Cooperative organizations as an engine of equitable rural economic development

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ABSTRACT

Cooperatives represent an alternative to large-scale corporate farms as well as to independent unaffiliated small private farms. This article presents a comparative modeling narrative on cooperative organizational forms' potential impact on equitable rural development. This speaks to issues of both increasing the size of the economic pie and how this income is distributed. The case is made that cooperatives can potentially generate higher rates of growth and more equitable growth, even in competitive economic environments. An important type of cooperative that is focused upon is one based on the linking of smaller farms into a cooperative. Economies of scale and scope as well in transaction costs can be captured by the cooperatives. Given cooperative governance, one would also expect higher levels of x-efficiency. Overall, cooperatives can generate relative high incomes to cooperative members, whilst remaining competitive with the traditional privately owned large farms. Critical to the success of the cooperative is a set rules and regulation that place them on a level playing field with the privately owned farm. In addition, the implementation and practice of cooperative principles are key to the success of the cooperative farm.

1. Introduction

Co-operative organizational forms represent an alternative to large-scale corporate farms and plantations as well as to independent unaffiliated small private farms. Co-operatives also represent an alternative to farmers as independent marketers of their products and purchasers of their inputs. This is analogous to the alternative provided by co-operatives, more generally, to traditional investor owned corporations. But what is unique to agriculture, especially in less developed economies, but also still somewhat the case in the more developed economies, is that small farms are of critical importance in agriculture whilst larger farm units often represent a competitive threat to relatively small independent family owned farms. Co-operatives represent a means to maintain the independence of these farms. At the same time, co-operatives provide the means for small farms to remain or become competitive through producing relatively efficiently in terms of high levels of productivity per unit of input and higher levels of quality per unit of output. An alternative means of

remaining competitive is for small farmers to cut their real income to keep costs and thereby prices down to competitive levels. But this would reduce the farm family's standard of living and potentially push the family into poverty.

An important issue raised in this article is to what extent are co-operatives substitutes for traditional investor-owned farms as productive and competitive economic entities? Related to this, can co-operatives provide an alternative to the larger investor-owned farms? Can agricultural co-operatives replicate or better the assumed competitive attributes of the larger investor-owned farms? Moreover, can agricultural co-operatives deliver on economic performance whilst generating higher levels of economic wellbeing to its members as compared to what's typically on offer in the larger investor owned farm in terms income and working conditions to employees? This would be apart from higher levels of social wellbeing that some might derive from being a member/owner of an economically productive and sustainable co-operative (IFAD, 2011).

It is also important to note the significance of cooperatives in agricultural sectors throughout the world in both developed and less developed economies (Altman, 2009a; ICA, 2014; United Nations, 2014). This speaks to the relative success of agriculture cooperatives, which requires explanation in face of the negative modeling scenarios and predictions flowing from standard economic theory. Estimates on the importance of agriculture cooperatives aren't

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unambiguously rigorous, but the available evidence suggests that such cooperatives are of importance to various economies' agricultural sectors. In many countries, including the United States, a large majority of farmers are members of agricultural cooperatives (ICA, 2014).

This article presents a comparative modeling narrative on the co-operative's organizational form compared to the investor-owned firm's (IOF) potential impact on equitable and sustainable rural development. This speaks to issues of both increasing the size of the economic pie and how this income is distributed. The focus here is on issues most pertinent to the agricultural sector and the co-operative farm in particular, but can be extended to supply and value added co-operatives and agricultural mutuals or credit unions, for example. These arguments build upon Altman (2001, 2002, 2006, 2009a, 2014), Ben-Ner and Jones (1995), Bonin, Jones, and Putterman (1993), Bowles and Gintis (2011), Chayanov (1991), Ellis and Biggs (2001), Gordon (1998), Leibenstein (1966), McCain (2008), Novkovic (2006, 2007), Schultz (1964), Sexton and Iskow (1993), and Williamson (2010).

It is critical to develop a modeling framework wherein one can articulate and specify the conditions under which different types of agricultural co-operatives can be sustainable in the economic realm, whilst meeting the social-economic objectives of members—where a key goal is often maintaining the economic viability and thereby the independence of the smallholder farmstead. A crucial point made in this article is that under reasonable assumptions and conditions agricultural co-operatives should be able to match the investor-owned firm in the economic domain. A co-operative also provides individuals with the opportunity to remain independent players (owners and core decision-makers) as opposed to being forced into becoming employees, often with little bargaining-power, in the investor owned farm. Related to this, co-operatives also provide smallholders with the opportunity to improve their level of material wellbeing by increasing their productivity and increasing their share of income from what it would be under traditional organizational forms.

2. What is a co-operative and co-operative governance?

Prior to a formal discussion of the potential role of agricultural co-operatives, it is important to briefly define what is a co-operative and what types of co-operatives tend to characterize the agricultural landscape. A co-operative organizational form has been defined, in its modern and operational form, flowing from the Rochdale Principles, articulated in 1844 by the Rochdale Society of Equitable Pioneers (a consumer co-operative) in Rochdale, England. This definition has been since modified by the International Co-operative Alliance, the international governing body of co-operatives. The original principles state (Rochdale Pioneers Museum, 2014):

- That capital should be of their own providing and bear a fixed rate of interest.
- That only the purest provisions procurable should be supplied to members.
- That full weight and measure should be given.
- That market prices should be charged and no credit given nor asked.
- That profits should be divided pro rata upon the amount of purchases made by each member.
- That the principle of 'one member one vote' should obtain in government and the equality of the sexes in membership.
- That the management should be in the hands of officers and committee elected periodically.
- That a definite percentage of profits should be allotted to education.

- That frequent statements and balance sheets should be presented to members.

The key point here is that the co-operative should be democratically governed and this should be translated into the economic realm. Revisions have been made to the principles, making the rules more flexible where the Rochdale rules were seen as potentially hindering economic performance. Even with the original principles, democratic governance is vested in a somewhat hierarchical structure that in effect reduces the transaction costs of governance—day-to-day decisions are not made by the collective, which would be a highly time-consuming and potentially economically inefficient process. Still, too often, the Rochdale rules of governance have been taken as the existing rules when co-operatives' governance structures are critiqued as being incompatible with both economic efficiency and economic effectiveness, especially when co-operatives are immersed in highly competitive environments.

The following summarizes the key revised co-operative principles most relevant to governance and therefore to the sustainability of co-operative organizational forms (ICA, 2008):

- *Democratic control by members*: One person, one vote, active membership participation, and elected officials responsible to membership. This incorporates a certain degree of hierarchical leadership since members need not and typically do not engage in day-to-day decision-making (reducing transaction costs). A key point here is that members have the last say on key decisions and are well informed of elected or appointed leadership decisions (transparency).
- *Democratic control of capital*: Based on member contributions to co-operative's capital (could be an equitable contribution). Part of capital is usually the common property of the co-operative. Surplus can be used for a variety of purposes as determined by co-operative members. Only part of the surplus is usually distributed to members. Surpluses can be used to build up reserves, to invest in the co-operative, and in the larger community. There is nothing stipulated in the rules pertinent to co-operative governance that surplus cannot be entirely invested to further develop or grow the co-operative. This would be similar to the investor owned corporation where the surplus can be invested or dispersed to shareholders as dividends or to management as bonuses. Except in the co-operative, surplus allocation decisions must be made in a democratic and transparent manner.
- *Autonomy and independence*: To maintain co-operatives as autonomous self-help organizations ultimately controlled by members, the terms by which co-operatives enter into agreements with other organizations, inclusive or private or public organizations, or raise capital externally (as opposed from members or surpluses) must ensure continued democratic control by members. Thus, co-operatives can link-up with non-co-operative organizations and even raise capital external to the co-operative, thereby relaxing or even removing constraints that are often assumed married to the co-operative organizational form.
- *Education*: Co-operative members, elected representatives, managers and employees are supposed to be educated and trained so they contribute to the development of their co-operatives.

3. Different types of co-operatives

Co-operatives can take many forms. Most pertinent to this article relates to co-operatives that represent a formal linkage or confederation of smaller farms. This allows farm families to

maintain ownership over their farm, whilst cooperating in the domain of inputs (equipment and seed, for example); marketing, sales, and the distribution of output; labor pooling; value added production (processing of outputs along the supply chain), and credit (credit unions and mutuals). These forms of cooperation can generate economies in these domains without farmers losing control over their farm—an important consideration in the context of economic development. Each farm becomes an equal partner in the co-operative. This can actually allow smaller farms to remain competitive and sustainable, which need not be the case in the absence of cooperation. This represents a type of polycentric governance structure (Ostrom, Tiebout, & Warren, 1961, pp. 831–832), which is a decentralized decision-making structure linking various nodes of local control (such as the individual small farm) with higher levels of shared governance (the collective).

Moreover, being part of a co-operative might help increase the overall size of the economic pie from what it would be in the absence of cooperation and, under certain conditions, even more so than what can be achieved by much larger corporate (investor owned) farms. In addition, given that small farm holders are analogous to the self-employed, they have the ability to capture a larger share of the economic pie than they would if they were simply employees on the larger farm or related corporations. Co-operative members have a determining say on how much they get compensated for their contributions to the co-operative. Capturing a larger share of the economic pie would also be facilitated when farmers are members of credit unions, supplier co-operatives, and value added production co-operatives. Members can accrue more direct economic benefits or revert these to their co-operative for investment purposes.

Co-operatives can also include common ownership of the farm—the more extreme form of an agricultural co-operative. In such co-operatives, economic operations could encompass agricultural production, manufacturing, and distribution. And such co-operatives can form larger co-operatives linking one to the other for the purpose of supply, distribution, and credit, for example, to capture economies of scale. The latter co-operative organizational form is exemplified by the 'classic' Kibbutz of Israel. But this vehicle for a co-operative economy completely integrates the individual into the collective or co-operative. For example, independent small famers would have to integrate themselves into this type of collective, giving up their farmstead and their economic independence. This is in contrast to co-operatives based on linking independent farmers in a variety of domains as discussed above. But this more integrated co-operative provides options to farm workers to become equal partners, which would not exist in the agricultural co-operative formed by linking currently existing small farms. If you are a farm laborer, you have no farm that could form part of a co-operative. The fact that agricultural co-operatives can take on different organizational forms, provides farmers as well as farm workers with alternatives within the co-operative structure to achieve economic sustenance and independence.

4. The demand and supply for agricultural co-operatives

One question to be modeled is whether co-operatives are at least as efficient as investor-owned firms (IOF) in agriculture. The focus here is on the more flexible co-operative wherein independent farmers retain their economic independence. When at least equally efficient as the larger IOF, agricultural co-operatives would be 'economic' substitutes to investor-owned agricultural economic entities. This would be independent of any distributional impact that the co-operative might have on the co-op members and the overall economy. In this case, the demand for co-operatives could then be modeled as the differential demand for alternative
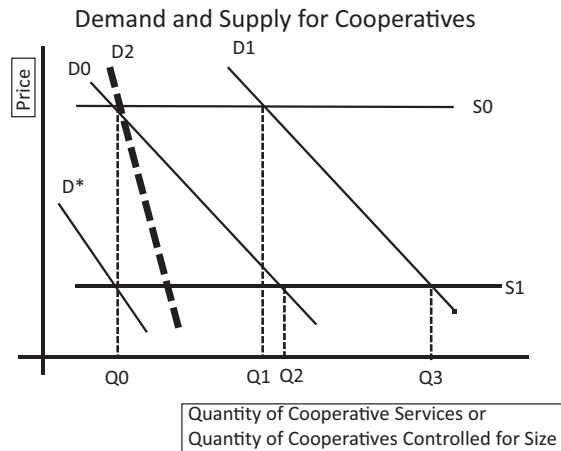

Fig. 1. Demand and supply for cooperatives.

organizational forms where the coop is in no way inferior (in terms of efficiency) to the IOF. One would then have to determine why farmers would not join a co-operative, especially if in so doing economic benefits are generated, such as increased efficiency and increased real income.

This issue can be addressed using a basic demand and supply analytical framework. This is given in Fig. 1. We assume that the demand curve for co-operatives (given by co-op services) is downward sloping—price goes down, demand goes up. We assume, for simplicity, that the supply of co-operatives or coop services is given by a horizontal supply curve. In this model, given the demand curve, it is possible that the equilibrium supply of co-operatives would be marginal when the supply curve is relatively high (costs are high), such as given by D0 and S0 in Fig. 1. But the equilibrium supply would by relative high if the supply curve shifts down to S1, for example. These shifts could be a product of changes in the institutional costs of establishing a co-operative. Therefore, if these costs are sufficiently high, they can squeeze out the co-operative alternative from farmers options. This squeezing out is both economically and socially problematic if the institutional parameters provide farmers or farm workers with artificially high cost co-operatives as an alternative to IOFs. This simply suggests that lowering these 'supply side' costs—creating at a minimum level playing field with IOFs can provide broader options to farmers and farm laborers. But in this scenario, when the co-operative alternative is not available, labor might be forced into IOFs, which can have serious negative implications in terms poverty, distribution, and even investment.

Both the demand and the supply side are important to determining the equilibrium number of co-operatives, controlling for the size of co-operatives. For example, if on the demand side, changes in the institutional parameters have little effect along demand curve, D2, the equilibrium level of co-operatives will remain relatively low. So the sensitivity of the demand for co-operative to price can be important. However, this being said, other demand-side factors are also of critical importance to the formation of co-operatives.

Even where demand is insensitive (or inelastic) to price, shifting the demand curve outward can play a determining role in the formation of co-operatives. For example, one can model the knowledge that potential co-operators have about the efficiency, competitiveness, sustainability, and wellbeing (including family income) effects of co-operatives, as a demand-side shift factor. If one believes that co-operatives are not sustainable or simply sustainable through farm families reducing their income to low levels, this would shift the demand curve inward, whilst a more

positive set of beliefs would shift the demand curve outward. A negative set of beliefs about co-operatives can be based on false or misleading information. But if the negative beliefs do not reflect the reality of the co-operative alternative, then the demand curve is situated further to the left than it would be if more accurate and plausible information were available. Therefore, the equilibrium level of co-operatives is also a function of the beliefs of potential co-operators and whether or not these accurately reflect the socio-economic fundamentals underlying co-operatives. To the extent that co-operatives are at least as economically viable as their IOF alternative, improving the information on co-operatives to potential co-operators will shift the demand for co-operatives to the right. Such information can also serve to breakdown traditional normative resistance and antipathy against the co-operative organization form. A key point here is that 'false' mental models about co-operatives can reduce the equilibrium amount of co-operatives, irrespective of 'supply-side' conditions.

Another demand-side shift factor would be increasing the productivity of co-operatives. The more productive the co-operative, the further to the right should be the demand curve. Higher productivity of the small farm can be achieved, in the first instance, simply by establishing a co-operative. This is related to both the scale effect and the x-efficiency effect, discussed below. Further increases in productivity can be achieved by increasing the linkages between farm co-operatives and other co-operatives related to agriculture such as supply and credit co-operatives. One might end up with a demand curve such as D1. In this case, the equilibrium number of co-operatives would be Q3 given supply curve S1. The demand curve could also be shifted based on the personal preferences of individuals involved in agriculture. Even given full knowledge about the efficiency of co-operatives (let's say high levels of efficiency), some individuals might simply prefer to remain independent economic agents, shifting the demand curve to the left.

A critical point to note is that even if based on objective conditions or fundamentals, the demand curve should be at D1 (this would incorporate the personal preferences of potential co-operators), the actual demand curve might only be at D0 or D*, if individuals do not have accurate information about co-operatives and if the information they have is not easily and well understood. An individual's demand for a co-operative may not reflect their true preferences, or the preferences they would have if they better and more easily understood information on co-operatives and this information was easily available—that is, at low cost and low risk.

5. The relative superiority of agricultural co-operatives

5.1. Economies of scale and scope and transaction costs

Co-operatives can potentially generate higher rates of growth and more equitable growth, even in competitive economic environments. Economies can be captured through producer, purchasing and marketing coops as well as through pooled labor amongst co-operatives. Economies of scale and scope, that larger IOFs naturally benefit from, can be achieved by small farm units, through cooperation. This would make the smaller farm units linked through co-operatives, more cost competitive than the de-linked small farm units that act as independent economic agents (for a similar argument see Vladislav, 2007). Co-operative linking also allows the smaller farm units to be competitive with the larger farm units by being relatively productive. In addition, as discussed below, co-operatives facilitate higher levels of x-efficiency, given by the nature of co-operative governance providing co-operatives, potentially, with a competitive advantage over IOFs; this is apart and distinct from economies of scale and scope. As mentioned above, achieving these various economies requires an awareness of the co-operative alternative and the capability of joining/forming a co-operative.

The traditional economies of scale refer to reducing average cost by increasing the scale of output, more bananas, cocoa, sugar or wheat. Economies of scope refer to reductions in average cost that are a result of producing more than one product. Scale and scope can be facilitated through larger units of production, often identified in the agricultural sector with the larger farm entity or with larger input suppliers and distributors.

Oliver Williamson (1981, 1985, 2010), building on the work of Roland Coase (1937), developed models to explain increasing the size of the firm *independent* of economies of scale and scope reasons. His explanations are largely related to reducing the overall transaction costs of doing business, hence reducing average production costs. Broadly speaking, transaction costs refer to the costs of drawing-up, signing, monitoring, and enforcing of contracts. Contracts, the specification of relationships between economic agents or entities, such as firms, are key to the functioning of any economy and they can also be of an informal type. Williamson attempts to explain why increasing plant size and more often than not, firm size (multi-plant firms), is rational from the point of view of increasing economic efficiency.

In terms of transaction costs analyses, Williamson focuses on (1981, 1985) bounded rationality (BR), opportunism with guile (OG), and asset specificity (AS). For Williamson, BR refers costs incurred in the collection and processing of information. OG refers to the tendency of many individuals to deceive and cheat others in market transactions—an important aspect of the human condition, according to Williamson. AS refers to assets that once set in place, cannot be *redeployed* except at a significant cost to its owners or users. It is realistically assumed that assets are not like 'putty' that can be costlessly shifted from one use to another. Opportunism with guile, the proclivity of economic agents to behave dishonestly, is critical to Williamson's analysis. In a world where honesty and goodwill prevail transaction costs would be negligible. In such a world one can trust individuals to provide good quality and accurate information. Therefore, data collection and processing costs would be negligible. Moreover, asset specificity would not be a relevant cost consideration when one's information is reasonably accurate since your initial allocation of assets would stand a very high probability of being correct. Williamson argues that growing the size of the firm, establishing or buying out similar types of firms (horizontal integration) and establishing or buying out suppliers and distributors, is a substitute for creating honesty across economic agents. Williamson *assumes* that opportunism with guile should not be prevalent inside the larger corporation as the goals and objectives and decision-making are more in sync and behavior is less costly to monitor.

The traditional view in economics is that small is better in the sense that many small firms generate more competitiveness and therefore more 'efficient' economic results. Although economies of scale are part of the traditional economic toolbox, very large firms are not considered to be necessary to generate optimal scale efficiencies, hence the pursuit of scale economies should not affect the extent of competitiveness. Still, arguments persist on the advantages of getting bigger and bigger, in terms of average cost, by taking advantage of economies of scale and scope. Transaction cost-type analysis goes beyond any traditional scale and scope analysis, maintaining that corporate bigness reduces transaction costs significantly. But both analytical frameworks pay no heed to co-operatives as an alternative organizational structure within which economies of scale and scope and just as importantly transaction cost economies can be achieved. Moreover, given Williamson's focus on opportunism with guile, co-operative governance structure, at least as specified by the International Co-operative Alliance and discussed above, provides an incentive environment to reduce such selfish and self-serving behavior. This is another good reason to model the co-operative as an alternative to IOF in agriculture.

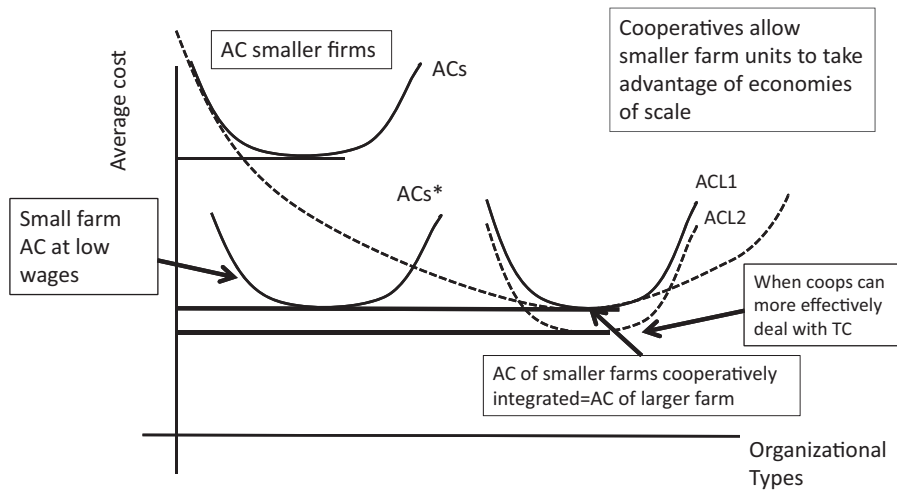## Scale Economies and Organizational Types

Fig. 2. Scale economies and organizational types.

Co-operatives based on the linking of independent small farms, which allows for the sharing of inputs such as equipment and seed, labor pooling, sharing land when necessary (larger more efficient plots of land), storage, and the distribution of output, are all plausible economic entities. Fig. 2 illustrates the impact of cooperation as well as corporate bigness on the productivity and hence the average costs of smaller farms. In the traditional model, simply increasing firm size shifts the firm's average cost curve downward and to the right from ACs to ACL1. But through cooperation, the average cost curve also shifts downward and to the right in a similar fashion (but here from ACs* to ACL1), as the co-operative becomes the vehicle through which economies in scale and scope as well as in transaction costs can be captured. Moreover, to the extent that the recommended governance structure of co-operative might be able to better handle transaction costs, especially with regards to opportunism with guile, co-operatives might serve to shift the average cost curve to ACL2, potentially making the co-operative even more cost competitive than the IOF. Much critically depends on the actual governance structure that the co-operative adopts and implements. This modeling matches and helps explain the relative success of agricultural co-operatives even when competing with relative larger IOFs. Achieving economies in scale and scope and transaction costs does not necessarily require large and highly integrated agricultural corporations. Cooperation through linkages across farms and farmers' ownership of supply and distribution co-operatives is a viable alternative. Theoretically, there is no good reason to predict that co-operatives should fare worse than IOFs in terms of economies of scale and scope. The same should be true of economies related to transaction costs.

It is important to note that small farms can compete with the larger farms without becoming part of a co-operative, at least up to a point. Farmers can cut their own income as well as that of their family members working on the farm to compete on the basis of cheap labor as opposed to higher productivity, which could be achieved through joining or forming a co-operative. Famers can engage in 'self-exploitation', paying themselves below the market wage to maintain their independence. This is illustrated by a shift downward in the small farm's average costs curve from ACs to ACs*. There is evidence that cutting income to workers is often accompanied by reductions in effort inputs and therefore productivity—the efficiency wage effect. Workers retaliate against employers for being treated unfairly. But this need not occur when

one has self-exploitation, where cuts to income are self-imposed to maintain ones competitive position. Small farmers can, therefore, be quite flexible in efforts to survive on the market. But the self-exploitation option is not sustainable in the long term from the perspective of productivity or wellbeing. However, this can be the only plausible option in the absence of a viable co-operative alternative. This latter alternative can be marginalized by supply and demand side considerations, inclusive of institutional impediments to co-operative development and misperceptions about the co-operative alternative amongst potential cooperators.

5.2. X-efficiency

An important theoretical concept that helps to better explain and frame the potential co-operative advantage of farmer ownership through co-operatives as opposed to corporate employment or large IOF (large farms) is x-efficiency theory. X-efficiency theory, first articulated by Leibenstein (1966), assumes, based on the evidence, that effort inputs in both its quantity and quality dimensions is a variable in the production function. Unlike conventional theory, the assumption is not made, a priori, that firms will be economically efficient independent of market structure and that one can assume that principle-agent problems are quickly resolved. Such presumptions generate the traditional theory's assumption that effort inputs are fixed at some level, which is often assumed to be at some maximum. But the alternative assumption of effort variability allows one to better model differential productivity across organizational forms. Given effort variability, it is possible for firms to produce less than their potential, given their traditional inputs (such as capital, labor, and land) and technology. When firms produce below their potential, because of relatively low levels of effort input, this is referred to as x-inefficiency in production. Ceteris paribus, the lower the level of effort input, the higher the level of x-inefficiency and the lower the level of x-efficiency.

The level of x-efficiency is a product of the incentive environment facing the firm. One argument (Leibenstein, 1966) is that in a less competitive environment firm management and owners prefer to invest less effort in managing the firm, reducing firm productivity and thereby increasing average production costs. This is referred to as managerial slack. Such behavior is rational from the perspective of management and owners given that such behavior serves to maximize or at least improve their level of wellbeing or utility. The higher average costs are sustainable as long as the x-inefficient

firms are not in an optimal competitive environment or are otherwise protected from competitive pressures.

Average cost can be given by the following equation, assuming a very simple economy where labor is the only costed input (Altman, 2001).

$$AC = \frac{w}{(Q/L)}, \tag{1}$$

where AC is average cost, w is the wage rate or, more generally, the unit cost of inputs, (Q/L) is the average product of labor, Q is total output, and L is labor input measured in terms of hours worked. Anything that reduces productivity, such as managerial slack will, ceteris paribus, increase average cost.

A broader x-efficiency theoretical framework opens the door to a wide array of incentives as being important to movements in effort inputs (Altman, 2001, 2002, 2006, 2009b, 2012; see also Gordon, 1998; McCain, 2008). This includes the incentive environment facing employees, which incorporates, wage and working conditions, affinity with and trust in the firm, substantive input in the decision-making process and the day-to-day operation of the firm, and evolved behavioral norms with respect to the firm. These variables can also affect managerial decision-making. Overall, these various incentives, if poorly designed and implemented will reduce effort inputs and, therefore, reduce labor productivity and possibly increase average cost. On the other hand, a well-designed incentive environment within the firm will increase effort inputs and, therefore, productivity and possibly decrease average cost. Moreover, these incentive variables affect effort inputs independent of the competitive environment. Therefore, even with imperfect competition in the product market it would be possible to have x-efficiency in production with a properly designed and implemented incentive environment. Perfect competition pressures firms into becoming more x-efficient, while imperfect competition protects x-inefficient firms.

This modeling framework can be applied to co-operatives in general and to agricultural sector co-operatives more specifically, especially given that many of the variables that, together, impact on productivity are part and parcel of the co-operative organizational form. In the managerial slack model, it is assumed that there are no changes to managerial or owner compensation as effort variability changes. It is also assumed that managerial slack (not working in the best interest of the firm), is the best behavioral assumption that can be made with regards management/owners. However, with regards to co-operatives this should not be the case. One would expect management's interest to be aligned with the co-operative and that effective application of co-operative principles would increase the probability that this would be the case and, thereby, increase the level of x-efficiency. But such an alignment of interests need not take place if institutional failure occurs—when the institutional environment is not conducive to minimizing managerial slack but also opportunism with guile.

More generally, the co-operative organizational form can provide a more x-efficient environment than what is provided by the IOF. But the improved incentive environment comes at some cost, especially with regards to improvements in wages and working conditions, which contributes to a sense of fairness and trust across economic agents within the firm. Therefore, this improved incentive environment positively affects both 'w' and (Q/L) or productivity. A poorer incentive environment would typically have a negative effect on both of these variables. In this type of model, increasing the level of x-efficiency, even while it increases 'w', need not increase average cost whilst firms that attempt to become more competitive by reducing 'w' need not end up reducing average cost. Both high and low 'w' might very well be equally competitive.

One common critique of co-operatives in general is that their governance is more costly and must therefore be less competitive than the IOF. Therefore, being fairer and more democratic is too costly to be sustainable in a competitive market economy. Increasing 'w' increases average cost because it is assumed that effort is fixed and that there can be no offsetting x-efficiency effect on productivity. But this should not be the case in a co-operative since higher costs are part and parcel of an improved incentive environment that generate offsetting increases in productivity. Therefore, co-operatives need not seek competitiveness by cutting labor costs, for example. And, co-operatives need not be less competitive than IOFs.

In the traditional economic model if two firms are equally competitive, one can infer they are both equally efficient. Two firms with same quantum of traditional inputs should produce the same level of output. But in the more generalized x-efficiency model it is possible for higher 'w' firms to be more productive than low 'w' firms. Therefore two equally competitive firms need not be equally efficient. The co-operative should generate a larger economic pie even whilst it is characterized by the same average cost as the IOF. Overall, co-operative organizational forms can incentivize increases in economic or x-efficiencies, which can contribute to the process of rural economic development by increasing pie size by directly increasing, at a minimum, the material wellbeing of workers. Moreover, contrary to the traditional economic model higher cost co-operatives in terms of 'w' need not be driven out of the market by the lower cost IOFs. Some these points are illustrated in Fig. 3.
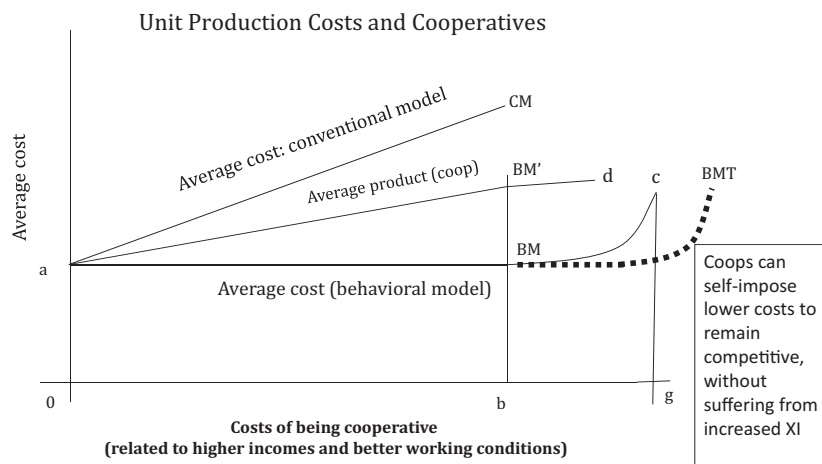

Fig. 3. Unit production costs and cooperatives.

In the traditional model, any increase to 'w', which is labeled for our purposes, "Costs of Being Co-operative," invariably increases average costs and is given by average cost curve CM, which relates average costs to changes in 'w'. But for the co-operative firm, the increasing costs of making a firm more co-operative need not increase the average, given the appropriate cost offsets through increases in productivity. So, productivity increases as immediate costs 'w' increase. This is given by d. As a consequence, it is possible that average cost will not change in the faces of increases in immediate costs, which is given by c, which is horizontal up to BM or b. As immediate costs increase beyond b, average costs increase as the co-operative cannot increase effort sufficiently to generate the necessary productivity cost offsets to keep average cost from rising. Effort increases hit the fall of diminishing returns. But there is a wide range of co-operativeness that is sustainable given effort variability and an appropriate incentive environment. The other side of the coin is that non-co-operative firms, dominated by the IOF organizational form, need not be more competitive than co-operative firms. Moreover, to the extent that technological change is motivated by the higher immediate costs of becoming more co-operative, this has the effect of shifting the co-operative firm's average cost curve to BMT (Altman, 2009b). This provides co-operatives with an additional degree of freedom in dealing dynamically, over time, with immediate cost pressures in a planned and systematic manner.

At this point, it is important to discuss the point that co-operatives are more flexible organizations when it comes to dealing with economic shocks than is the traditional IOF. As already discussed, independent small farmers can drive their income down to quite low levels to maintain their competitive position against larger farms. Of course, farmers do not respond to their self-exploitation by retaliating against themselves by reducing their efforts inputs and thereby their productivity. This same narrative can be applied to co-operatives where farmers are in effect owner-operators. However, when large IOF (farms) attempt to cut wages to become more competitive, productivity might very well diminish. This argument can be modeled through the prism of the efficiency wage literature, where it is assumed in its most contemporaneous version, that effort is a positive function of wages up to some maximum wherein average costs are minimized and rates of profits are maximized. This is referred to as the efficiency wage. It is argued that wages are sticky downward since cutting the wage, for example, during an economic recession or company crises, will result in workers retaliating against being treated unfairly by reducing their effort inputs thereby increasing average cost. Related to this, workers will lose trust in their employers causing workers to locate other jobs when and where possible, increasing job turnover and further increasing average cost (Akerlof, 1982; Akerlof & Yellen, 1990; Bewley, 1999).

In Fig. 4 these points are illustrated by efficiency wage curve EW, which is subject to diminishing returns with regards to changes in the wage rate. The efficiency wage is given by w*. The important point to be made here is that in co-operatives if the wage and other benefits need to be reduced, it is unlikely that cooperators will cut effort inputs in response, hence if wages are reduced below w*, one can assume a perfectly elastic productivity curve at point a. Any reduction in wages would not affect the co-operatives' productivity. Co-operatives are unlikely to be subject to the efficiency wage effect whereby workers reduce effort input when wage and/or working conditions deteriorate.

Therefore, in face of economic shocks, workers (coop members) can reduce their own economic compensation without retaliating (against themselves) for cutting such compensation. For this reason, co-operatives are more flexible than IOFs in face of price shocks, for example, which are very common in agriculture. They can better survive a crisis and also maintain employment by
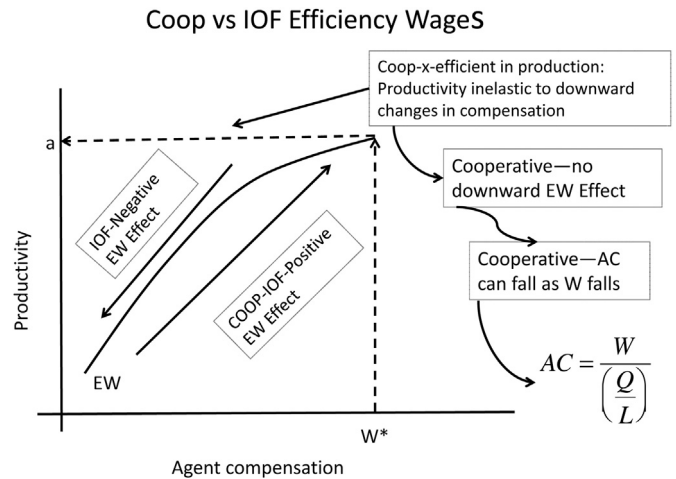
Coop vs IOF Efficiency WageS

Fig. 4. Coop vs. IOF efficiency wages.

cutting own real income during economic crisis (Tremlett, 2013). They can also reduce wages and other benefits to redirect these funds to investment purposes, providing co-operatives with an additional degree of freedom in the investment domain.

6. Co-operatives, income, and surplus

Because of the potential efficiency advantage of co-operatives over independent small farms, they should yield higher incomes to farmers than the independent farmers might accrue, thus increasing the extent of poverty reduction that might otherwise occur. Based on implementing and adhering to principles of co-operative governance, one would expect that co-operative members should, on average, earn higher incomes than small independent farmers. This is related to co-operatives capturing economies of scale and scope as well as reducing pertinent transaction costs. Moreover, given effort variability, co-operatives can generate higher levels of x-efficiency, allowing for both higher income and cost competitiveness.

One would also expect that co-operatives would yield higher incomes to rural agricultural workers (when they are co-operative members) than they would earn as employees of privately owned farms large or small. To extent that farm workers have few legal rights to organize one would expect, based on the generalized x-efficiency theory discussed above, farm workers would be paid relatively low wages, unless employers are sympathetic with the wellbeing of their employees through a sense of moral sentiments and responsibility. So, improved bargaining power can provide farm workers with higher income and incentivize higher level of x-efficiency in the larger IOF. But being part of a co-operative provides farm laborers with the capability to achieve higher levels of material wellbeing given the innate decision-making mechanism, if enforced, in the co-operative organizational form.

It is important to note that the higher productivity in co-operatives as compared to the smaller farms, not only allows for higher income to farmers but higher levels of surplus—a residual that can be used for investment. It can also be returned to members as a bonus or dividend or invested in one's community. The co-operative also has potentially an efficiency advantage over the larger farm through x-efficiency and its greater capacity to reduce transactions cost most closely associated with opportunism with guile. The higher productivity of the co-operative can generate a higher surplus, even when cooperators are paid more than wage laborers. To some extent that surplus is determined by the compensation directed to management including CEOs and CFOs.

Output and Surplus

Fig. 5. Output and surplus.
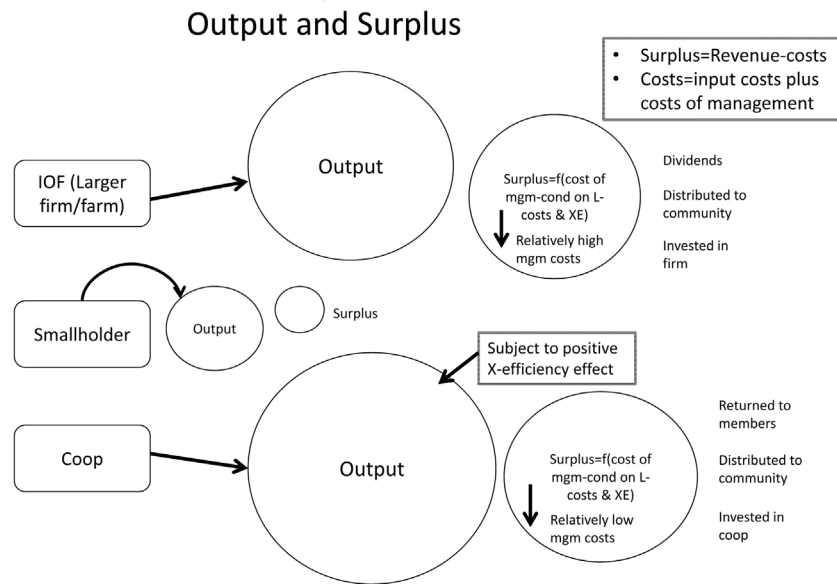
One advantage of co-operatives is such payments can be significantly less than paid by IOFs—much depends on the extent to which co-operatives apply principles of equity and fairness to their governance structure and practice. But in principle, co-operatives are not at a disadvantage in providing internal sources of income for investment purposes. Of course, some co-operatives are turning to the market or government to source funds for investment.

Some these points are illustrated in Fig. 5. The small farm is the weakest economic link in the system with regards to surplus generation. But unlike what would be expected in the traditional economic model, the co-operative is not at a disadvantage when compared with the larger farms. To the extent that co-operatives have an advantage, this is related to both higher levels of efficiency and a lesser share of income going to management.

7. Conclusion

Agricultural co-operatives play an important role in rural development, as vehicles of employment provision, food security, fairer income distribution and potentially poverty alleviation. Contrary to predictions of standard economic theory, the evidence points to the viability and sustainability of agricultural co-operative form. Specifying the conditions under which co-operatives can be established and fostered, this article employs institutional analysis, x-efficiency theory, efficiency wage theory, and transaction cost analysis, to model co-operatives as viable organizational forms.

Co-operatives are not necessarily superior to IOFs as competitive economic entities, but they should also not be modeled as a high cost alternative to investor owned firms or farms. Co-operatives provide a viable alternative to the typically hierarchical IOF, in that they provide small farmers as well as agricultural workers with the means to capture economies of scale and scope as well as to reduce transaction costs in a manner that is at least equal to what can be achieved by the larger privately owned farm. In addition, agricultural co-operatives can better and more easily achieve higher levels of x-efficiency and reduce transaction costs related to opportunism with guile. This is related to the governance structure one would expect deployed, at least in theory, in the co-operative organization.

Co-operatives also provide advantages in terms of the income that can be secured by members. Co-operative members themselves decide the share of total output, inclusive of surplus, that they will secure. In the IOF, decisions on the distribution of income are determined by owners who usually are delinked from members in terms of preferences and knowledge of the size of the economic pie. In the IOF, the distribution of total output depends on the bargaining power of workers, which is contingent on the laws related to union organization and collective bargaining being conducive to such collective action. Furthermore, co-operatives have additional degrees of freedom in terms of being able allocate income away from member payments or wages to investment purposes as part of the democratic decision-making process. Given that this is a form of self-exploitation, there would be no expected negative effect on x-efficiency (efficiency wage effect) in the co-operative as there would be in the IOF.

Co-operatives will not be the choice of all agents given the risks involved in establishing and maintaining them. As discussed above (The Demand and Supply of Agricultural Co-operatives), this helps explain why co-operatives are not even more economically significant than they already are. But if the co-operative alternative is available and understood in terms of economic sustainability and risk, it provides a more objective option to famers and farm laborers as well as workers in the agricultural sector. The co-operative option in governance, production, and income distribution needs to be appropriately framed so as to provide real options to decision makers. This is especially the case in a world of imperfect, asymmetric, and biased information.

Overall, the viability of co-operative is a function of the institutional rules of the game within which co-operatives must operate. But the same is the case of IOF. If the institutional parameters are not appropriate, it becomes difficult to establish co-operatives, and co-operatives can be squeezed out of the agricultural sector for institutional as opposed to economic efficiency reason. Therefore, at a minimum, an equal institutional playing field between agricultural co-operatives and IOFs in agriculture must exist for co-operatives to become a viable and plausible choice amongst farmers and farm workers.

The predicted advantages of agricultural co-operatives are very much a function of whether or not and extent to which co-operative principles are employed to underpin co-operative governance. Transparency and accountability are critical ingredients of co-operative success. Also, important is having a robust and tested business plan and competent and qualified individuals
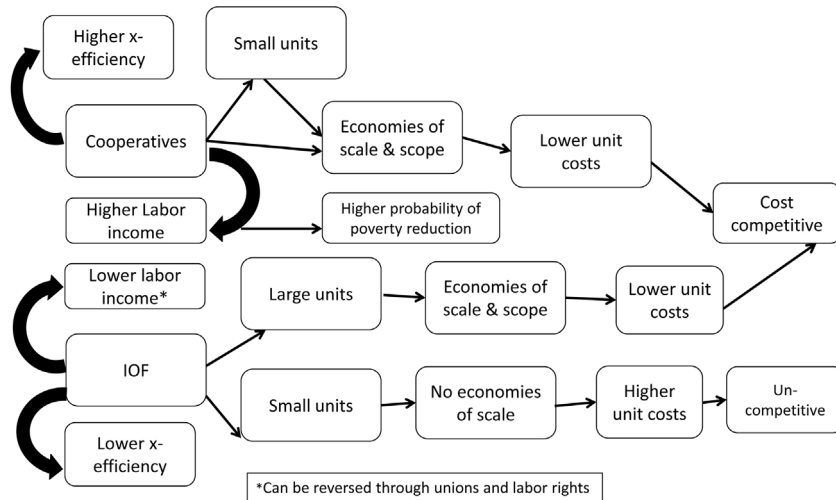
Agriculture and Coops

Fig. 6. Agriculture and coops.

leading the organization. Co-operatives typically do not survive if they are poorly managed and build upon an unsustainable business plan. Co-operative principles should help make a robust business plan a success.

Some of the key points made in this article are summarized in Fig. 6. Given the appropriate institutional environment agricultural co-operatives should be associated with higher levels of x-efficiency and higher levels of labor income, both of which are causally related. This higher labor income should result in co-operatives contributing more to poverty reduction than IOFs. The larger farm (IOF) should be associated with lower levels of x-efficiency and lower levels of labor income, but the latter is contingent on workers' bargaining power and the preferences of employers. The co-operative organizational form allows smaller farms to take advantage of economies of scale and scope and in transaction costs, which the larger IOFs are able to achieve by the nature of their size. All told, co-operatives should be cost competitive with the larger IOFs even whilst providing higher levels of economic benefits to their members. The smaller farm unit should be relatively high cost, but can survive, as discussed above, through self-exploitation.

It is critical to reiterate the subtext underlying predicted co-operative success in agriculture:

i. Exogenous institutions (laws, rules, and regulations) that provide co-operatives with an equal playing field with IOFs;
ii. Implementing and maintaining co-operative principles in operating the co-operative;
iii. Good economic governance in the context of co-operative principles;
iv. Qualified individuals operating the co-operative in the context of co-operative principles (requires co-operative education and hiring and promotion based on merit).

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