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2018 - 05

Title:

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Economics and Business Administration for Society

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CO-OPERATIVE PRINCIPLES AND OBJECTIVES ^(*)

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Abstract:

This work illustrates how integrating co-operative principles into co-operative objectives conditions their chances of success. Starting from the traditional model in co-operative literature, this paper defines the net income function to analyze the impact of applying the open doors principle. The main contribution of this paper is that it explicitly adds the consequences derived from applying the democratic management and economic participation principles. In the former case, it incorporates decision costs and, in the latter, it considers the restrictions in applying the value of economic justice on partner income. The resulting model explains both the viability of the co-operative formula and its disappearance or degeneration, especially when co-operatives consider new membership. The work shows three feasibility strategies that support co-operative principles. However, these strategies apply the principle of open access and economic participation differently. The only strategy that may contribute to the expansion of the co-operative model is the one in which financial commitment accompanies new membership. Surplus is especially relevant in this case.

Keywords: Co-op principles; Co-op objectives; economic participation; democratic management; decision costs, economic surplus.

(*) We thank Eduardo Giménez for his valuable comments and suggestions.

1. INTRODUCTION

The main hypothesis in models inspired in Ward (1958), Domar (1956) and Vanek (1970) assume that the objective of co-operatives is to maximize partners' net income. Obviously, members must primarily consider their potential future net income when they create a firm. No matter the legal form, two or more people exploiting a common asset must obtain a higher total net income jointly than they would have achieved separately. Otherwise, collaboration would be unsuccessful. However, they voluntarily accept managing their common assets according to specific co-operative principles once they launch a co-operative. These principles are the rules used to integrate collective and individual objectives, which converge in a co-op firm.

Co-operative partners accept the principles of open membership and democratic management. As a consequence, anyone has the right to join the co-operative, provided that he meets the requirements. Each member has a vote in the decision-making, regardless of his/her capital contribution. This democratic rule encourages teamwork, but members incur in additional costs. It is reasonable to expect these costs are negligible when few members start the firm, but they increase as more partners join the firm. When the current partners consider opening the doors to a new member, they must confront the positive and negative effects on the partner's net income (individual objective). Adhering to democratic rules (collective objective) may represent less income for the members.

The way the co-op applies the principle of economic participation has an impact on the objectives. Moreover, co-op partners also agree to implement the income distribution principle. This principle establishes that individual incomes are proportional to their transactions, while capital is paid at a fixed price. If the co-operative achieves an economic surplus at the end of the fiscal year, part of it returns to the partner. The remainder must be kept in the firm to cover collective objectives like retaining earnings to improve co-op self-finance, developing education and training activities for members, fostering co-operation with other co-operatives or working for a sustainable community.

Economic literature has not made these principles explicit. Models have emphasized the individual perspective as the method to compare co-operative and conventional firms (Ben-Ner, 1984; Kahana and Nitzan, 1989; Craig and Pencavel, 1993; Pencavel, Pistaferri and Schivard, 2006; Burdín and Dean 2009). Although these models have actually contributed to understanding the co-operative phenomenon, they have left collective objectives on the back burner. It is necessary to study both objectives together to determine whether individual

partner income may be maximized while achieving the collective objectives emerging from co-op principles. To contribute to this question, the paper proposes a theoretical model that integrates both individual and collective principles with co-operative principles. Unlike previous models, this paper proposes a production function that explicitly adds the decision costs that members incur as they follow the co-operative principles. By doing this, the model explains why some co-ops fail while others achieve economic success. This could pose a way to solve the contradiction between theoretical and empirical literature (Bonin, Jones and Putterman, 1993).

The article is organized as follows. Section 2 reviews the economic literature on the purpose of a co-operative. Section 3 begins by describing the characteristics the net income function of the co-operative should present once the decision costs are separately explained. This section then illustrates a specific form of production that exemplifies the trade-offs that partners face when following co-operative principles to reconcile collective and individual objectives, especially when they open the door to new members. Section 4 concludes with a summary of the main results in that reveals the relevance of the surplus in establishing the co-operative's objectives.

2. THEORETICAL DEBATE

The promoters of the co-operative movement had clear aims from the very start concerning the goals of a co-operative. In reaction to the enormous inequalities caused by the industrial revolution, their ultimate desire was to achieve a fairer society. The first co-operatives promoted by William King adopted different ideas promoted by the utopian socialists (Saint-Simon, Owen, Fourier, King, Buchez, Blanc, and Derrion) that were effectively collected in the statutes of *The Wholesale* in 1844, the consumption co-operative of the Rochdale Pioneers. These ideas later became, with certain variants, the principles of the co-operative movement through its main institution, the International Co-operative Alliance (Lambert, 1975; Lasserre, 1972). We would like to highlight the following principles given their direct economic repercussions: the principle of open membership, the principle of democratic management and the principle of economic participation.

The principle of open membership proposes that the co-operative should welcome all those who wish to become members, provided they meet the necessary requirements, as a basic strategy for the expansion of the co-operative model. Therefore, according to this principle, the long-term goal of all co-operative societies should be to increase membership. The

decision to admit new members must respect the principle of democratic management, which indicates that all decisions must be made following the one-member-one-vote criteria. In this way, all those who contribute more capital to the company do not accumulate more power. However, the level of participation in the business activity may affect the ability to make decisions.

In deciding whether to admit new members, partners consider the impact of their decision on their income, conditioned by the application of the principle of economic participation. Unlike the two former principles, this principle is less explicit in its content due to the classical debates concerning fair price and the role of profit in capitalist societies. The so-called value of commutative justice assumes that capital must be remunerated at a limited interest rate, work must be remunerated according to a fair wage and the price paid to the inputs delivered by the producers must also be fair. In this way, the price of the products will be fair for the final consumer if the income of the activity covers the intermediate costs and the fair remuneration of the factors. Upon achieving these objectives, the co-operative also achieves the individual objectives of its members and contributes to the welfare of society as a whole.

Discrepancies are greater concerning the value of distributive justice, which affects the amount of surplus of the business activity and its distribution. No consensus has been reached on the way the surplus should be distributed or whether it should be an objective of the co-operative. However, certain shared rules deal with distribution. It is common for one part of this surplus to return to the partner, while the rest remains in the co-operative and must be used to increase retained earnings and provide funds for training and inter-cooperation activities. Intercooperation is the co-operative principle that contributes, through external growth, to extending the co-operative model to society as a whole. It complements the internal growth derived from the application of the principle of open membership.

Ward (1958), Domar (1966) and Vanek (1970) introduced the criterion of maximization of net income per partner. Thereby, they synthesized the principles that gathered the singularity of the co-operative society, as the co-operative's specific aim and made it analogous to the profit maximization criterion of conventional capitalist enterprises. The proposal, henceforth WDV model, promoted a series of works that enriched the economic analysis of co-operatives. We mainly highlight the work of Meade (1972), which develops the WDV model, to show that it is possible to differentiate co-operatives that, under the same principles, follow very different strategies. It also considers co-operatives that may, in practice, behave like conventional capitalist firms.

One of the fundamental criticisms of the model WDV model comes from the Theory of the Agency. Furubotn (1976), Jensen and Meckling (1979), among others, pointed out the problem of time horizon as one of the coops' main weaknesses. This problem stems from the improbable recovery of part of the resources allocated to the company's retained earnings in pursuit of their own co-operative principles. The application of one member one vote, combined with the retention of part of the surplus in the co-operative (principle of economic participation), causes the member to constantly lose part of the future returns on capital. This loss puts co-operatives at a disadvantage with respect to conventional capitalist firms and entails disappearance, degeneration or a minority presence.

Despite these criticisms, empirical evidence does not confirm the superiority of traditional capitalist enterprises (Bonin et al, 1993). Co-operatives can compete with productivities or returns akin to those of the market. The phenomenon of underinvestment contradicts certain evidence. On the one hand, the average size of a co-operative is often greater than that of traditional companies (Perotin, 2015). On the other hand, some coops retain earnings from partners to reinvest in the firm (Cabaleiro-Casal and Iglesias-Malvido, 2016) and they use these retained earnings to face downturns (Navarra, 2016). This proves that partners also consider other objectives besides net income. Notable to this respect are the works of Craig and Pencavel (1993), and Burdin and Deán (2009), which introduce employment in the production function to contrast the weight partners grant to maintaining employment as opposed to partner income.

The greater degree of globalization of the current economies has not banished divergence of opinions on the viability of the co-operative model. To begin with, it seems difficult to promote the local community and compete internationally while applying democratic rules and common values to a growing number of partners (Hansmann, 1988). However, a substantial number of co-operatives succeed in globalized markets while preserving co-operative values (Birchall 2014). Bretos and Marcuello 2017, in an updated review of this debate, propose an agenda for future research to gain a better understanding of co-operatives. Among their proposals is the need to evaluate the impact of principles and values on efficiency and co-operative competitiveness.

In short, maximization of individual economic objectives (net income, wages, employment, etc.) must be present in the analysis of co-operatives, and it must include the effects derived from coops controlling property rights and the manner in which this affects future partner

income. However, we propose these elements be operated according to collective objectives pursued by the co-operative acting according to its principles.

3. OBJECTIVES AND PRINCIPLES

The co-op must make compatible collective and individual goals and it must do so respecting co-operative principles. This places these firms in a special position with respect to the rest of the capitalist companies (Marcuello e Nachar 2013), particularly when they need to increase financial resources. New equity may come from either current or new partners. In the case of the former, the members keep control of the company but make a greater financial effort. In the case of the latter, the current partners may reduce their financial contribution in exchange of decision-making power.

Although both alternatives may be combined to achieve the same collective objective, our model proposes a situation in which partners must choose between two extreme situations: to either open the door to a greater number of partners and reduce their individual financial contribution or make a greater contribution to capital to avoid the entry of new partners.

3.1. The Collective Objective of the Co-operative

Collectively, a co-operative must try to obtain the maximum level of production from the resources provided by partners. Let n be the number of co-operative members who decide to jointly exploit an asset, A . The participation of partners in the business activity will depend on the type of co-operative. This may consist in a number of work hours, delivered production, or acquired production. Regardless of the type of participation, let us call the partner's net contribution to the activity x_i .

Given that the participation of each partner is generally very much alike, we will assume that it is the same for all the n partners:

$$[1] \quad x = x_i = x_j \text{ for all } i, j \Rightarrow \sum_{i=1}^n \frac{x_i}{n} = x$$

Then, let X be the function describing the aggregate net product of the activity the partners can obtain with the available asset (which we will consider constant).

$$[2] \quad X = F(n, \bar{A})$$

The partners must therefore decide on the number of partners participating in the co-operative. They must also decide the working hours or amount of product to be delivered or consumed. This function must comply with a series of requirements so that members decide to share the asset. In the first place, the product of the business activity must increase with the number of partners, regardless of the legal form of the company:

$$[3] \quad \frac{\partial X}{\partial n} > 0$$

Secondly, we have assumed that the income derived from the entry of new members is distributed per capita among all the partners; a partner will show greater willingness to receive new members when the production function presents increasing returns¹. That is:

$$[4] \quad \frac{\partial^2 X}{\partial n^2} > 0$$

The fulfillment of this condition implies that the entry of new partners increases net product per partner given that the member's marginal net product is higher than the marginal increase of the average net product.

$$[5] \quad \frac{\partial X}{\partial n} > \frac{\partial (X/n)}{\partial n}$$

Given the double condition of the partner, he will choose to join a co-operative as long as his net production exceeds what he would obtain individually. Using this same criterion, the members of an existing co-operative are willing to welcome new partners if the increase in the net production of the co-operative after the entry is accompanied by an increase in the average net product per partner.

We must now assume that increasing returns of the co-operation disappear as of a certain number n^* of partners. Otherwise, it would always compensate to exploit the common asset. Thus, the production function must present diminishing returns. In this case, the properties of the function are:

$$[6] \quad \frac{\partial^2 X}{\partial n^2} < 0$$

$$[7] \quad \frac{\partial X}{\partial n} < \frac{\partial (X/n)}{\partial n}$$

¹ Diminishing returns discourage new membership. It compensates to hire new workers that receive a salary equivalent to marginal productivity, as presented in the WVD model.

The entry of a new partner makes the increase in the marginal net production per partner lower than the marginal increase in the average net production. This discourages the entry of new partners.

Since n^* is the value as of which increasing returns become decreasing returns, the following must be fulfilled:

$$[8] \quad \frac{d^2X}{dn^2} = 0$$

From all of the above, we have obtained the characteristics the co-operative's production function must present to explain restrictions on the entry of new members and why some co-operatives share a common asset.

$$[9] \quad \begin{aligned} \frac{\partial^2 X}{\partial n^2} &> 0 \text{ for all } n < n^* \\ \frac{\partial^2 X}{\partial n^2} &< 0 \text{ for all } n > n^* \\ \frac{\partial^2 X}{\partial n^2} &= 0 \text{ for all } n = n^* \end{aligned}$$

Values below n^* create incentives to cooperate, which disappear as of higher values.

3.2. Principle of Economic Participation and Income Distribution

The previous argument explains why numerous co-operatives have a small number of partners. However, it is unable to explain the existence of co-operatives with a number of partners greater than n^* . To this end, we must include the principle of economic participation in the analysis.

In the co-operative, the payment for contributions to capital (k_i) and participation in productive activity (x_i) must be prefixed in advance to apply the value of commutative justice. Being $\bar{r}$ the fixed price for the fair remuneration of the capital, $\bar{r}k_i$ constitutes the financial income. Let us call $\bar{w}$ the price that the co-operative establishes as fair remuneration for the participation of each partner in the activity, in such a way that $\bar{w}x_i$ is the economic income of the member. $\bar{Y}$ is the sum of the economic and financial income of all the partners:

$$[10] \quad \bar{Y} = \bar{r} \sum_i^n k_i + \sum_i^n \bar{w} x_i$$

The co-operative assumes the collective objective of achieving at least enough income to compensate all of its members both economically and financially. Assuming that all partners receive the same income ($\bar{w}$) and contribute an equal amount to the capital (k)². That is to say:

$$[11] \quad w_i = w_j = \bar{w} \text{ for all } i, j$$

$$[12] \quad k_i = k_j = \bar{k} = \frac{\bar{K}}{n} \text{ for all } i, j$$

By considering [11] and [12], expression [10] above may be rewritten as:

$$[13] \quad \bar{Y} = \bar{r}\bar{K} + \bar{w}n$$

In this expression, we can see that the income objective varies with the number of partners, but it is constant for the other variables. An increase in the number of members translates into higher income for the co-operative via economic income, regardless of the financial income. The marginal increase depends on the established salary:

$$[14] \quad \partial \bar{Y} / \partial n = \bar{w}$$

If we establish p as the market price of product X offered by the co-operative in a competitive market, the fulfillment of the objectives will depend on the volume of net turnover or net income (pX) achieved by the co-operative. Three different situations may take place:

- i. Case $pX < \bar{Y}$: The net income of the co-operative is insufficient to achieve the fair remuneration of the members; the company has losses. Given this situation, one of the possible strategies is to reduce the number of partners.
- ii. Case $pX = \bar{Y}$: If this happens, the co-operative achieves the economic objectives of the members, their fair remuneration through economic and financial income. The criterion of commutative justice is fulfilled, but distributive justice cannot be applied because there is no surplus. This situation creates no incentives to increase size.
- iii. Case $pX > \bar{Y}$: If the company obtains a positive surplus ($S = Y - \bar{Y}$) in addition to satisfying the economic needs of the partners, it may fully apply the principle of economic participation because a part of the surplus reverts to the company in the form of retained earnings that integrate the common equity of the partners.

² The total amount contributed by the members is not necessarily equal to the total asset. The coop may also finance their assets with the retained earnings, which do not individually belong to partners.

In the latter case, the economic objective of the company and the partners is achieved. By consolidating the joint business project, the co-operative becomes more capable of welcoming new partners. Thus, it achieves compatibility between the principles of economic participation and open membership. Companies with the capacity to generate an additional economic income that may consolidate the co-operative's assets have incentives to open the door to new partners.

This argument justifies the existence of co-operatives with a number of partners superior to the critical value (n^*), which achieve both individual and collective objectives. Taken to the extreme, this fact could permit the unlimited growth of the co-operative. Obviously, the organisation cost of the co-operative society rises as the number of members increases; so, the number of members cannot grow unlimitedly.

3.3. Principle of Democratic Management and Decision Costs

The value of democracy, initially collected in “one member one vote” is the hallmark of co-operative society. In the models of classical literature, this effect is implicit in the production function upon the existence of diminishing returns. The literature generally concurs that a greater number of partners always generates a higher cost because the heterogeneity of the partners increases and it becomes increasingly difficult to reach a consensus (Hansmann, 1988, Morales, 1996, Bel, 1997, Hart and Moore, 1998, Mozas, 2002). Given the likely significant effect of new membership on decision-making, it seems relevant to explain this effect and the technical function of net production X separately³. Similarly, if we define:

$$[15] \quad D = D(n)$$

as the function describing how the costs of applying the democratic management principle evolve as the number of partners increases, then:

$$[16] \quad \frac{dD}{dn} > 0$$

The literature also agrees that it is a function of increasing costs in n :

$$[17] \quad \frac{d^2D}{dn^2} \geq 0$$

³ In other words, X now includes technology that is available to all firms, regardless of their organizational form.

The growth of these costs may vary from one co-operative to another. In small teams, the decision is usually made by consensus and in real time, needless of prior meetings. This speeds up the decision-making process practically without incurring costs. We may say this represents a system of direct democracy in decision-making. The cost of reaching an agreement increases as the number of members increases. What is more, they are expected to increase in a greater proportion as of a certain number of partners. This makes it impossible to apply the system of direct democracy, which will instead be closer to a representative democracy. In the latter case, growth in decision costs stabilizes upon the delegation of most of the decision-making.

3.4. Net Income and Decision Costs

The union of the net production function of the co-operative and the function of decision costs allows us to express the objective function of the co-operative as:

$$[18] \quad Y(n) = X(n) - D(n)$$

When combining these costs with the net production function, the defined characteristics of the net income function are:

- i. It is canceled for a value of n equal to zero or when $X(n)=D(n)$. In this case, the positive effects of carrying out joint business activity in the co-operative are offset by the decision costs derived from participating in the management. The costs of democratic management absorb the results of economic participation.
- ii. It takes positive values whenever $X(n)>D(n)$, i.e., with a number of partners for whom the net income exceeds the decision cost.
- iii. It is increasing when $\frac{\partial X}{\partial n} > \frac{\partial D}{\partial n}$ because $\frac{\partial Y}{\partial n} > 0$. The increase in income derived from the entry of new partners is greater than the increase in the decision costs that such entry causes.
- iv. It is decreasing when $\frac{\partial X}{\partial n} < \frac{\partial D}{\partial n}$ given that $\frac{\partial Y}{\partial n} < 0$. The increase in income derived from the entry of new partners is less than the increase in decision costs caused by the entry.

This function is no more than the net income function of the WDV model, which explicitly incorporates the costs derived from the application of the democratic management principle.

3.5. Strategies and Dilemmas of the Co-operative

For the sake of clarity, let us suppose that the net production of co-op Y adopts the following functional form:

$$[19] \quad Y = \alpha \bar{A} q n^2 - \beta \bar{A} q^2 n^3$$

In this equation the ratio $q = x/\bar{A}$ informs of the use each partner makes, on average, of the shared asset. This can be interpreted as the productivity of the partner. Thus, the function shows that the production of the co-operative depends on the number of partners, the volume of assets and the average productivity of the member.

Parameters α and β reflect the organizational capacity of the co-operative to extract from the group of partners a volume of net production higher than what they would extract if these partners worked separately. The first term ($\alpha \bar{A} q n^2$) is associated with the positive effects of the entry of new partners on production, while the second term ($\beta \bar{A} q^2 n^3$) corresponds to the negative effects of a greater number of partners. This second term may also be interpreted as a congestion effect resulting from a greater number of partners jointly managing the asset.

It can be seen in the function that the product $qn = nx/\bar{A}$ is the asset turnover. Assuming that the asset volume is fixed, we may observe that asset turnover becomes the main variable, in function of the number of partners. As a consequence, asset turnover increases only and only if new members enter. The level of assets, which we have assumed to be constant, determines the scale of the activity.⁴

We can analytically verify that the proposed function complies with the general properties discussed above. A maximum of production is present for a certain number of partners when the following two conditions are met:

$$[20] \quad \frac{\partial Y}{\partial n} = 2\alpha \bar{A} q n - 3\beta \bar{A} q^2 n^2 = 0$$

$$[21] \quad \frac{\partial^2 Y}{\partial n^2} = 2\alpha \bar{A} q - 6\beta \bar{A} q^2 n < 0$$

⁴ If the partner decides to work independently, income function would contain neither the positive nor the negative impact of the cooperation. The term α would be one and β would be zero. Then, incomes for not cooperating would simply arise from individual productivity and capital contribution k_i . The result is a Leontief production function and the economy presents constant returns to scale. Any firm may enter the market by replicating the same technology. The final supply will depend on the market prices.

The function Y shows positive values provided that $\alpha > \beta q n$. Under this condition, it is satisfied that the net production reaches a maximum in $n = 2\alpha/3\beta q$. It takes null values when no partner participates and when $n = \frac{\alpha}{\beta q}$. As of this last value, the entry of more partners would have more negative than positive effects.

If we establish the price level as the unit, variable Y represents the accounting net turnover (which approaches the concept of net co-operative income proposed in the WDV model). We can affirm that the co-operative function will have positive income and a maximum in $n = \frac{2\alpha}{3\beta q}$ provided that:

$$[22] \quad qn < \frac{\alpha}{\beta} < \frac{3}{2}qn$$

Under our assumptions, the entry of more partners will depend on the organizational capacity of the co-operative for a given asset turnover. The greater the difference between the positive effects of cooperating (α) and the negative effects of cooperating β , the greater the number of partners reaching maximum revenue is. The defined production function also allows us to deduce that, for a given α and a β , the partner will prefer to share the common asset the lower the productivity it extracts from the asset separately. In other words, cooperation allows for a more intensive use of shared resources, which would otherwise maintain a certain degree of idleness. This is really the condition of viability of the co-operative.

This objective must be achieved under the principle of economic participation. As we may recall, this is:

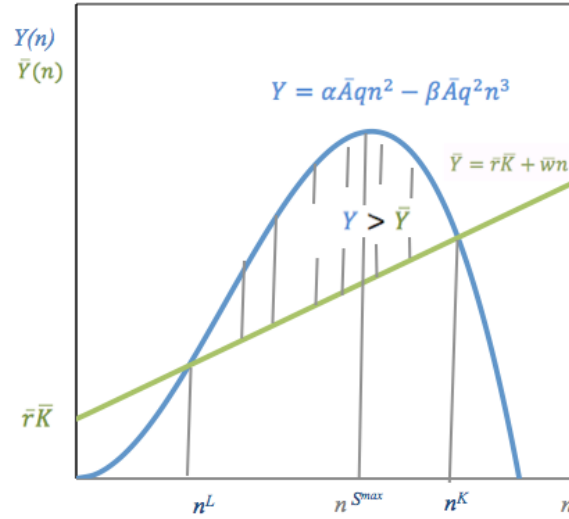
$$[23] \quad \bar{Y} = \bar{r}\bar{K} + \bar{w}n$$

This function takes the value $\bar{r}\bar{K}$ for $n=0$ and increases with respect to n . Its slope is salary established in the co-operative $\partial\bar{Y}/\partial n = \bar{w}$. Figure 1 shows the superposition of the line with the net production function. More than one strategy accomplishes the objectives of the co-operative.

For a number of partners between the values n^L and n^K , the co-operative meets its objectives. For values lower than the first or higher than the second, the co-operative fails to satisfy the restriction. It is precisely in the values n^L and n^K that the equality between the net income of the co-operative and fair remuneration of the partner is met. This situation reveals a *first dilemma* faced by the members of the co-operative: it can achieve its objective with a small or

large number of partners. Evidently, the same principle of open membership is being applied differently in n^L and n^K .

Figure 1: The co-op objective



Source: Own elaboration

A relevant difference affects the way the principle of economic participation is applied between the intermediate values and the values n^L and n^K . The accounting surplus is zero at the extremes, while the co-operative liquidates its accounts with a positive surplus in the intermediate values. This is the second dilemma faced by the members. If they only intend to apply distributive justice and achieve a fair retribution of activity and capital, the co-operative must choose between two alternatives: n^L or n^K . However, the number of members is between the values n^L and n^K if they also apply the value of commutative justice. This is where the net income of the co-operative exceeds the income assigned to the members and, consequently, the surplus is positive.

In cases of positive surplus, the principle of economic participation establishes that the surplus must be partially used to increase the resources of the co-operative, as well as coop training, information and collaboration⁵. The model shows diverse possibilities of surplus. Its maximum level, n^{Smax} , is not necessarily reached with the largest number of partners or the largest volume of co-operative net income. The number of partners with which to obtain the maximum surplus may be lower than the maximum net income. Its amount depends on the technical characteristics of the company, but it essentially depends on whether the collective

objective of the co-operative includes the surplus. Although these objectives are decided democratically among all partners, each partner must finally make a personal assessment on how new membership affects their individual objectives.⁶

3.6. The Partner's Perspective

The perspective of the partner is not necessarily identical to the perspective of the co-operative. Each partner must analyze how he is particularly affected by the entry of a new member. Part of the effects will take place immediately as a result of their economic participation, while other effects will extend into the future as a result of the cost associated to the financial immobilization of their contribution to the capital.

The net production per member results from dividing the joint production by the number of partners:

$$[24] \quad y_i = Y/n = \alpha \bar{A} q n - \beta \bar{A} q^2 n^2$$

The function y_i is growing and concave with respect to the number of partners, as may be deduced from the first and second derivatives of the function:

$$[25] \quad \frac{\partial y_i}{\partial n} = \alpha \bar{A} q - 2\beta \bar{A} q^2 n = 0 \Rightarrow n = \frac{\alpha}{2\beta q}$$

$$[26] \quad \frac{\partial^2 y}{\partial n^2} = -2\beta q^2 < 0$$

Figure 2 represents this function. The function has a maximum value at $n = \frac{\alpha}{2\beta q}$. It is canceled for the values $n = 0$ and $n = \frac{\alpha}{\beta q}$. For low values of n , the entry of new partners leads to an increase in the net income of the co-operative, until it reaches its maximum value at $\alpha/2\beta q$. From this value, costs grow at a faster rate than the revenues generated by the greater number of partners. Consequently, even though the number of members may increase beyond the

⁵ Law establishes a minimum mandatory reinvestment percentage over economic surplus (30 per cent), while the remainder may be used to compensate partners for their participation in the activity, regardless of their financial contribution.

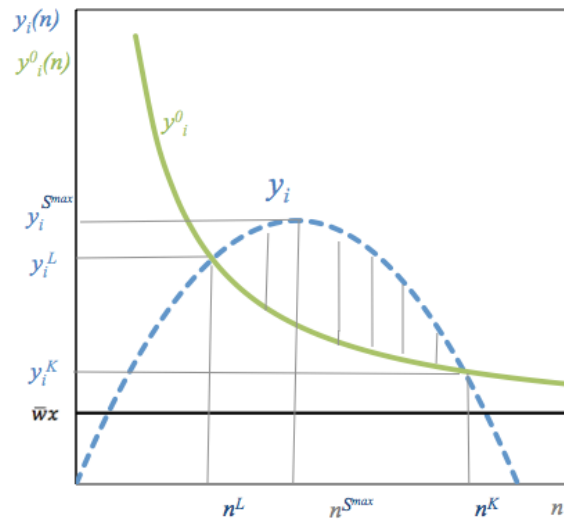
⁶ This is the discussion between the English and French schools in the 19th century. According to the former, worker cooperatives were entitled to obtain surplus. However, the French school believed worker cooperatives had to be subordinated to consumer cooperatives and surplus appropriated by the consumer through reduced prices.

value for which the maximum income is reached, this increase is associated with a reduction in the net income of the co-operative.

The partner does not receive y_i , but rather receives y_i^o , the income that results from applying the co-operative principle of economic participation:

$$[27] \quad y_i^o = \frac{\bar{y}}{n} = \bar{r}k_i + \bar{w}x$$

Figure 2: The partner's objective



Source: Own elaboration

As we have assumed that all members have contributed equal parts of capital, the individual income of the member is:

$$[28] \quad y_i^o = \bar{r} \frac{\bar{K}}{n} + \bar{w}x$$

This function monotonically decreases with horizontal asymptote in $\bar{w}x$, given that:

$$[29] \quad \frac{\partial y_i^o}{\partial n} = -\bar{r} \frac{\bar{K}}{n^2}$$

$$[30] \quad \lim_{n \rightarrow \infty} y_i^o = \bar{w}x$$

In Figure 2 we can see how the net income and the fair income per member both change with the number of members when the asset is kept constant. Clearly from the sign of the expression [29], the individual contributions to capital are reduced with the entry of partners and so is the remuneration for this concept. Thus, the remuneration perceived in the limit (expression [30]) is close to the one corresponding to an employee of the co-operative that

contributes no capital (only labor). The entry of new partners allows for a constant economic income, and it reduces individual financial income due to the lower capital contribution. For the values of n^L and n^K , the compensation of the partner coincides with the average net product per member, for which there is no surplus. The surplus is positive between the intermediate values.

Therefore, when a co-operative considers the optimal size of membership to share an asset, each partner must choose the appropriate combination of economic participation and financial participation at an individual level, and consider the impact of new membership on the decision-making process. The smaller the number of partners, the lower the decision costs in exchange for making a greater individual contribution in terms of capital. The greater the willingness to enter new partners, the higher the decision costs that will be compensated with a lower financial commitment. Both decisions are strategies that result from applying co-operative principles differently.

When members choose to keep a small number of members, they restrict the open door principle by setting a high requirement in terms of capital contribution per member. In so doing, they also concentrate income from the activity and reduce the differences between the marginal revenue per partner and the average net income per partner. This is the situation that is exposed in the WDV models. At the other extreme, the partners flexibly apply the principle of open membership to reduce capital requirements per member. However, they run the risk of distorting the essence of the co-operative with extremely low financial contributions per partner. Each partner acts like a salaried worker.

These are the two situations usually highlighted in the co-operative: one describes the difficulties of co-operatives to grow, and another their tendency to degenerate. However, there is a third situation. This happens when co-operatives reflect positive surplus as their usual policy to maintain adequate self-financing. WDV models make no explanation for this. In this situation the partners reconcile collective and individual objectives while preserving the co-operative principles.

4. CONCLUSIONS

Co-operatives were created to meet the economic needs of their members. The question is how to achieve these individual goals. If the strategy of the company implements co-operative principles, individual objectives fall into the background and behave like a necessary economic constraint for the sake of achieving a broader objective, the collective objective.

The ultimate objective of the co-operative as a business organization is to make the co-operative movement extensive to society as a whole. The open door principle is the vehicle that achieves this, but there is no unique way to apply it because it depends on how the coop implements the rest of the principles. Coops adopt a broad range of behavioral strategies to address the dilemmas faced by partners that open the door to new membership. These strategies require a unique alternative model to explain them.

Some strategies allow the survival of the co-operative, but they clearly differ in size and financial commitment. Most are demanding in terms of new membership given the increase in decision costs associated to applying the democratic management principle. This makes them small-sized firms with reduced membership that maintain high participation in the activity and high financial contribution. Yet we observe that other companies open the door to a greater number of partners because this has no significant effect on decision costs and it entails lower individual partner commitment in the firm's activity and financing. Although they implement the principle of free access differently, both strategies apply the principle of economic participation the same way; this leads to the non-existence of surplus. This might imply the risk of degeneration but, above all, it breaches the ultimate objective: the expansion of the co-operative formula.

Contrarily, when partners apply the value of commutative economic justice implicit in the principle of economic participation in addition to complying with the principles of free adherence and democratic management, they contribute to the expansion of the co-operative model in conditions that guarantee the economic viability of the firm. If the increase in income is greater than the increase in the costs of the activity, both in terms of production and decisions, the resulting net income leads to a positive surplus. According to the value of distributive justice inherent in the principle of economic participation, this surplus must return to the individual, the co-operative and society. That is, co-operatives accomplish their ultimate goal when they integrate the full set of principles into their individual and collective objectives.

This paper highlights that one of the keys to economic success lies in following the principles outlined by co-operative movement forerunners. These principles have hardly changed throughout time. They are the fundamental core of co-ops and the best blueprints for harmonizing individual and collective objectives. This is why our work suggests keeping this perspective in the analysis and leaving behind the recurrent comparison between co-ops and other economic organizations. To this end, we should make a greater effort to analyze the

principle of economic participation to better understand the impact of a positive net surplus on the viability of the co-operative movement.

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