

# Farmer Cooperatives as Systems of Attributes: An Analysis of Ownership and Investment Complementarities

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**Abstract** The long-term economic viability of the farmer cooperative mode of organization is often assumed to be jeopardized by an equity constraint. To inform possible solutions, the farmer cooperative is conceptualized as an independent firm comprising a system of attributes, thus facilitating a better understanding of the dual function of organized farm producers as both patrons and capitalists. We place emphasis on the hybrid assignment and configuration of claim rights to find possible complementarities between ownership and investment so as to loosen the equity constraint. Based on survey data on US farmer cooperatives, we analyze multiple configurations of membership access, ownership transferability, equity redeemability, preferred stock provision and ownership, and upfront capital contribution in relation to the desire to patronize and the obligation to capitalize the cooperative. Thus, we inform constitutional responses to rapid developments in the agri-food industry, which force farmer cooperatives to find additional equity for necessary growth in scale and scope.

## 1 Introduction

The rights to claim profits and the rights to control resources relate to the boundaries of the firm (Demsetz 1983). For the firm, its main characteristic is the dispersion of claim rights to capital suppliers and the delegation of control rights to decision specialists (Fama and Jensen 1983). The separation of control and ownership, or the separation of risk bearing and decision management, is therefore at its absolute in the firm. In general, shareholders claim income but do not participate in the day-to-day management of the business operations. Formal control is only exercised at annual meetings when voting on board proposals.

By comparison, the farmer cooperative is both owned and controlled by farm operators who act as its patrons as well as its capitalists. Traditionally, the rights to claim profits are nontransferable, non-appreciable, and redeemable (Chaddad and

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Cook 2004). Also, as opposed to the firm, the rights to control cooperatively owned assets and resources are only delegated to board directors, who are member patrons and also often serve as managers. Thus, the separation of control and ownership is often limited to its legal requirement.<sup>1</sup> Such a unique assignment and configuration of the rights to claim profits and control resources is characteristic of the classical cooperative (Chaddad and Cook 2004).

Over time, however, farmer cooperatives have made adaptations to the assignment as well as the configuration of claim and control rights, as documented by various researchers in Europe and North America. For example, Nilsson (2001) observed cooperatives with subsidiary organizations to spur growth in nonmember business, and Van Bekkum and Bijman (2006) discussed farmer cooperatives with nonvoting preferred stock to induce nonmember investment yet preserve member control of joint assets and resources. All such structures are considered to be hybrid modes of organization with market-like and hierarchy-like attributes (Menard 2007). In fact, considering the diversity in structure, Chaddad (2012) declared the cooperative the true hybrid mode of organization.

The hybrid character of the farmer cooperative is arguably best summarized in Cook and Chaddad (2004), who advanced a typology of ownership structures with claim rights as the basis. Including the classical cooperative, Cook and Chaddad (2004) identified eight common structures with various assignments and configurations of claim rights. However, the typology may not constitute an accurate portrayal of the current landscape as the agri-food industry is characterized by rapid evolution. For example, James et al. (2007) noted how increasingly more value is coordinated by means of nonmarket arrangements, which is related to increased concentration in the processing sector and particularly the retail sector (Sexton 2013; Katchova 2013). Further indication of the increased industrialization of US agriculture is the 4.3% decrease in farm operations and the 3.8% increase in average farm size between 2007 and 2012 (USDA 2014). Correspondingly, farmer cooperatives face pressure to consolidate as internal equity is not always sufficient for necessary growth in scale and scope (Briggeman et al. 2016).

As its current function is different as compared to one decade ago, the objective of the present chapter is therefore to further analyze the assignment and configuration of claim rights in farmer cooperatives so as to better understand the constitutional responses to dynamic agri-food market conditions. Considering the crucial importance of equity availability, we place primary emphasis on the formal interrelationship of ownership and investment as organized farm producers both patronize and capitalize the cooperative. In doing so, we conceptualize the cooperative as an independent firm comprising a system of attributes, including ownership, leadership, administrative control, incentive intensity, and others (Hendrikse and Veerman 1997; Feng and Hendrikse 2008; Makadok and Coff 2009; Chaddad 2012). We thus inform the ongoing discussion of the conceptual and theoretical interpretation of the cooperative as an extension of the farm, a coalition of

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<sup>1</sup>Cooperative law mandates the formation of a board of directors.

independent farm enterprises, or an independent firm. Our findings and conclusions may also inform cooperative policy in terms of the legal foundation of claim right configurations.

The chapter proceeds as follows. We give a brief literature review of comparative organization in Sect. 2, placing emphasis on hybrid modes of organization. In Sect. 3, we conceptualize the farmer cooperative as an independent firm comprising a system of attributes, which includes its own attributes in addition to complementary farm attributes. We do so to better understand the dual function of the member, who patronizes as well as capitalizes the cooperative. With emphasis on the interrelationship of ownership and equity investment, Sect. 4 reviews the observed claim rights assignments and configurations, and Sect. 5 uses survey data on US farmer cooperatives to inform a richer conceptualization of novel claim rights configurations. Section 6 relates the observations to an advanced interpretation of farmer cooperatives as systems of attributes, and Sect. 7 summarizes and concludes.

## 2 Hybrid Modes of Organization

Modes of organization can be positioned on a spectrum or continuum with the market and the hierarchy at the two extremes (Williamson 1991). The price mechanism serves as the defining characteristic of the anonymous spot market, offering buyers and sellers a strong incentive to exploit discrepancies in the prices of today and tomorrow. By comparison, the hierarchy, in which ownership of the rights to profits and resources of two or more organizations is combined in one, adapts to economic change with managed coordination. While the market and the hierarchy are polar opposites with unique combinations of mechanisms and instruments, hybrids are modes of organization for which subsets of assets, rights, and profits are shared by individuals and organizations (Ménard 2004, 2013). The hybrid is thus conceptualized as a market-like hierarchy or a hierarchy-like market or a mixture of competition and cooperation.

While the sole proprietorship and the firm are the stereotypical market and hierarchy representatives, respectively, there exist many examples of observed as well as unobserved hybrid organizations (Baker et al. 2008). For example, Makadok and Coff (2009) identified piece-rate employment, empowerment, and quasi-integration as nonmarket and non-hierarchy arrangements. Parmigiani and Rivera-Santos (2011) discovered other examples of prevalent hybrid arrangements, such as alliances, joint ventures, partnerships, licensing, franchises, networks, condominiums, trade associations, and consortia. In consideration of the great diversity in possible arrangements, Ebers and Oerlemans (2016) observed hybrid organizations do not necessarily combine market-like and hierarchy-like attributes, but may actually be characterized by an intermediate arrangement of such attributes as profit allocation, input sourcing, and asset investment.

While acknowledging its great diversity, Menard (2007) applied emphasis on one particular type of hybrid arrangement, namely, the cooperative mode of

organization. He again envisioned a spectrum, characterized at one end by cooperatives in which control and ownership are for the most part separated and at the other end by cooperatives with tight coordination of joint activities, such as the separation of low- and high-quality supply, the equity investment in asset growth, or the negotiation of pooled supply. Menard (2007) identified three pillars of hybrid cooperatives: (i) pooled resources; (ii) intra-cooperative contractual relationships, which are defined to various extents in the bylaws and the supply agreements; and (iii) competition parameters, which promote alignment of member objectives and joint strategies. Menard (2007) thus described hybrid cooperatives in terms of attributes but did not explicitly use the term system to emphasize complementarity.

### 3 Hybrid Systems of Attributes

Milgrom and Roberts (1990, 1994) first advanced the conceptualization of an economic organization as a system of attributes by emphasizing synergy or complementarity between activities. An organization is assumed to be composed of many activities or attributes, such as sourcing, financing, accounting, and manufacturing. The payoff associated with an attribute is dependent on its complementarity with other attributes, which intensifies the notion of a system (Milgrom and Roberts 1994). If complementary, the total economic value of two attributes is greater in combination than in isolation ( $\pi_{ab} > \pi_a + \pi_b$ ). Different attributes must thus be in alignment to ensure optimal performance. For example, complementarity is likely between invention and human capital yet not likely between product quality and piece-rate compensation. Altogether, when examining the boundaries of the firm, complementarity may explain the observed combination or system of activities. By extension, the concept of complementarities is useful to inform make-or-buy decisions and mergers and acquisitions (Brynjolfsson and Milgrom 2013).

Hendrikse and Veerman (1997) first approached the farmer cooperative mode of organization as a system of attributes, which Feng and Hendrikse (2008) later refined. In their framework, the cooperative is conceptualized as an independent firm collectively owned and controlled by individual farm producers who are its patrons and its capitalists. Similar to Menard (2007), the cooperative is comprised of multiple attributes, including its commodity pooling arrangement, its price-quality schedule, and its patronage refund policy, and each individual member farm is also comprised of a system of attributes. The boundaries of the cooperative thus include its own attributes as well as the complementary farm attributes of its member patrons (Feng and Hendrikse 2008). For example, a grain marketing cooperative is characterized by closed membership, a quality premium, and exclusive supply agreements with diversified member producers, many of whom also supply a local dairy cooperative and a livestock marketing firm. In theory, each member maximizes the payoff associated with joint attributes, which in turn facilitates a spillover effect on the other attributes (Baker et al. 2008).

In contrast to Feng and Hendrikse (2008), Makadok and Coff (2009) extended the system of attributes theory to an analysis of hybrid organizations. Specifically, Makadok and Coff (2009) dismissed the hybrid mode of organization as a two-dimensional construct, instead offering a taxonomy with authority, ownership, and incentive intensity as the three dimensions. Examples given are networks, partnerships, joint ventures, and cooperatives, which did not feature as the main focus. By contrast, Chaddad (2012) did specifically study the cooperative mode of organization in terms of its attributes, placing emphasis on bargaining associations, marketing cooperatives, and so-called new generation cooperatives. For example, the marketing cooperative is described as having market-like attributes such as strong incentive intensity and autonomous adaptation and hierarchy-like attributes such as formal authority and central administration. In observing the great diversity in structures and attributes, Chaddad (2012) declared the cooperative the true hybrid mode of organization. In the process he thus combined two similar conceptualizations of the cooperative firm, one concentrating on comparative organization (hybrids) and the other on complementary rights, assets, and payoffs (systems of attributes).

#### **4 Cooperative Modes of Organization: A Claim Rights Approach**

A specific emphasis on claim rights is warranted as the long-term economic viability of the farmer cooperative mode of organization is believed to be jeopardized by an inherent equity constraint (Cook 1995). Specifically, Richards and Manfredo (2003) claimed the equity constraint is the primary cause of mergers and acquisitions by farmer cooperatives, and Van der Krogt et al. (2007) also concluded the preference for mergers, partnerships, and joint ventures in the cooperative sector is motivated by insufficient access to equity. Similarly, Chaddad et al. (2005) empirically tested the financial constraint hypothesis and concluded investment is very much dependent on the availability of internal equity, which is an important observation as Baarda (2006) and Briggeman et al. (2016) each discussed how new capital requirements for cooperative growth in scale and scope put pressure on the ownership structure. As such, emphasis is placed on two specific attributes of the cooperative: ownership and equity investment incentives.

The base case is the classical cooperative, which is characterized by the full restriction of ownership to individuals who are its patrons and capitalists (Van Bekkum and Bijman 2006). Put differently, the farm producers who supply the cooperative with equity and patronage have full formal control and ownership, although real control is at least delegated to board directors. In addition, shares of the classical cooperative are non-tradable, non-appreciable, and redeemable, which imposes a hard limit on member equity investment. The classical structure is most

applicable to small local supply and marketing cooperatives, such as collectively owned grain elevators.

Over time, many cooperatives have adapted the ownership structure of the classical cooperative, seemingly in response to the equity constraint (Chaddad and Cook 2004). One example is the proportional investment cooperative (PIC), in which equity and patronage proportionality is supposed to limit the relative over- or underinvestment of member patrons (Chaddad and Cook 2004). Proportionality of patronage and equity investment is best accomplished via a base capital plan, although over- or underinvestment is also at times treated by facilitating an inside market for equity. Altogether, improvement in financial flexibility is likely only marginal as member equity is still redeemable and non-appreciable.

Another configuration of the ownership structure is the member-investor cooperative, which distributes net earnings on the basis of share ownership, not patronage.<sup>2</sup> Hence, each member patron is considered an investor, akin to a firm shareholder (Nilsson 1999). Of course, the member-investor cooperative is not traded on the stock exchange, and outside ownership or investment is not allowed. In addition to common stock, member investment is facilitated by such financial instruments as participation units, capital units, and preferred stock (Chaddad and Cook 2004). The appreciability of shares, including bonus shares and participation unit shares, serves as motivation to retain equity for future growth opportunities.

Theoretically, even greater financial flexibility is achieved in the new generation cooperative (NGC), which features both transferable and appreciable shares (Harris et al. 1996; Cook and Iliopoulos 1999; Nilsson 1999). Similar to the member-investor cooperative, member patrons can thus align risk portfolios to risk preferences by buying or selling ownership if the perceived risk of equity investment in the cooperative is relatively low or high, respectively. Two other characteristics, closed membership and a relatively high upfront capital requirement, have an ambiguous impact on financial flexibility. As an ownership right is synonymous to a delivery right and supply is controlled by marketing agreements (Chaddad and Cook 2004), the NGC structure is likely to support a relatively small, homogeneous group of large producers. As noted by Baarda (2006), NGCs are active in swine processing, pasta production, beer manufacturing, ethanol production, and other agri-food sectors.

The equity constraint is further loosened in cooperative modes of organization in which ownership is not restricted to member patrons. One example is the participation shares cooperative or the investor-share cooperative, featuring a combination of member patrons who receive net earnings on the basis of patronage and investors who receive net earnings on the basis of equity (Nilsson 1999; Chaddad and Cook 2004). Thus, the defining characteristic of the participation shares cooperative is the presence of nonmember equity inside the cooperative. The equity

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<sup>2</sup>Confusingly, Nilsson (1999) applied the term member-investor cooperative to the new generation cooperative and the public limited company. In the present chapter, member investor is defined as in Chaddad and Cook (2004).

is invested by means of preferred stock, nonvoting common stock, and participation unit shares, which are accessible to any investor, including member patrons and other cooperatives (Chaddad and Cook 2004). The participation shares cooperative is thus analogous to the member-investor cooperative, except ownership in the cooperative is open to outside investors.

The addition of subsidiary joint-stock entities is common to so-called comaker 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 nonmember business.<sup>3</sup> The subsidiary thus serves as a complementary activity, such as dairy product manufacturing, to the core activity of the cooperative, such as raw milk marketing. Contrary to the investor-share cooperative, nonmember equity is not held inside the cooperative but instead in the subsidiary entity, which may be a joint venture, a partnership, a trust company, or even a public company (Chaddad and Cook 2004). Thus, the organizational form of the subsidiary entity may or may not correspond to the organizational form of the cooperative itself. In fact, in many instances the subsidiary entity is a limited liability company (LLC) so as to separate member and investor objectives (Lund 2013). If the subsidiary entity is traded on the public market, the cooperative is considered a hybrid listed cooperative (Van Bakkum and Bijman 2006).

A different legal entity is manifested in the limited liability cooperative, also called a public limited company (Harte 1997; Nilsson 1999), which is almost analogous to the LLC structure.<sup>4</sup> The creation of the limited liability cooperative is spurred by state legislature.<sup>5</sup> Similar to the NGC structure, each owner is primarily considered an investor, which implies ownership is both transferable and appreciable. A key difference is the possibility of outside ownership, which is not necessarily public in character. In fact, the organization is only considered a cooperative if its suppliers hold majority ownership. Thus, there exist two types of stock owners: member patrons and member investors. In addition to dynamic ownership, the structure of the limited liability cooperative is defined by proportionality of control to investment, not patronage, similar to the proportional cooperative. Baarda (2006) argued the LLC structure poses a viable long-term alternative to the cooperative mode of organization, yet Lund (2013), who used the term limited cooperative association, observed a low adoption rate as member-patron and member-investor preferences often conflict.

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<sup>3</sup>Subsidiary formation is not exclusive to the comaker structure. However, the defining characteristic of the comaker cooperative is combined member and investor ownership, not full member ownership as is applicable to other structures with vertical investment (Cook and Chaddad 2004).

<sup>4</sup>In reference to Südzucker, the German sugar producer, Filippi et al. (2012) used the term cooperative investor-owned firm to describe its ownership structure. Südzucker is traded on the public market, but majority ownership is held by Süddeutsche Zuckerrübenverwertungsgenossenschaft (SZVG), the sugar producer cooperative.

<sup>5</sup>For example, see the Wyoming Processing Cooperative Statute, the Minnesota Cooperative Associations Act, the Iowa Cooperative Associations Act, and the Tennessee Processing Cooperative Law.

The most radical adjustment to the ownership structure of the classical cooperative is the converted listed cooperative, whose ownership is traded on the stock exchange (Chaddad and Cook 2004; Van Bekkum and Bijman 2006). Individual, unorganized farm producers are now just suppliers or customers of the organization, which is no longer user-owned, user-controlled, or user-benefited. Recent examples of such conversions are South Dakota Soybean Processors in 2002, FCStone in 2004, and Diamond Walnut Growers in 2005 (Fulton and Hueth 2009).

## 5 A Richer Conceptualization of Claim Right Configurations

The above description and categorization of claim rights assignments and configurations is based on the combination of seven dimensions: ownership of common stock, equity and patronage proportionality, ownership transferability among members, equity appreciability, equity redeemability, subsidiary organization(s), and ownership of subsidiary organization(s). However, there are other dimensions to be considered, including but not limited to ownership transferability among members and nonmembers, equity redemption period, preferred stock provision and ownership, membership access, and upfront capital contribution. Together, these dimensions inform the tension between patronizing and capitalizing the cooperative. Supported by survey data on 371 US farmer cooperatives, the next section describes each dimension and its importance to the interrelationship of ownership and member equity investment.<sup>6</sup>

### 5.1 *Membership Access*

One of the main characteristics of the classical cooperative is open membership, which in most instances is attained by means of patronage in addition to some equity investment. The member patrons of a supply cooperative are primarily farm producers who buy seed, fertilizer, and other inputs. For a marketing cooperative, its member patrons are primarily farm producers who supply raw agricultural commodities, such as corn, milk, livestock, or fruits and vegetables. Membership implies ownership, which is manifested by (i) the right to claim profits, and (ii) the right to control resources (Chaddad and Cook 2004; Baker et al. 2008). In case of the marketing cooperative, membership is also often evidenced by a supply, delivery, or marketing agreement, which solidifies the transactional nature of the member-cooperative relationship.

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<sup>6</sup>For a full description of the survey data, see Grashuis and Cook (2017).



The membership policy of the cooperative is important as open access facilitates free riding (Cook 1995). Specifically, new members can free ride on past investment by old members, in particular if equity is non-appreciable. If free riding is applicable, member patrons face disincentive to invest equity as the future payoff to farm attributes shared in the cooperative is diluted by the noninvestment or relative underinvestment of free riders (Cook and Iliopoulos 2000; Sykuta and Cook 2001). A relatively recent response to the free rider problem is the implementation of closed membership to prevent inclusion of farm producers who over-consume or under-produce.<sup>7</sup> In our sample, 133 of the 371 respondents (36%) do not have open membership access (see Table 1). However, such a restrictive access policy may cause excessive taxation and under-inclusion of newcomers with severe business and antitrust consequences (Rey and Tirole 2007). As exhibited by Organic Valley, closed access is also possible on an ad-hoc basis to respond to market supply and demand fluctuation (Su and Cook 2015).

In addition to the free rider problem, open access also facilitates an adverse selection problem in terms of product quality. Mérel et al. (2009) examined the impact of heterogeneous product quality for the farmer cooperative, where heterogeneity is apparent in land quality, operator skill, technology, and other characteristics and less apparent in free riding behavior in the open access cooperative. Because of heterogeneity in product quality, the cooperative is expected to be less competitive in the differentiated product market as the firm is the recipient of high-quality supply (Mérel et al. 2009). After making similar observations, Deng and Hendrikse (2013) advocated for partial pooling with variable price structures, which serves as incentive for high-quality producers to supply the cooperative (Liang and Hendrikse 2016). Subsequently, Mérel et al. (2015) investigated the optimal pooling ratio based on ex ante heterogeneity in member characteristics. A stable solution is available if risk aversion is not too low and member heterogeneity is not too high, which implies a narrow margin for incentivizing member equity investment.

## 5.2 *Equity Redemption Date*

While conceptualization of equity redeemability is often binary, much more intuition is required for its practical implementation. Equity redemption is standard practice in the classical cooperative, but the actual date or period of redemption is variable. Considering the vast heterogeneity in member preferences and joint strategies, it is not surprising to observe wide variation in the survey responses. While 194 of our 371 respondents do not redeem equity, the remaining 177 do but

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<sup>7</sup>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.

**Table 1** Claim rights configurations of surveyed US farmer cooperatives

Claim rights characteristic	Definition	% of respondents
Common stock ownership	Closed to outside investors	96%
	Open to outside investors	4%
Equity-patronage proportionality	No	52%
	Yes	48%
Ownership transferability	No	89%
	Yes, among members	9%
	Yes, among members and nonmembers	2%
Equity appreciability	No	91%
	Yes	9%
Equity redeemability	No	55%
	Yes, within 0–5 years	5%
	Yes, within 6–10 years	9%
	Yes, within 11–15 years	10%
	Yes, after 16 or more years	20%
Preferred stock provision	No	65%
	Yes, to members	35%
	Yes, to members and nonmembers	9%
Membership access	Open	64%
	Closed	36%
Upfront capital contribution	No	44%
	Yes, a nominal amount below \$1000	42%
	Yes, a nominal amount above \$1000	4%
	Other	10%
Subsidiary formation	No	75%
	Yes, with member ownership	21%
	Yes, with dual ownership	4%

use different return windows. Twenty cooperatives redeem equity within 0–5 years, while 74 wait 16 or more years.

In practice, cooperatives redeem and invest equity by means of (i) the revolving fund financing system or (ii) the base capital plan system. In the revolving fund financing system, the oldest member equity is redeemed and replaced by new member equity, which is often based on patronage. In the base capital plan system, equity is redeemed or invested if the amount is above or below the desired share of total equity (Baarda 2006). Examples of cooperatives with a base capital plan are Coulee Region Organic Produce Pool (CROPP), Riceland, Land O'Lakes, and Dairy Farmers of America (Chaddad and Cook 2004). In practice, however, a combination of both systems is possible (Lund 2013).

The matter of equity redemption is related to the horizon problem, which applies 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). If so, the member patron has disincentive to invest because part of the return on investment is beyond the claim right. Generally, the horizon problem inspires a preference for “current cash flow at the expense of future earnings” (Statz 1987). Member patrons with a horizon problem will be relatively uninterested in investing in long-term growth

opportunities, in particular such activities as research and development, if the revolvment period is too long (Cook 1995). Such member patrons may pursue an increase in patronage refund or even full dissolution of the cooperative. Similarly, Baarda (2006) described the horizon problem as the equity redemption problem, noting how the situation is exacerbated by retired farm producers whose equity is still in the cooperative. As such, the cooperative may instead consider an exit payment. Altogether, the cooperative must find a balance between preferences for equity redemption at the farm and equity retention in the cooperative.

### ***5.3 Ownership Transferability***

In addition to equity investment and equity redemption, another mechanism to align risk preferences to risk portfolios is ownership transferability, which in part defines the NGC structure. Non-transferability of ownership is in particular problematic in case of equity and patronage proportionality, which facilitates a portfolio problem (Porter and Scully 1987; Cook 1995). The portfolio problem is probable when a liquid secondary market for ownership is nonexistent. As in the classical cooperative, ownership cannot be sold or traded to facilitate risk alignment, which implies under- or overinvestment. 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. Interestingly, only 9% and 2% of our survey respondents report the use of ownership transferability among members and among outside investors, respectively. As such, an internal market for ownership is rarely facilitated.

### ***5.4 Preferred Stock Provision and Ownership***

In addition to common stock ownership and retained patronage, a cooperative may use other financial instruments to attain member or nonmember equity. Arguably the most common financial instrument to induce member as well as nonmember investment inside and outside the cooperative is preferred stock, which is typically nonvoting (Lund 2013). In addition, the return to preferred stock is proportional to capital investment, and preferred stock carries a senior claim on assets and dividends. As preferred stock at times involves a redemption date, it is not always considered to be permanent equity. As indicated by the survey data, 35% of the respondents have issued preferred stock, and 9% issued preferred stock to outside investors. When preferred stock is owned by nonmember patrons, the cooperative has two objectives: (i) generating a return on patronage and (ii) generating a return on investment. Perhaps the most prominent example of preferred stock provision by any farmer cooperative is CHS, which first listed preferred stock on NASDAQ in

2003 (Goldberg and Preble 2011). However, as the return to dividends is by law capped at 8%, public interest in preferred stock in farmer cooperatives is often not high enough to pursue a time- and cost-consuming public listing (Lund 2013).

### ***5.5 Upfront Capital Contribution***

As indicated by the survey data, 56% of the farmer cooperatives require an upfront capital contribution, which is synonymous to a one-time membership fee. However, in most instances the nominal contribution is less than \$1000 (42%). The main reason behind the upfront contribution is to secure startup capital (Lund 2013). For example, a marketing cooperative must invest in storage capacity in order to handle member supply. The necessity of an upfront contribution is even greater in case of vertical integration into processing or other value-added business activities. As opposed to the equity invested in relation to common or preferred stock ownership, the upfront contribution is nonrefundable or non-redeemable in most instances.

Similar to the concept of equity appreciability, the magnitude of the upfront capital contribution should be dynamic to reflect any decreases or increases in the value of the cooperative. If static, a \$100 membership fee is not the same in 2016 as compared to 1986, which implies new member patrons may free ride on past capital investment by old member patrons. Altogether, the exact impact of the upfront capital contribution on the interrelationship of ownership and equity investment is rather ambiguous as there are two opposing forces: (i) capital constitutes a barrier to entry at the farm level, yet (ii) startup capital is needed to fund business activities at the cooperative level.

## **6 Hybrid Systems of Attributes: Ownership and Investment Complementarity**

By conceptualizing the cooperative as an independent firm comprising a system of attributes, emphasis is placed on the complementarity between attributes of the farm and the cooperative. Here, specific attention is paid to the complementarity between the desire to patronize, which relates to certain attributes of the farm, and the desire to capitalize, which relates to certain attributes of the cooperative. Complementarity is not straightforward, however, as there exist many different assignments and configurations of claim rights, which influence the capital structure as well as the ownership structure of the cooperative. Correspondingly, as the optimal assignment and configuration of claim rights is dependent on multiple attributes of the farm as well as multiple attributes of the cooperative, there may exist multiple equilibria (Milgrom and Roberts 1994). At each equilibrium, there is assumed to be an optimal balance between the desire to patronize and the obligation

to capitalize the cooperative, which relates to its balance between individuality and communality (Puusa et al. 2016).

For example, free riding may warrant an upfront capital contribution or an exclusive supply agreement for member patrons to invest additional equity for nonmember business activities (Cook and Chaddad 2004). Similarly, closed membership may prevent dilution of average product quality, but so may the implementation of two commodity pools to separate low- and high-quality member supply, thus providing a price incentive for product differentiation if there is member interest in value-added business activity (Hovelaque et al. 2009). In terms of management, leadership is also important as an outside CEO is preferable to a member CEO when marginal productivities in upstream and downstream value chain segments are not complementary (Liang and Hendrikse 2013). Furthermore, in case of an outside CEO, remuneration should be in part based on member welfare parameters, and nonmember leadership must be supported by board directors who represent all member interests. As another example, risky nonmember business is arguably better organized in a subsidiary entity with an LLC structure for member ownership of preferred stock to be attractive (Lund 2013), although the same outcome is possible if equity is allowed to appreciate in value (Cook and Iliopoulos 2016). The cooperative may also consider faster revolvment of member equity or enable internal ownership transferability, particularly if investment in research and development is to be incentivized.

As illustrated by the examples in the previous paragraph, conceptualizing the cooperative as an independent firm comprising a system of attributes facilitates a clear emphasis on the tension between patronizing and capitalizing the cooperative. Said tension is encapsulated by the equity problem, which is driven by the free rider problem, the horizon problem, and the portfolio problem (Cook 1995). As such, lack of complementarity between attributes of the farm and attributes of the cooperative is in part caused by suboptimality in the assignment and configuration of claim rights. Such suboptimality may decrease the expected complementarity between, for example, corn production at the farm and ethanol production by the cooperative, thus preventing its combination. Consequently, as farmer cooperatives face pressure to grow in scale and scope (Briggeman et al. 2016), approaching the cooperative as an independent firm comprising a system of attributes is thus useful to inform constitutional responses for long-term survival and success (Grashuis and Cook 2016; Cook and Iliopoulos 2016).

Of course, complementarity between attributes of the farm and attributes of the cooperative is only productive if there is also complementarity between attributes of the cooperative. It is therefore important to consider the interrelationships of leadership, strategic orientation, personnel, administration, governance, and other attributes which in part define the boundaries of the cooperative (Chaddad 2012). Specifically, a member CEO is likely optimal if the cooperative places emphasis on commodity market access as opposed to differentiated product development (Liang and Hendrikse 2013). Alternatively, in case of an outside CEO, if the cooperative is pursuing a higher margin by means of product differentiation, specific investment in human capital for market research and product development is likely necessary if

the market-oriented strategy is to be successful (Benos et al. 2016). Regardless of CEO identity, leadership must be supported by board directors who possess relevant industry knowledge in order to evaluate strategic decisions and recommendations, which may require directorship by decision specialists who are not member patrons. Also, as in any other organization, formal systems and processes must be in place to allow efficient communication between managers, directors, administrators, advertisers, and other employees to improve coordination across various attributes of the cooperative.

## 7 Summary and Conclusion

Skepticism of the long-term economic viability of the cooperative mode of organization in the agri-food industry has warranted new attention to its hybrid structure. To begin, we conceptualized the farmer cooperative as an independent firm to better describe its hybrid arrangement of various attributes. By focusing on the assignment and configuration of rights to claim profits, we placed specific emphasis on ownership and equity investment to inform constitutional responses to rapid developments in the agri-food industry, which force farmer cooperatives to find additional equity for future growth in scale and scope. While consideration of claim right configurations is not necessarily new, we considered characteristics which are often omitted in the analysis of joint ownership by organized farm producers. Supported by survey data on 371 US farmer cooperatives, we analyzed the possible configurations of membership access, equity redemption date, ownership transferability, preferred stock provision and ownership, and upfront capital contribution. In doing so, we informed possible complementarities between attributes of the farm and attributes of the cooperative in terms of ownership and equity investment. Moreover, we formed recommendations to help farmer cooperatives and its member patrons find a balance between the desire to patronize and the obligation to capitalize.

While we believe our research contributes to the literature on cooperative finance and ownership, there remain many open questions. For example, to what extent is member equity investment driven by adaptations to claim rights? What other attributes impact member equity investment? Should cooperative policy address challenges to the survival of the cooperative mode of organization? What is the relationship of organizational design to organizational purpose? How many different hybrid cooperatives exist? Future research is therefore recommended to direct attention toward (i) the causal impact of various claim right characteristics on the dual responsibility of member patrons to both patronize and capitalize the business, (ii) the complementarity between farm attributes and control right configurations, (iii) the relative optimality of different hybrid arrangements within the farmer cooperative sector, and (iv) the complementarity between claim and control right configurations. Such research is expected to help ensure the continued existence of farmer cooperatives with long histories in the agri-food industry.

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