underlying objectives: (i) to ease member equity acquisition and improve financial flexibility, which relates to the equity problem, or (ii) to adjust member control and improve alignment of farm-level and cooperative-level objectives, which relates to the agency problem. In doing so, relative optimality of the cooperative mode of organization is improved or restored. Tinkering is accomplished without changing the organizational scope or purpose, which implies the economic justification and the organizational design of the cooperative are not reformulated. However, tinkering may not prove to be a long-term solution, but rather a prelude to more tinkering or reinventing.

REINVENTING

While tinkering addresses intra-cooperative relationships to better pursue the cooperative equilibrium, member interests and objectives may still not be in alignment to actions and strategies. Put differently, despite internal alignment of member interests and common interests, coordination of the input-output process is at times unbalanced by external change. Hence, a cooperative may consider reinventing, which is defined as the adaptation of organizational scope or purpose to adjust the alignment of actions (coordination) to interests (cooperation). Specifically, reinventing involves the reformulation of actions and strategies. Again, secondary case study evidence is used to offer illumination.

If formed in response to a market failure, the cooperative is likely viewed as an extension of the farm, a single-purpose organization which minimizes the cost of input or maximizes the return on output for its member patrons (Cook et al., 2004). The cooperative is not operated to maximize profit or minimize cost at the cooperative level, but rather to maximize farmer or member welfare. If the local or regional market is characterized by market failure or imperfect competition, the cooperative is rooted in a collective need for defense or survival. As Cook and Plunkett (2006) noted, the objective of the classical cooperative is to “defend the economic position of the patron relative to upstream or downstream transactors.” Altogether, the economic purpose of the classical cooperative is to set a benchmark for the monopolist or monopsonist in the sector or industry, to force honesty (Hogeland, 2006).¹⁶ More generally, the purpose is to decrease the market price of inputs or to increase the market price of outputs.

¹⁶ From the perspective of microeconomics, the economic purpose of the cooperative is market equilibration, which is oft-discussed in the context of entrepreneurship in Austrian economics (Kirzner, 1997). The attempt to make the monopolist or monopsonist honest can be interpreted as moving the market toward equilibrium. The entrance of the cooperative forces all business entities in the sector or industry to behave more competitively. Altogether, the sequence is part of the process of dynamic competition, for which the outcome is market equilibrium or, more realistically, a less severe form of disequilibrium. The equilibrative process is spurred by entrepreneurial action or discovery: the seizing of opportunities for profit, the exploiting of differences in the prices of today and tomorrow. While the role of the firm is not a major topic of discussion in Austrian economics, entrepreneurship is not the sole territory of individuals. Indeed, operating a cooperative is not only collective action but also collective entrepreneurship if rent generation is the primary objective (Cook and Plunkett, 2006). As such, the offense-oriented cooperative is characterized by profit seeking behavior.

Blue Diamond (almonds), Growmark (supply), Northwest Dairy Association (milk), South Dakota Wheat Growers (grain), and Sunkist (citrus) are some of many examples of current U.S. farmer cooperatives with a history of market failure correction or missing market development. However, a look at the current landscape is indicative of how many cooperatives are seemingly not seeking to set benchmarks for non-cooperatives. On the contrary, many cooperatives are apparently in pursuit of market domination (Cook, 1995). Examples of offense-oriented cooperatives with large market shares are CHS (mixed), Dairy Farmers of America (milk), Land O' Lakes (butter), Ocean Spray (cranberries), and United Sugars Corporation (sugar). The general success of the cooperative form is also evident at the aggregate level: between 2000 and 2013 total revenue of all agricultural cooperatives rose from \$120.7 billion to \$246.1 billion, an annual increase of almost 8%, far surpassing the GDP growth rate (USDA, 2014).

Over time, the cooperative ability to protect or advance member welfare is increased by means of decreasing agency cost and transaction cost. In certain situations, the defense-oriented cooperative may translate its bundle of property rights to assets and resources to become offense-oriented, which implies a change in organizational purpose. While the defense-oriented cooperative is engaged in price correcting, the offense-oriented cooperative is engaged in price taking or even price setting. Put differently, at the foundation, market rent protection is the primary purpose of the defense-oriented cooperative, and market rent extraction of the offense-oriented cooperative. Considering the traditional role of cooperatives, a defense-to-offense transition may seem counterintuitive, but in addition to the possibility of better protecting farm-level assets, there is another possible explanation: according to microeconomic theory, firm-like or even monopolistic behavior is facilitated by the possibility of scale economies. Hence, defense-to-offense transition by cooperatives is possibly a necessary consequence of average cost minimization. Of course, a similar explanation is offered by transaction cost theory, which sees organizational modes as transaction cost minimizers, whether market or hybrid or hierarchy. As such, if economic theory is assumed to be a reliable predictor of economic organization, then adaptation of

organizational scope or purpose may be motivated by the offense-oriented cooperative being the optimal mode of organization.

There is no shortage of case study evidence of reinventing. For example, in 2002 New Zealand dairy cooperative Fonterra formed an alliance with Nestle to expand into North, Central, and South America (Goldberg and Porraz, 2003). As Fonterra supplied the expertise and Nestle the branding and the infrastructure, the companies had equal stakes in the alliance with a first-year turnover of \$1.4 billion. Kennelly and Bailey (2007) described how Agri-Mark, a regional dairy marketing cooperative in New England, completed a fundamental change in 1992 by merging with Cabot Creamery, a Vermont cooperative with milk and cheese processing facilities. Later, in 2003, Agri-Mark also purchased McCadam cheese and its manufacturing plant in Chateaugay, New York. Goldberg and Preble (2011) wrote about CHS, traditionally a regional multi-purpose cooperative which began its global expansion in 2001 by establishing its first international grain marketing office in Brazil around 2001. Soon after, CHS expanded to East Europe to become not just international but also global, which constituted a significant change in purpose. In the Netherlands, Bijman et al. (2012) described how Cebeco, traditionally a supply cooperative, expanded into food processing in the 1980s. Considering the small domestic market of the Netherlands, Cebeco simultaneously intended to go international. As part of its new purpose, Cebeco purchased companies with value-added operations in potato processing. Finally, Südzucker, owned by German sugar producers, expanded into bioethanol production in 2005 (Filippi et al., 2012). After establishing the first plant in Zeitz, Germany, in 2006 Südzucker proceeded to build ethanol facilities in Austria, Belgium, France, and Hungary to gradually become the European market leader.

EXIT

In addition to tinkering and reinventing, another possibility is to exit in response to rising agency and transaction cost. There are three types of exit: (i) conversion, (ii), liquidation, and (iii) bankruptcy.

Emphasis is placed on conversion and liquidation as bankruptcy is assumed to be self-explanatory.¹⁷ In each case, the cooperative is assumed to no longer be the optimal mode of organization.

“The true place of the cooperative is that of economic architect, not commercial Napoleon” (Nourse, 1942). The quote captures the neoclassical sentiment of cooperatives having a yardstick objective in the economy, nothing more and nothing less. Harte (1997) echoed Nourse by stating “a point may be reached when co-operative enterprises attain a level of development and complexity where further progress can be best achieved under a corporate organisation form”. However, there is limited evidence to support the notion cooperatives cede to non-cooperatives once a benchmark is set. Of 314 U.S. cases of cooperative restructuring during the 1989-1998 period, only 4.8% involved the acquisition of cooperative assets and resources by firms (Mooney and Gray, 2002). In fact, the acquisition of firm assets and resources by cooperatives accounted for a much greater percentage (16.6%) of all restructuring (Mooney and Gray, 2002).¹⁸ Indeed, cooperative conversion is seldom (Chaddad and Cook, 2004; 2007).¹⁹ In observation of the few conversions since the early 2000s, Battilani and Schroter (2012) remarked how “[m]ember heterogeneity and suboptimization of multiple objectives appear to have been influential in this decision-making process. Ownership rights were misaligned with use, control, investment incentives, and benefit distribution.”

When is conversion or liquidation the appropriate response to degeneration? In a meta-analysis of case studies on conversions and restructurings by U.S. agricultural cooperatives, Fulton and Hueth (2009) identified a few common causes: (i) low capital, (ii) book value and market value discrepancy, (iii) post-

¹⁷ Chaddad and Cook (2007) discussed the few large agricultural cooperatives which filed for bankruptcy in the 2000s, including Tri Valley Growers, Agway, and Farmland Industries. In each case, member heterogeneity is observed to a contributing factor. Other recent bankruptcies are Associated Wholesalers and Universal Cooperatives, both in 2014.

¹⁸ Intra-cooperative restructuring, which is indicative of reinventing, is most common (36.6%).

¹⁹ Examples of cooperative conversion are American Rice Growers Association in 1988 and Capitol Milk Producers in 1988 (Collins, 1991). More recent examples are South Dakota Soybean Processors in 2002, FCStone in 2004, and Diamond Walnut Growers in 2005 (Fulton and Hueth, 2009).

merger monopolistic market structure, (iv) poor management, and (v) structural inefficiency. Each cause is related to one or more property rights problems, which underlines the applicability of transaction cost theory and property rights theory to the life cycle model from birth to death. Specifically, conversion or liquidation implies the cooperative mode of organization is no longer optimal or efficient (Battilani and Schroter, 2012). Following the emergence of property rights problems, the cooperative is no longer the organization which minimizes the cost of transacting, no longer the organization which maximizes the difference between ex ante specific investment and ex post rent protection, and no longer the organization which attributes the most value to the bundle of property rights to assets and resources.

Because of decreased membership and increased consolidation at the processor stage, profitability of dairy marketing cooperative Cass-Clay had been declining for some time (McKee and Boland, 2007). Consequently, Cass-Clay management perceived a misalignment of its actions and strategies to member interests and objectives. Thus, in 2006, Cass-Clay sold all its assets to Associated Milk Producers, Inc., a regional dairy processing cooperative in New Ulm, Minnesota, to guarantee the economic livelihood of its former member patrons. As discussed by Fulton and Larson (2009), in 2006 Saskatchewan Wheat Pool became a federal corporation under the Canada Business Corporation Act, which caused a change in the legal interpretation of its structure. A year later, Saskatchewan Wheat Pool took over Agricore United and continued as Viterra, a privately held grain handler, thus ending its long-time existence as a farmer cooperative. Finally, as told by Stofferahn (2010), in 2004 member patrons of South Dakota Soybean Processors (SDSP) approved the reorganization of the cooperative into a limited liability company (LLC). As compared to the cooperative, the LLC structure facilitated an internal and external market for ownership, thus improving financial flexibility. Identical to the previous two examples, the reorganization implied a loss of relative optimality for the cooperative mode of organization.

SUMMARY AND CONCLUSION

For a relatively long time, researchers have acknowledged the incompleteness of the property rights structure in traditional farmer cooperatives. The free rider problem, the horizon problem, the portfolio problem, the control problem, and the influence problem are subjected to much conjecturing, but proposed solutions are few and far between, which is in part explained by the complexity of the concept, as well as the general unavailability of cooperative data. The present article therefore attempted to advance discussion of the constrained input-output process in context of the cooperative equilibrium, thus highlighting the necessary balance of individual member objectives and collective actions at the foundation of all farmer cooperatives.

Such balance is achieved by tinkering, defined as the adaptation of member interests and objectives, as well as reinventing, defined as the adaptation of organizational scope or purpose to align actions (coordination) to interests (cooperation). As illustrated by secondary case study evidence, tinkering and reinventing in part explain how farmer cooperatives survive and succeed in the economic environment. In all likelihood, farmer cooperatives tinker and reinvent frequently in order to improve or restore the balance in pursuit of the cooperative equilibrium. However, such dynamic behavior is seldom observed as cooperative data is not available in abundance, thus emphasizing the great importance of continued case study research on the cooperative mode of organization.

Of course, the ultimate objective is to inform or inspire an econometric model with performance as the criterion, where the exact nature of performance varies (Soboh et al., 2009). Ideally, it will be possible to spot property rights problems as well as the precursors to property rights problems. In order to do so, tinkering and reinventing will likely have to inform a farmer cooperative life cycle model which considers the full birth-to-death trajectory (Cook, 1995). Overall, better understanding of the dynamic balance of actions and objectives may prevent what happened to American Rice Growers in 1988, Diamond Walnut Growers in 2005, and Associated Wholesalers in 2014, thus preserving and strengthening the cooperative nature of economic organization in much of agriculture.

REFERENCES

- Barnard, C. (1938). *The Functions of the Executive*. Cambridge, MA: Harvard University Press.
- Barton, D. G. (2004). A comparison of traditional and newly emerging forms of cooperative capitalization. In *NCR-194 Research on Cooperatives Annual Meeting*. Kansas City, Missouri.
- Barton, D. G. (2009). FCStone conversion to a public corporation. *Journal of Cooperatives*, 23, 183-202.
- Battilani, P., & Schröter, H. G. (2012). Demutualization and its problems. In *The cooperative business movement, 1950 to the present*. Cambridge University Press.
- Bijman, J., Hendrikse, G., & Oijen, A. (2013). Accommodating two worlds in one organisation: Changing board models in agricultural cooperatives. *Managerial and Decision Economics*, 34(3-5), 204-217.
- Bogetoft, P., & Olesen, H. B. (2007). Sales distortion in heterogeneous cooperatives. In *Vertical Markets and Cooperative Hierarchies* (pp. 213-223). Springer Netherlands.
- Carlberg, J. G., Ward, C. E., & Holcomb, R. B. (2006). Success factors for new generation cooperatives. *International Food and Agribusiness Management Review*, 9(1), 33-52.
- Chaddad, F. R., & Boland, M. (2007). *Cooxupe and the world coffee industry: strategies to increase producer income*. Sao Paulo, Brazil: IBMEC.
- Chaddad, F. R., & Cook, M. L. (2004). Understanding new cooperative models: an ownership-control rights typology. *Applied Economic Perspectives and Policy*, 26(3), 348-360.
- Chaddad, F. R., & Cook, M. L. (2007). Conversions and other forms of exit in US agricultural cooperatives. In *Vertical markets and cooperative hierarchies* (pp. 61-72). Springer Netherlands.
- Chaddad, F., & Iliopoulos, C. (2013). Control rights, governance, and the costs of ownership in agricultural cooperatives. *Agribusiness*, 29(1), 3-22.
- Coles, J. L., Daniel, N. D., & Naveen, L. (2006). Managerial incentives and risk-taking. *Journal of Financial Economics*, 79(2), 431-468.

- Collins, R. A. (1991). The conversion of cooperatives to publicly held corporations: a financial analysis of limited evidence. *Western Journal of Agricultural Economics*, 16(2), 326-330.
- Cook, M. L. (1995). The future of US agricultural cooperatives: A neo-institutional approach. *American Journal of Agricultural Economics*, 77(5), 1153-1159.
- Cook, M. L., & Chaddad, F. R. (2004). Redesigning cooperative boundaries: The emergence of new models. *American Journal of Agricultural Economics*, 86(5), 1249-1253.
- Cook, M. L., Chaddad, F. R., & Iliopoulos, C. (2004). Advances in cooperative theory since 1990: A review of agricultural economics literature.
- Cook, M. L., & Iliopoulos, C. (1998). Solutions to property rights constraints in producer-owned and controlled organizations: prerequisite for agri-chain leadership. In *Proceedings of the Third international Conference on Chain Management in Agribusiness and the Food Industry* (pp. 541-553). Ede, the Netherlands.
- Cook, M.L., & Iliopoulos, C. (1999). Beginning to inform the theory of the cooperative firm: emergence of the new generation cooperative. *The Finnish Journal of Business Economics*, 4(99), 525–535.
- Cook, M. L., & Iliopoulos, C. (2000). Ill-defined property rights in collective action: the case of US agricultural cooperatives. In *Institutions, contracts, and organizations: Perspectives from new institutional economics*, 335-348.
- Cook, M. L., & Plunkett, B. (2006). Collective entrepreneurship: an emerging phenomenon in producer-owned organizations. *Journal of Agricultural and Applied Economics*, 38(2), 421-428.
- Ellerman, D. P. (1986). Horizon problems and property rights in labor-managed firms. *Journal of Comparative Economics*, 10(1), 62-78.
- Ertan, A., Page, T., & Puterman, L. (2009). Who to punish? Individual decisions and majority rule in mitigating the free rider problem. *European Economic Review*, 53(5), 495-511.
- Fahlbeck, E. (2007). The horizon problem in agricultural cooperatives. In *Vertical Markets and Cooperative Hierarchies* (pp. 255-274). Springer Netherlands.

- Filippi, M., Kühl, R., & Smit, A. B. (2012). *Support for farmers' cooperatives: internationalisation of sugar cooperatives: Cosun, Südzucker/Agrana, Tereos*. Wageningen, the Netherlands: Wageningen UR.
- Foss, K., & Foss, N. J. (2005). Resources and transaction costs: How property rights economics furthers the resource-based view. *Strategic Management Journal*, 26(6), 541-553.
- Frydman, C., & Saks, R. E. (2010). Executive compensation: A new view from a long-term perspective, 1936–2005. *Review of Financial Studies*, 23(5), 2099-2138.
- Fulton, M. E., & Hueth, B. (2009). Cooperative conversions, failures and restructurings: an overview. *Journal of Cooperatives*, 23, 1-11.
- Fulton, M. E., & Larson, K. A. (2009). The restructuring of the Saskatchewan Wheat Pool: overconfidence and agency. *Journal of Cooperatives*, 23, 1-19.
- Goldberg, R. A., & Porraz, J. M. (2003). Fonterra: taking on the dairy world. *Harvard Business School Case 903-413*. Cambridge, MA: Harvard University Press.
- Goldberg, R. A., & Preble, M. (2011). CHS Inc.: cooperative leadership in a global economy. *Harvard Business School Teaching Note 911-418*. Cambridge, MA: Harvard University Press.
- Gulati, R., Lawrence, P. R., & Puranam, P. (2005). Adaptation in vertical relationships: Beyond incentive conflict. *Strategic Management Journal*, 26(5), 415-440.
- Hansmann, H. B. (1996). *The organization of enterprise*. Cambridge, MA: Harvard University Press.
- Hansmann, H. B. (1999). Cooperative firms in theory and practice. *LTA*, 48(4), 387-403.
- Hariyoga, H., & Sexton, R. J. (2009). The rise and fall of Tri Valley Growers Cooperative. *Journal of Cooperatives*, 23, 87-100.
- Harris, A., Stefanson, B., & Fulton, M. (1996). New generation cooperatives and cooperative theory. *Journal of Agricultural Cooperation*, 11, 15-28.
- Hart, O., & Moore, J. (1990). Property rights and the nature of the firm. *Journal of Political Economy*, 98(6), 1119-1158.
- Harte, L. N. (1997). Creeping privatisation of Irish co-operatives: A transaction cost explanation. In *Strategies and structures in the agro-food industries* (pp. 31-53). Van Gorcum.

- Hayek, F. A. (1945). The use of knowledge in society. *American Economic Review*, 35, 519-530.
- Henehan, B. M., & Schmit, T. M. (2009). Serving member interests in changing markets: a case study of Pro-Fac Cooperative. *Journal of Cooperatives*, 23, 53-70.
- Hogeland, J. A. (2006). The economic culture of US agricultural cooperatives. *Culture & Agriculture*, 28(2), 67-79.
- Holland, S. J., & King, R. P. (2004). Trading mechanisms for new-generation cooperative stock: The architecture of organizational formation and demise. *American Journal of Agricultural Economics*, 86(5), 1262-1268.
- Iliopoulos, C., & Hendrikse, G. (2009). Influence costs in agribusiness cooperatives: evidence from case studies. *International Studies of Management & Organization*, 39(4), 60-80.
- Inderst, R., Müller, H. M., & Wärneryd, K. (2007). Distributional conflict in organizations. *European Economic Review*, 51(2), 385-402.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360.
- Jensen, M. C., & Meckling, W. H. (1979). Rights and production functions: an application to labor-managed firms and codetermination. *Journal of Business*, 52(4), 469-506.
- Kenkel, P., & Holcomb, R. B. (2011). Producers Cooperative Oil Mill: a case study in strategic planning for a cooperative. *Journal of Cooperatives*, 25, 82-96.
- Kennelly, J.J. & Bailey, S. (2007). Got milk? Agri-Mark and the U.S. dairy industry. *Case Research Journal*, 27(2), 45-75.
- Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35(1), 60-85.
- Lopez, R. A., & Spreen, T. H. (1985). Co-ordination strategies and non-members' trade in processing cooperatives. *Journal of Agricultural Economics*, 36(3), 385-396.
- Mahoney, J. T. (2005). *Economic foundations of strategy*. Sage Publications.

- McKee, G., & Boland, M. (2008). Cass-Clay Creamery: a new direction for an old brand. *Journal of Cooperatives*, 21, 1-14.
- Meyer, M., Milgrom, P., & Roberts, J. (1992). Organizational prospects, influence costs, and ownership changes. *Journal of Economics & Management Strategy*, 1(1), 9-35.
- Milgrom, P., & Roberts, J. (1988). An economic approach to influence activities in organizations. *American Journal of Sociology*, S154-S179.
- Milgrom, P., & Roberts, J. (1990). Bargaining costs, influence costs, and the organization of economic activity. In *Perspectives on Positive Political Economy*, (pp. 57-89). Cambridge, MA: Cambridge University Press.
- Mooney, P. H., & Gray, T. W. (2002). Cooperative conversion and restructuring in theory and practice.
- Nilsson, J. (1999). Co-operative organisational models as reflections of the business environments. *The Finnish Journal of Business Economics*, 4(99), 449-470.
- Nilsson, J. (2001). Organisational principles for co-operative firms. *Scandinavian Journal of Management*, 17(3), 329-356.
- Nourse, E. G. (1942). The place of the cooperative in our national economy. *Journal of American Cooperation*, 1945, 33-39.
- Olesen, H. B. (2007). The horizon problem reconsidered. In *Vertical markets and cooperative hierarchies* (pp. 245-254). Springer Netherlands.
- Olson, M. (1965). *The logic of collective action: Public goods and the theory of groups*. Cambridge: Harvard University Press.
- Ostrom, E. (2000). Collective action and the evolution of social norms. *The Journal of Economic Perspectives*, 14(3), 137-158.
- Park, J. L., & Siebert, J. (2010). Rebuilding cooperative leadership: the case of Pedernales Electric Cooperative. *Journal of Cooperatives*, 24, 63-79.
- Plunkett, B. (2005). *The portfolio problem in agricultural cooperatives: an integrated framework*. Doctoral dissertation, University of Missouri-Columbia.

- Porter, P. K., & Scully, G. W. (1987). Economic efficiency in cooperatives. *Journal of Law and Economics*, 30(2), 489-512.
- Pozzobon, D. M., Zylbersztajn, D., & Bijman, J. (2012). How can cooperatives reduce democratic costs without incurring excessive agency costs? *Journal of Rural Cooperation*, 40(2), 119-144.
- Rajan, R., Servaes, H., & Zingales, L. (2000). The cost of diversity: the diversification discount and inefficient investment. *Journal of Finance*, 55, 35–80.
- Rey, P., & Tirole, J. (2007). Financing and access in cooperatives. *International Journal of Industrial Organization*, 25(5), 1061-1088.
- Reynolds, B. J. (2010). Choosing to defect from cooperation: the 2003 collapse of California Pear Bargaining. *Journal of Cooperatives*, 24, 44-62.
- Richards, T. J., & Manfredo, M. R. (2003). Cooperative mergers and acquisitions: The role of capital constraints. *Journal of Agricultural and Resource Economics*, 28(1), 152-168.
- Ross, S. A. (2004). Compensation, incentives, and the duality of risk aversion and riskiness. *The Journal of Finance*, 59(1), 207-225.
- Royer, J. S. (1999). Cooperative organizational strategies: A neo-institutional digest. *Journal of Cooperatives*, 14(1), 44-67.
- Sexton, R. J., & Iskow, J. (1988). *Factors critical to the success or failure of emerging agricultural cooperatives* (Vol. 88, No. 3). Division of Agriculture and Natural Resources, University of California.
- Sexton, R. J. (1990). Imperfect competition in agricultural markets and the role of cooperatives: A spatial analysis. *American Journal of Agricultural Economics*, 72(3), 709-720.
- Soboh, R. A., Lansink, A. O., Giesen, G., & Van van Dijk, G. (2009). Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice. *Review of Agricultural Economics*, 31(3), 446-469.
- Staatz, J. M. (1987). The structural characteristics of farmer cooperatives and their behavioral consequences. *Cooperative Theory: New Approaches*, 18, 33-60.

- Stofferahn, C. W. (2010). South Dakota Soybean Processors: the discourse of conversion from cooperative to limited liability corporation. *Journal of Cooperatives*, 24, 13-43.
- Su, Y., & Cook, M. L. (2015). Price stability and economic sustainability—achievable goals? A case study of Organic Valley. *American Journal of Agricultural Economics*.
- Sykuta, M. E., & Cook, M. L. (2001). A new institutional economics approach to contracts and cooperatives. *American Journal of Agricultural Economics*, 83(5), 1273-1279.
- United States Department of Agriculture (2014). Cooperative statistics, 2013. *Service Report 75*. Washington, D. C.: United States Department of Agriculture.
- Valentinov, V. (2007). Why are cooperatives important in agriculture? An organizational economics perspective. *Journal of Institutional Economics*, 3(01), 55-69.
- Van Bekkum, O., & Bijman, J. (2006). Innovations in cooperative ownership: Converted and hybrid listed cooperatives. In *7th international conference on management in agrifood chains and networks, Ede, The Netherlands* (Vol. 31).
- Van der Krog, D., Nilsson, J., & Høst, V. (2007). The impact of cooperatives' risk aversion and equity capital constraints on their inter-firm consolidation and collaboration strategies—with an empirical study of the European dairy industry. *Agribusiness*, 23(4), 453-472.
- Van Dijk, F., Sonnemans, J., & Van Winden, F. (2001). Incentive systems in a real effort experiment. *European Economic Review*, 45(2), 187-214.
- Vitaliano, P. (1983). Cooperative enterprise: an alternative conceptual basis for analyzing a complex institution. *American Journal of Agricultural Economics*, 65(5), 1078-1083.
- Williamson, O. E. (1991). Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quarterly*, 36(2), 269-296.

Table 1 Summary of Property Rights Problems

Property Rights Problem	Description
Free Rider Problem	Differences in the production and consumption of the collective good
Horizon Problem	Differences in the lifespan of claim rights and rent-generating assets
Portfolio Problem	Differences in risk preferences at the farm level and the cooperative level
Control Problem	Differences in the maximization parameters of members and managers
Influence Problem	Differences in realized and possible rent and cost distribution

Table 2 Overview of Tinkering Methods in Response to Property Rights Problems

Problem	Adaptation of Rights	Adaptation of Policies and Procedures
Free Rider	non-member ownership equity and patronage proportionality share transferability among members share transferability among members and non-members equity appreciability equity redeemability	closed membership upfront payment delivery rights and obligations separate base capital pools variable patronage refund structure selective incentives
Horizon	upfront capital investment threshold closed membership subsidiary formation	equity redeemability exit payment generational transferability
Portfolio		separate base capital pools joint ventures, alliances, and partnerships
Control	voting and patronage proportionality board size director independence management team size	fee schedules contractual incentives monitoring variable or proportional voting structure
Influence	manager independence CEO independence board committee formation	decentralized decision making annual meeting participation member relations department

Figure 1 Taxonomy of Ownership Structures for Cooperative Modes of Organization

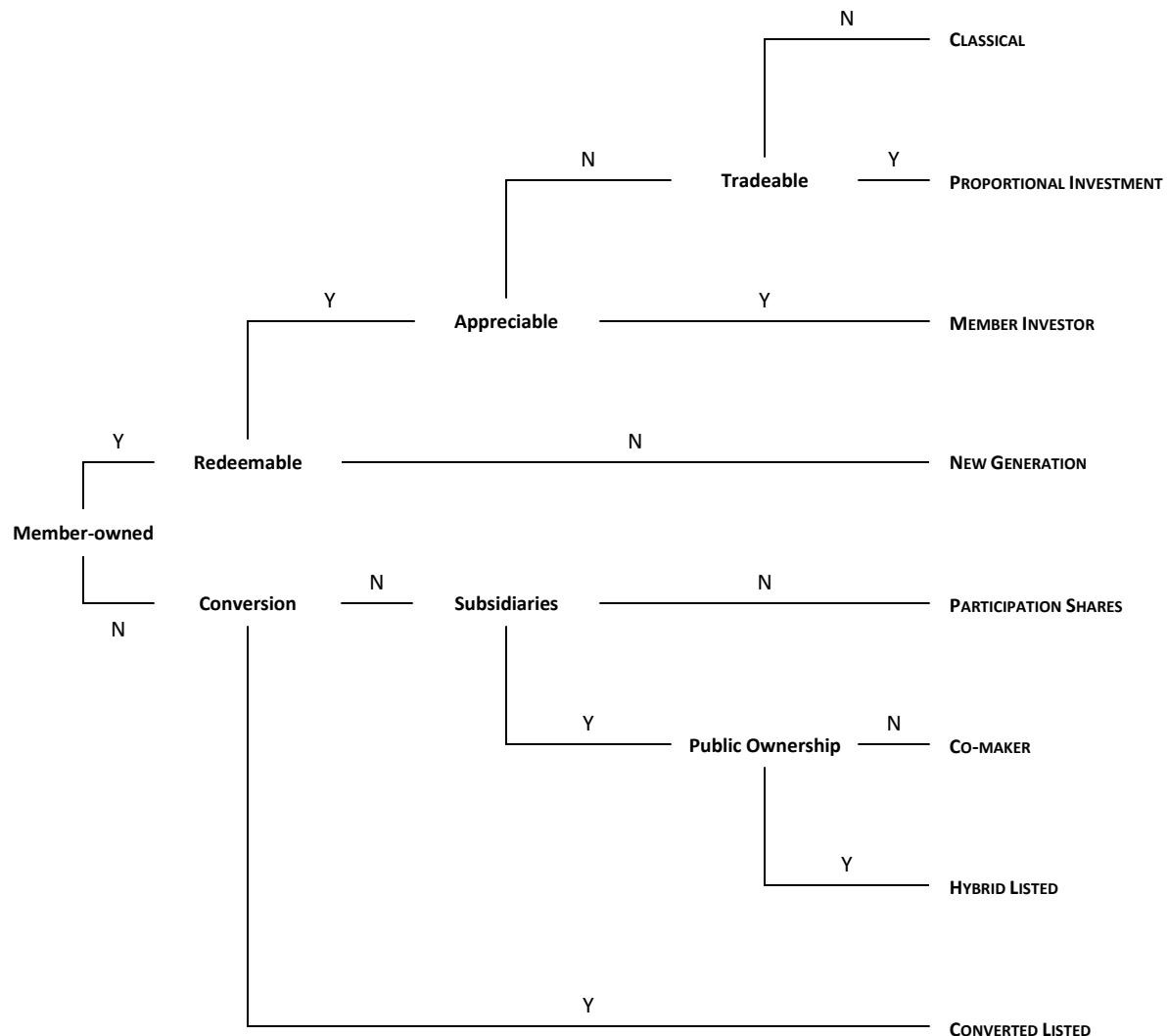


Figure 2 Taxonomy of Governance Structures for Cooperative Modes of Organization

