

5th EMES International Research Conference on Social Enterprise

Helsinki, June 30 – July 3, 2015

The effects of workers' participation in governance, ownership and profit sharing on the economic performance of worker cooperatives.

An empirical analysis of 1200 French SCOP

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June 2015

¹ The authors want to express their deep gratitude to the *Confédération Générale des SCOP* (Paris) for providing financial information for more than 1,200 member worker cooperatives.

Introduction

A production activity results from the association of both labor and capital. The alliance between those two inputs makes a company able to perform its economic activity but unable to leave aside neither one nor the other. Therefore, why does the decision-making power of most companies end up in the hands of capital owners only?

Many economists, starting with the utopian socialists of the nineteenth century, have raised this question. At that time, the questioning of the association between power and capital ownership as well as the willingness to incorporate democratic principles in the business world led to the launch of initiatives based on so-called cooperative or self-management principles.

Nowadays, this question becomes more relevant than ever. The supremacy of capital along with the shareholder's search for the maximization of short-term profit are seen by many as responsible for the recession that Western economies have just come through. The shortcomings of our capitalist model highlighted by the crisis lead us to explore other business conceptions such as the cooperative, and in particular the worker cooperative. Specifically, we propose to study here the economic relevance of this business model, and in particular, the impact of workers' participation on economic performance.

From a theoretical and empirical point of view, workers' participation in governance, ownership and profit sharing seems to have ambiguous effects on companies' efficiency. Workers' participation, regarded sometimes as an incentive to make an extra effort, sometimes as an additional cost, has fueled many theoretical and empirical scientific debates, especially in the 1970's and 1980's marking the end of "The Glorious Thirty". Today, in a Europe struggling to find the growth path, it makes sense to try to update the debate. In this perspective, we will conduct our own analysis by studying the case of French *Sociétés Coopératives et Participatives* (SCOP).

This article begins with an overview of theoretical works about self-managed companies' economic performance. Then, in a second section, we present the model thanks to which we will address the issue as well as the database that we use. Our approach is based on the estimation of a production function "augmented" by variables apprehending the different forms of participation. Our econometric estimations will of course be discussed and we will conclude with a summary of our main results.

1. Economic theory and economic performance of the self-managed firm

According to economic theory, the various forms of participation in a self-managed firm may influence positively or negatively the firm's performance through their actions on the workers' productive capacity, on the intensity of their effort in work and/or on the company's organizational efficiency. In the following three paragraphs, we go back on those three effects as highlighted by economic theory.

1.1. The effects of participation on workers' productive capacity

Let us focus first on the impact of workers' participation on their productive capacity and specifically, on *the increase of human capital*, that is to say, the workers' skills. Indeed, a

participatory system can lower turnover and better preservation of professional experience within the company through the following three mechanisms:

- An easier resolution of conflicts thanks to a democratic framework and a better information flow. Such a more pleasant working environment encourages workers to stay in the company²;
- A low liquidity of capital shares held by workers in the framework of workers' participation in ownership³. Since capital shares are reimbursed at their nominal value, workers have little incentive to sell capital shares and to leave the cooperative;
- An incentive for workers, both psychological and material, to dedicate themselves more to the firm⁴. In the first case, a participatory scheme generates a stronger identification with the company among workers. In the second case, the promise of higher income via profit sharing, the greater job stability or, the prospect of remuneration linked to years of service are elements that encourage workers to compromise themselves in company's life.

Participation may, however, have a negative impact on some workers' productive capacity, namely on managers' one⁵; the decrease of authority and of discretionary power of managers resulting from a participatory system makes *the managerial input less productive*.

1.2. The effects of participation on workers' effort

The *positive image* that workers have of their work place, the *evolution of their income* related to company's performance and the increase of *responsibilities* are three elements resulting from participation that encourage workers to make an extra effort and to care more about the quality of their work⁶. The *possession of capital shares* is also an element that promotes labor-force's motivation because it involves a risk for workers of lower wealth if the company does not grow richer⁷.

However, nuances must be brought concerning this motivation generated by a participatory system. Regarding for instance profit sharing, since the company's profit depends on many more factors than only on workers' effort, without any access to management, labor-force may be reluctant to invest too much energy in a situation they sparsely control. Participation in management allows them thus to decide on key elements with respect to the performance and increases their ascendancy on the company's success. The involvement of workers in decision-making may therefore be essential to feel the positive effect of profit sharing⁸. Workers' trust in management is another element that supports the positive influence of profit sharing⁹. Indeed, without any clear and accurate information, employees may feel that management manipulates the company's result to their detriment, especially when the extra income related to profit sharing is low.

² Freeman (1976) et Hirschman (1970)

³ Levin (1984)

⁴ Levin (1982) and Vanek (1970)

⁵ Webb & Webb (1920)

⁶ Jevons (1887) and Mill (1909).

⁷ Perotin & Robinson (2003)

⁸ Perotin & Robinson (2003)

⁹ Fakhfakh & Perotin (2000)

Another element that seems to reduce absenteeism, laziness and waste is based on the development of a system of horizontal monitoring¹⁰. In an organization ruled by the principles of cooperation, pressures and informal sanctions from above are replaced by social dynamics based on positive collusion. The peer pressure pushes workers to improve their productivity. In addition, employees have the ability to put pressure on the less productive ones given that they hold information that is not accessible for managers¹¹.

Other mechanisms related to workers' participation also positively influence employees' effort in production. In particular, this is the case of the setting of *common objectives* which fosters cooperation between employees and management¹².

Nonetheless, several authors express reserves about this positive effect of participation on efforts provided by workers.

First, given the difficulty to measure precisely individual productivity, workers' remuneration is not directly and proportionally influenced by the energy they display. Everyone therefore may tend to take advantage from their colleagues' effort and to decrease their productivity without observing a proportional reduction of their remuneration. This free-rider phenomenon implies the need of a team supervisor or a foreman and is therefore opposed to the horizontal monitoring theory previously developed¹³. Nevertheless, if we further explore the issue by assuming that free-riding is chosen by everybody, workers may finally choose to cooperate because this solution offers greater benefits to everyone¹⁴. Vanek (1970) accentuates this assumption because according to him, given the democratic principle set up in a self-managed company and the absence of conflict between employer and employees, workers perform their work as a unit and not as individuals. Consequently, each one provides the necessary effort to improve the business' performance and to increase earnings of all.

Second, by mortgaging their authority and discretionary power, the participatory system can also encourage the company's management to provide less effort¹⁵.

1.3. The effects of participation on organizational efficiency

Cooperation creates an atmosphere that facilitates *communication* between workers and management, allowing the latter to be aware of company's organizational inefficiencies. Indeed, in a classical firm, revealing some problems is not always advised for workers¹⁶. Moreover, participation makes workers more likely to implement decisions from management, to welcome technological progress and to venture their own innovative proposals in their field¹⁷.

However, many authors noted that participation can also have a negative impact on company's organizational efficiency.

¹⁰ Cable & Fitzroy (1980a ; 1980b)

¹¹ Jones & Svejnar (1982)

¹² FitzRoy & Kraft (1987b).

¹³ Alchian & Demsetz (1972)

¹⁴ Weitzman & Kruse (1990)

¹⁵ Marshall (1919) and Steinherr (1977)

¹⁶ Cable (1984)

¹⁷ Cable & FitzRoy (1980a), Levin (1982) and Vanek (1970)

Regarding participation in governance, workers inexperienced in management supervision or control through a General Assembly need *training* in this area, what may represent a significant cost for the firm¹⁸.

The *formation of collective preferences* can also create some difficulties when individuals have heterogeneous preferences. According to the “public choice” literature, transaction costs related to decision-making increase when preferences within a group are heterogeneous¹⁹. When these decisions are taken by majority vote, they are affected by consistency problems²⁰.

The impact of participation on organizational effectiveness also depends on the *size* of the company, especially the number of workers. For example, a participatory model may be less efficient in businesses with few employees if the small size of the firm and/or its youth tempt the organization to involve everyone in all decision-making, despite the negative impact that a “democratic excess” could have on organizational effectiveness²¹.

Participation in governance can also be seen as inappropriate in large companies where the hierarchical system seems the most suitable to manage complex information at low cost²². The communication network required for participation in a large organization generates large transaction costs and therefore, an inefficient organizational system²³.

1.4. Other effects on economic performance

Participation in ownership implies that workers invest significantly in the firm and it does not allow them to *effectively diversify their assets*. Indeed, the company is the guarantor of both their jobs and a part of their savings. Dealing with this situation, workers are less likely to make risky investments. They will rather accept a lower level of risk than shareholders whose assets portfolio is diversified. This may result in lower productivity for the self-managed enterprise²⁴. One solution could be to use external investments, but when they are accompanied by a control power, what is often the case, the principle of self-management weakens.

1.5. Synthesis

All in all, economic theory identifies three channels through which worker participation affects company's performance: the workers' productive capacity, the workers' effort and the company's organizational effectiveness. Through the reading of the ambiguous theoretical predictions, workers' participation appears to be a complex phenomenon. It causes various consequences on workers' behavior and therefore, the most likely global effect on the firm's performance is hard to identify.

¹⁸ Marshall (1919)

¹⁹ Jensen & Meckling (1979)

²⁰ Bonin & Putterman (1987)

²¹ Defourny (1987)

²² Simon (1971)

²³ Williamson (1975)

²⁴ Meade (1972)

2. Lessons from previous empirical studies

Debates on the effects of workers' participation have already inspired various empirical attempts to capture the actual effects of such participation the performance of self-managed firms. Most of these studies were undertaken in the 1980's and 1990's but the last fifteen years also witnessed various studies. An updated overview of these empirical works is provided by Dethier (2014).

To sum up, such empirical works can be classified into three major categories. First, the early studies were based on simple static comparisons of average data for small samples of self-managed firms, mostly worker cooperatives on the one hand, and for traditional for-profit companies in the same industries. Such studies, mostly focusing on countries like the UK, Italy and the US appeared very basic and with major limitations, especially regarding the small number of observed cooperatives and the broad definition of their industries.

A second wave of studies used econometric techniques to estimate the impact of various types and various degrees of worker participation on self-managed firms' performance. Estrin, Jones and Svejnar (1987) provided a synthesis of such studies carried out for workers cooperatives in Western economies. We will not go into details of these techniques now as this paper will use the more appropriate ones, i.e. those based on the estimation of a production functions "augmented" with some variables reflecting various modes of actual participation.

A third category of empirical studies relied on dataset including both self-managed and capitalist firms in the same industries. Some of them provided interesting results but were heavily dependent on the quality and comparability of data from both sides. Various econometric techniques were used for such comparisons among which estimation of stochastic or deterministic "production frontiers" representing the higher levels of output that can be achieved with given quantities of inputs. For each firm, a degree of technical efficiency can be computed on the basis of its proximity to the production frontier. Provided data are available for both types of firms within narrowly defined industries, such works can prove to be quite complementary to econometric studies of the second category.

It is quite difficult to summarize results of all these empirical works. At this stage, let us note that various studies tend to suggest a positive effect of worker participation on productivity. However, such an effect seems to vary a lot depending on what kind of worker participation is analysed. Moreover, evidence of a lower economic performance of workers' cooperatives does exist as well, especially for undercapitalized coops and in certain industries.

Generally speaking, studies on French workers' cooperatives (SCOP) carried out since the mid-1980's benefitted from rather good datasets. Among them, econometric works by Defourny, Estrin, Jones (1985), and production frontiers estimated by Defourny (1992) could rely on data for a few hundreds of cooperatives. However, these works relied on data collected for the 1970's and early 1980's and updates would be needed. Moreover the quantity and quality of data collected by the Confederation of SCOP have increased significantly in the last two decades and allow for more reliable works. Finally, we should note that a few scholars like Fakhfakh and Perotin (2000) or Fakhfakh, Perotin and Gago

(2012) worked on French SCOP with more recent data but from perspectives which are not in the line of the second and third categories described here above.

3. Modelling workers' participation in French producer cooperatives

As just mentioned, several studies regarding the impact of participation on the SCOP's performance have already been conducted but the majority of them predate the 2000s. It is thus interesting to update the results of those empirical researches using more modern and rigorous techniques, especially regarding data collection. We chose to study SCOP because they are grouped into a well structured network which provided access to a truly outstanding dataset covering most of member cooperatives. Our study is therefore characterized by the use of a large reliable database and by the updating of the methods used previously.

Data used in our study come from the *Confédération Générale des Scop* (CG-Scop) which has lists of its member cooperatives with various characteristics (year of creation, industry, etc.) and from the financial statements of these cooperatives which are collected by the Confederation. Our sample consists of general and financial data collected for all SCOP members of the CG-Scop in 2006, 2009 and 2012. The choice of these years allows us to have information about these cooperatives before, during and after the economic crisis. From our primary dataset, we removed enterprises that were unable to provide financial data given their recent creation or imminent bankruptcy or that showed inconsistent data. As a result, we have at our disposal data for 1219 SCOP in 2006, 1333 in 2009, 1436 in 2012. To our knowledge, such a dataset covering practically all French SCOP is probably the largest empirical basis ever used in the economic analysis of workers' cooperatives in Europe and elsewhere.

Our research strategy does not involve any comparison with conventional companies owned and controlled by shareholders. Instead, given that all SCOP have varying degrees of participation, the size of our sample almost covering the entire population allows us to observe a large spectrum of participation degrees in governance, ownership and profit sharing. We will therefore try to see whether the degree of participation along these three modes has an impact on cooperatives' economic performance. The following sections outline our methodological approach, results and their analysis.

3.1. Methodology: toward an « augmented » production function

To measure the impact of workers' participation on company's economic performance, we adopt a method already used by previous similar studies²⁵, namely *the estimation of a production function "augmented" by variables that capture the degrees of the different types of participation*. Specifically, we consider the following production function:

$$V = V(K, L, X_1, Z), \quad (1)$$

where V stands for the added value; K , the equity; L , the average workforce, i.e. the firm's average number of employees during a year; X_1 , a vector of variables specific to the company including binary variables for the field of activity (industry), the region where it operates, its legal form, the way the cooperative was founded, the age of the enterprise; Z , a vector of four

²⁵ See, among others, Conte & Svejnar (1988), Conte & Tannenbaum (1978), Estrin, Jones & Svejnar (1987), Defourny, Estrin & Jones (1985), Jones & Kato (1995) and Jones & Svejnar (1985).

variables measuring the importance of the different modes of participation. (See Appendix 1 for details about these variables).

A key step in the specification of the model of course consists in determining and in defining precisely the variables that constitute the Z vector, namely the four variables measuring the importance of the different forms of participation which are *the participation in governance*, *the participation in individual ownership*, *the participation in collective ownership* and *the participation in profit sharing*. This will be discussed in the three sub-sections hereafter.

Another key step of our methodology consists in choosing the most suitable form of equation (1), that is to say a form of production function that is relatively simple, whose properties are well known, but which however avoids problems of model specification. To meet this objective, we have decided to choose between the three following forms of production function: a Cobb-Douglas production function (CD), the linear approximation of Kmenta (1967) of the production function with constant elasticity of substitution (CES) and the transcendental logarithmic form of the production function (Translog). The development of these three production functions is available in the Appendix 2. After estimating by ordinary least squares these different forms of production function, we will select the best suited to the technological state of the economy and analyzes the results.

3.2. Participation in governance –(LS)

Measuring participation in governance represents usually a major problem, since this form of participation is more qualitative than quantitative. It would have been optimal to conduct a detailed survey in all worker cooperatives to assess workers' actual degree of participation in governance. We do not have such data which would have required another whole research project. Therefore, we adopt the most frequently used method which consists in taking the proportion of workers who are members of the general assembly as a proxy. This variable is called LS in our analysis and it varies from zero to one: it is equal to the number of member-workers divided by the total number of workers (see Table 1 hereafter)

Although this procedure has been used in various studies, we admit straight away that it is unsatisfactory because it only poorly reflects the reality of a participatory governance process: it captures only one dimension of such governance, i.e. the right to take part in the G.A., which probably hides a diversity of behaviors, from just attending (or not) meetings to very active ways of participating in the decision making process within such an assembly.

3.3. Participation in ownership

Participation in the ownership of a worker cooperative may take individual and collective forms. We will thus establish two different measures in order to assess the impact of these two types of participation on the firm's performance.

Participation in individual ownership – KLS

To measure individual participation in ownership, we take the average amount of capital shares held by member-workers, as Jones & Svejnar (1985), Defourny (1987) and Jones (2007) did. This variable is named KLS and is expressed in euro. It is thus equal to the total value of capital shares held by all member-workers divided by the total number of member-workers.

Let us also note that SCOPs have mechanisms that encourage workers to invest in their cooperative without however purchasing capital shares in the short run. More precisely, when profits are distributed to workers (see section 3.4. here after), the latter have some fiscal incentives to leave such distributed profits on internal accounts which then represent a kind of loan to their enterprise. Part of such “loans” can be transformed in capital shares after a certain period. However, we were not able to take this “financial individual commitment” of workers into account here, especially when it does not induce purchase of shares.

Participation in collective ownership – COKLS

In order to take into account the participation in ownership at the collective level, we have created a variable named COKLS, expressed in euro. At the end of each fiscal year, all SCOPs are under the legal obligation to allocate a share of their net surplus to the development fund on one side, to the legal reserve on the other side. The amount of these two allocations results from a choice of the GA, even if minimum levels are imposed by legal rules and somehow guided by tax benefits²⁶. As a consequence, the amount of such allocations indicates the extent to which member-workers decide to strengthen the financial health of their cooperative rather than to benefit individually from a higher pay.

Our variable COKLS represents the average amount of profits allocated to both collective reserves, namely the legal reserve and the development fund, per member-worker, using in this way a method similar to Jones & Svejnar (1985), Jones (2007) and Defourny, Estrin & Jones (1985).

Table 1: The four chosen variables to capture participation

Mode of participation	Name of the variable	Content of the variable	Unit
Participation in governance	LS	$\frac{\text{Number of member-workers}}{\text{Number of workers}}$	Percents
Participation in individual ownership	KLS	$\frac{\text{Capital shares held by member-workers}}{\text{Number of member-workers}}$	Euro
Participation in collective ownership	COKLS	$\frac{\text{Amount allocated to collective reserves}}{\text{Number of member-workers}}$	Euro
Profit sharing	PARTL	$\frac{\text{Amount allocated to "worker distribution"}}{\text{Number of workers}}$	Euro

3.4. Profit sharing – PARTL

SCOPs are legally obliged to distribute at least 25% of their net income to workers, be they members or not. This profit share distributed to all workers is called "worker distribution". In

²⁶ The amounts allocated to the legal reserve and development fund may be deducted from the taxable basis provided that the cooperative commits to reinvest this money in a four-year period.

a SCOP, each worker has therefore the right to receive part of profits. When he/she is also a member worker, he/she can also receive a dividend for being a “shareholder” of the cooperative. However, such a dividend depends more heavily from the financial health of the enterprise as the G.A. may decide not to distribute any dividend in difficult years.

To effectively measure profit sharing, it seems straightforward to take the average amount allocated to "worker distribution" per worker. In our analysis, this variable is called PARTL and is expressed in euro. Let us note that PARTL does not include any dividends on capital shares.

As already mentioned, workers may decide to leave their profit share on internal accounts within the cooperative. If the "worker distribution" is then blocked for a period of five years in the firm and then converted into capital shares, they can benefit from tax deductions.

4. Results of the econometric estimations

This section outlines the major findings of our empirical research. We will first adopt a general point of view without making any distinctions among SCOP on the basis of their size. Then we will provide more detailed results, especially when taking into account size categories among cooperatives, a dimension which may influence the actual feasibility of at least some forms of participation.

From a technical point of view, we have decided to only focus on results showing estimators which prove to be significant for at least two years out of three. For each model, we have also checked the exogeneity of our participatory variables. Indeed, strictly speaking, our econometric estimations identify correlations but not the direction of the link between independent and dependent variables. In a series of previous studies, authors acknowledged they just assume exogeneity. In our case, we have tried to check whether participatory variables were indeed exogenous instead of endogenous. The possible endogeneity of the participatory variables would mean that the level of participation is itself determined by the cooperative's economic performance. We therefore have tested the nullity of correlations between the error terms of our models and the participatory variables as potential sources of endogeneity. The absence of correlations demonstrated by our testing tends to suggest that our participatory variables are not sources of endogeneity and that our model does not face any simultaneity problem. Our participatory variables thus do not appear to depend on our dependent variable measuring the enterprise's performance and thus suggest a certain robustness of our results.

4.1. Impact of workers' participation without size categories

As announced, we start by adopting a general point of view, i.e. without adding any dummy for size categories to variables included in the “augmented” production function. Table 2 hereafter shows in a simplified way results for estimated coefficients of the participatory variables. Full results are presented in Appendix 3.

Impact of participation in governance - LS

Let us start with the analysis of the impact of the participation in governance through the LS estimated coefficients. Our results mainly show a *negative and significant effect* of the workers' participation in governance on cooperatives' performance. In our theoretical

synthesis, we have pinned that participation in governance could diminish the authority and the discretionary power of managers and thus undermine the effectiveness of the managerial input²⁷. Nevertheless, remember that LS is a less reliable indicator of workers' participation and more comments should come from taking account the size of cooperatives (section 4.2).

Table 2: Results of econometric estimations for the participatory variables

LS	_06	-	**
	_09	-	**
	_12	-	***
KLS	_06	+	**
	_09	+	*
	_12	+	
COKLS	_06	-	
	_09	-	
	_12	-	
PARTL	_06	+	***
	_09	+	***
	_12	+	***
R2 adjusted	_06	0,935	
	_09	0,895	
	_12	0,91	

*/**/** indicates a significant test at the threshold of 10/5/1 percent(s)

-/+ indicates a negative/positive estimator

Source: data from the CG-Scop

Impact of the participation in individual ownership - KLS

Regarding the participation in individual ownership, we observe a *positive and moderately significant impact* of this participation on added value in two years out of three.²⁸ In our theoretical synthesis, we have noted that the individual participation to capital can improve business performance through *the increase of human capital* as a result of the lower staff turnover²⁹, the low liquidity of the capital shares held by workers or the stronger identification with the company³⁰.

Second, and more directly, since *the prospect of receiving a higher dividend* depends on their productivity, the more capital shares one member-worker holds, the stronger the incentives they have to provide a more intense effort in work³¹.

Impact of the participation in collective ownership – COKLS

When it comes to the participation in collective ownership, this link between pay and participation appears to be less direct for the worker³². Indeed, we observe no *significant impact*³³ of the participation in collective ownership on performance.

²⁷ Webb & Webb (1920), Marshall (1919) and, Steinherr (1977).

²⁸ Defourny et al. (1985), Estrin et al. (1987), Jones & Svejnar (1985) et au niveau de la rentabilité de l'entreprise, Conte & Tannebaum (1978).

²⁹ Levin (1984).

³⁰ Levin (1982) et Vanek (1970).

³¹ Jones & Kato (1995).

Since the allocation of a proportion of profits to collective reserves is *legally bound and tax-efficient*, this result is logic: an increased collective ownership only slightly reflects a real will of the member-workers to take more part into a collective effort.

In addition, we explain this result by the fact that *the COKLS estimator competes with the KLS and PARTL estimators*. Indeed, the member-worker remains aware that a greater participation in collective ownership contributes to a balanced situation for the company but it is only in the long term that they will benefit, for example, from a more stable job or from a higher pay³⁴. In the short term, however, the allocation of a larger share of profits to collective reserves means weaker possibilities for dividends and for remunerating workers in the form of "work distribution". Since, in the case of participation in individual ownership and of profit sharing, the link between benefits and effort is more direct, it is logic to observe that KLS and PARTL have more significant estimated coefficients than COKLS. This leads us to analyze the PARTL estimator.

Impact of profit sharing - PARTL

In our estimations, the link between profit sharing and cooperatives' performance clearly appears to be *positive and significant*. Such a result is not surprising as it confirms a trend which already appeared in various previous studies, not only about French SCOP but about workers' cooperatives in several other countries as well³⁵. This result can be considered logical given that there seems to be a *direct link between workers' higher pay and a more intense effort* leading to better economic performance.

4.2. The influence of SCOP size

Although these first estimations already highlight important elements that explain the impact of participation on company's performance, our analysis should not be stopped now. Indeed, several authors among whom Defourny (1987) have suggested that the size of a worker cooperative also influences the importance of this impact because the ways workers can actually participate and feel the benefits of such participation are extremely different in a context where the workforce is made of say 5, 50 or 500 people.

Correlation between participation and workforce size

Such a hypothesized relation between the size of a cooperative and workers' participation appears particularly convincing by looking at Table 3 hereafter which shows correlation coefficients between participatory variables and the average (over a year) number of workers are strongly significant for three of our four participation indicators.

From this table, we see that when the size (workforce) of the cooperative increases, the proportion of workers who are members decreases. This meets the common sense: in its founding stage, a workers' cooperative generally involves all the latter in its membership. At

³² This result is similar to the one obtained by Estrin & al. (1987).

³³ However, let's note that when we take into account the fact that participation can have an embedded and a non-embedded effect into the labor factor, the impact of participation in collective ownership appears slightly significant and positive.

³⁴ Levin (1982) and Vanek (1970) theoretically had imagined this positive effect of participation in collective ownership.

³⁵ Defourny & al. (1985), Estrin & al (1987), Fakhfakh & Perotin (2000), FitzRoy & Kraft (1986 ; 1987a ; 1987b), Jones & Kato (1995) and, Jones & Svejnar (1985)

the other extreme, workers being hired by a large cooperative are less likely to all become members.

Table 3: Correlation coefficients between participatory variables and the number of employees

	L_06	L_09	L_12
LS	-0,10046763***	-0,12827510***	-0,15099520***
KLS	0,16966249***	0,14797584***	0,13397973***
COKLS	0,09896016***	0,07989917***	0,06872484***
PARTL	0,02447659	0,00732564	-0,00103991

*/**/*** rejection of the null hypothesis of no correlation at 10/5/1 percent (s)

Otherwise, non-rejection of the null hypothesis of no correlation

Source: data from the CG-Scop

As to participation in individual and collective ownership, we note that both of them are quite significantly and positively related to the cooperative size, although with the correlation coefficient for the former (KLS) being twice as high as for the latter (COKLS), both variables being expressed in euro/(member) worker. Several reasons may explain such relationships which can probably reflect influences in both directions. First, a greater participation in individual ownership (more shares per worker) implies a greater availability of equity funds for the enterprise and, all things being equal, a greater capacity for the enterprise to finance its growth. In the other direction, we have seen that the net operating surplus allocated as "worker distribution" can be blocked for a period of time with tax exemption³⁶. In such a context, a large company, being more likely to be older and to have experienced more years of economic success, has probably distributed more profits as "worker distribution" over time. At least part of the latter having been converted into capital shares, accumulated participation in individual ownership is generally higher in large companies.

Regarding the COKLS variable, it seems clear that a higher participation in collective ownership (through profits being allocated to a collective reserve) also enables greater availability of funds to finance the cooperative's growth.

Finally, concerning the PARTL variable, we see no significant correlation between profit sharing and company size. Instead of resulting from a cumulative process of purchasing shares (KLS) or allocations to collective results, the participation to profit sharing is a yearly event which may totally differ from one year to another. Moreover, the annual economic success of an enterprise is probably more related to various internal and external factors than to the workforce size.

Results from econometric estimations

We now use the same approach as in the general case (section 4.1 here above), but separating our SCOP population into three different groups, depending on the enterprise's size. We have defined small businesses as those whose average number of employees is less than 10; the average number of employees of medium-sized enterprises is between 10 and 49; and the

³⁶Distributed profits which are blocked for five years on internal individual accounts under "worker distribution" are exempt from income tax and social security contributions. In case of immediate payment of "worker distribution", the distributed profits are subject to income tax.

workforce of large companies is greater than or equal to 50³⁷. Estimations we obtained for participatory variables are represented in a simplified way in Table 4, full results being presented in Appendix 3 (Table A3.b).

Table 4: Results from econometric estimations for the participatory variables with size effects

		L < 10		10 ≤ L < 50		50 ≤ L	
LS	_06	-		-		+	
	_09	-		+		-	
	_12	-	***	-		+	
KLS	_06	+		+	**	+	
	_09	+		+	***	+	
	_12	-		+	***	+	
COKLS	_06	+	**	+		-	**
	_09	-		+		+	
	_12	+		-		+	
PARTL	_06	+	***	+	***	+	***
	_09	+	***	+	***	+	**
	_12	+	***	+	***	+	***
R2 ajusté	_06	0,795		0,798		0,8491	
	_09	0,6865		0,7301		0,9193	
	_12	0,7055		0,7897		0,8706	

*/**/*** indicates a significant test at the threshold of 10/5/1 percent(s)

-/+ indicates a negative/positive estimator

Source: data from the CG-Scop

Impact of participation in governance – LS

We first observe that when we disaggregate the impact of participation by company size, *the estimator of the participation in governance becomes generally non-significant*. This result is discordant with the one we previously obtained but this can be at least partly explained along the following lines. First, in spite of the already stressed weakness of the proportion of workers who are members as an indicator of actual participation in governance, such a ratio still deserves some attention. More particularly, the proportion of member workers appeared strongly correlated to the cooperative size (Table 3), which helps to understand that such correlation most probably decreases among cooperatives within more homogenous size categories. Second, coming now to the impact of the proportion of member workers on the enterprise's performance, the strong negative effect suggested by our first results (Table 2) may have disappeared with the strong reduction of the size effect within size categories. Even if such an interpretation may be correct, we should not forget that our LS variable remains a poor indicator of the actual workers' participation in governance.

³⁷ For small businesses, the number of SCOP for the years 2006, 2009 and 2012 is respectively 686, 695 and 817. For the medium-sized category, the number of SCOP for the years 2006, 2009 and 2012 is respectively 444, 502 and 486. For the large-size category, the number of SCOP for the years 2006, 2009 and 2012 is respectively 119, 136 and 133.

Impact of participation in individual ownership - KLS

Coming now to individual participation in ownership, Table 4 show much clearer results than our previous estimations where the KLS estimator only appeared only slightly or moderately significant for two years out of three. On the contrary, the KLS estimator is *most often highly significant and positive for medium-sized enterprises*, while it is never significant (although positive) for small-size and large workers' cooperatives. Such a clear result for a quite precise and reliable indicator of participation seems to be a major result of our empirical analysis. Moreover, it tends to confirm results achieved by previous studies of French SCOP relying on a large number of observations (around 300 or 500 SCOP) which however were much older (1970-1979). By that time, such studies were carried out by Defourny et al. (1985) and Defourny (1987) with augmented production functions like in this paper, by Defourny (1986) for comparative performance analysis on the basis of financial and economic ratios as well as by Defourny (1987, 1992) for comparative performance analysis carried out through the estimation of stochastic production frontiers. Let us now see what can be drawn from these previous studies for the interpretation of our present results.

Many small workers' cooperatives seem to suffer from under-capitalization (Defourny, 1986, 1987). In labor-intensive industries such as intellectual services, the low level of capital brought about by workers into a SCOP in its initial stages does not affect much the cooperative's performance. However, in the case of more capital-intensive industries, such under-capitalization prevents cooperatives from achieving a good performance, while a traditional entrepreneur may have at the outset or find more easily enough capital for the enterprise he is setting up (Defourny 1990). By separating our population according to the workforce size, we have created a group of small SCOP partly made up of cooperatives suffering from underfunding and therefore, the overall category of small SCOP logically displays various levels of economic performance. In such a heteroclite group, the link between KLS and business' performance then proves to be difficult to observe.

To interpret the quite significant results regarding medium-sized SCOP, we put forward the hypothesis that the KLS variable, i.e. the average amount (in euro/membre) of workers' individual capital shares may reflect three drivers of workers' involvement:

- Co-ownership: through participation in individual ownership, the worker buys at least one share of his enterprise and becomes co-owner. This reinforces the sense of the worker's identification to the company. Moreover, such co-ownership is steadily reinforced each time distributed profits are converted into capital shares after having been blocked on personal accounts within the cooperative.
- Co-responsibility: the purchase of capital shares makes the worker co-responsible of the company's decisions. Indeed, holding a capital share gives him access to the GA which holds the ultimate decision making power, even if the decision-making process is organized through delegations to a single director or a board of directors for everyday life.
- Co-benefit: as a shareholder of the cooperative, the worker is also entitled to profit sharing in the form of a (limited) dividend for the capital shares he/she holds.

We explain the non-significance of KLS in large enterprises mainly by the fact that *the larger the company is, the less workers feel influenced by the three previous elements*, in spite of the fact that the average amount of individual capital shares may be the higher in large SCOP as suggested by Table 3 here above. Regarding co-ownership, the feeling of self-identification of each worker is probably diluted in a group of more than 50 or 100 member workers. In terms of co-responsibility, the same dilution effect occurs: the weight of a worker in the decision-making process, as well as his/her sense of responsibility is lessened when the size of the company increases.

As to the right to receive a dividend on individual capital shares, it certainly exerts a stronger effect in small and medium-sized cooperatives than in larger ones. In a small business, a member worker can particularly influence the performance of the latter by being more productive and therefore expect to receive a larger dividend. This probably holds true in medium-sized cooperatives when this effect is combined with the others already stressed for such a category. On the other hand, in large companies, the extra effort provided by a member worker is much more diluted and it has a less direct impact on the company's profits and on a potential dividend.

As a general note about incentives provided by a potential dividend, we know that such a dividend always remains limited due to a key cooperative principle imposing a limited remuneration of capital. Second, such a dividend can only, by definition, be decided when the year's net income is positive. Third, when making profits, French SCOP seem to prefer organizing first individual participation in profits among all workers through the "worker distribution" mechanism associated with fiscal incentives, rather than through dividends on shares. In conclusion, the individual participation in ownership does not probably reflect much of the effects which might result from profit distribution. As we will see, the variable PARTL captures such effects much better as already suggested by results presented in Table 2, even without taking the size of cooperatives into account.

Impact of profit-sharing – PARTL

Indeed, results for the PARTL estimators remain all positive and strongly significant with disaggregation of our SCOP population into size categories. This is clearly the second major finding of our empirical analysis: workers' participation in profits does exert a strong effect on cooperatives' economic performance whatever the size of the workforce. To rightly interpret this result, we can stress that participation in profits, especially through "worker distribution" is to a large extent proportional to the overall profits as at least 25% of total profits must be distributed to workers. This means here that workers' increased efforts leading to higher profits in general are "paying back" almost automatically whatever the size of the cooperative. Along the same lines, as already stressed, distribution of profits is a yearly "event" and individual benefit directly depending on the overall efforts provided by workers during that year while individual participation in ownership is a cumulative process less related to the annual performance.

Impact of the participation in collective ownership – COKLS

We left the COKLS estimators for the very end of this analysis as they are *weakly significant, regardless the cooperative size*. It thus seems that participation in collective ownership

influences very slightly economic performance. This was already our assessment in the previous section because this indicator follows external rules about allocation of profits to a collective reserve rather than resulting from an actual expression of participation.

Conclusions

Faced with the harmful consequences that the capital and the shareholder hegemony has on our economies, a growing number of citizens and institutions do question growing inequalities and increasing gaps between capital and labor incomes. Alternative ways of producing goods and services are experimented in order to better take into account the interests of the enterprise other stakeholders. In this overall search for a greater pluralism of economic models, the workers' cooperative is drawing much more attention than 10 or 20 years ago. According to a report of the European Commission, it even appears as "*one of the most effective ways to preserve income and employment and, therefore, a natural response to economic difficulties*"³⁸.

Through our research, we wanted to better apprehend potential advantages and weaknesses of such a "production and management system" and in particular, the effects of workers' participation in governance, ownership and profit-sharing on their cooperative's economic performance. Relying on previous empirical studies and predictions of economic theory, we conducted our own analysis with an outstanding dataset provided by the General Confederation of SCOP for more than 1,200 worker cooperatives and the years 2006, 2009 and 2012.

The estimation of a production function "augmented" by variables apprehending the different forms of participation demonstrate unequivocally that *profit-sharing in workers' cooperatives of all sizes and participation in individual ownership in medium sized cooperatives positively and significantly influence the enterprise's performance*.³⁹

We had data for years before, during and after the last major financial and economic crisis but we did not identify any major impact of the latter. A certain number of SCOP probably experienced difficulties or even went bankrupt but we can state the effects of participation remained throughout the period. Combined with many observations made by a European federation of workers' cooperatives, this might suggest the latter can demonstrate a particular "resilience" in difficult times, likely related to a deeper involvement of workers in their enterprise's everyday life.

Finally, it should be stressed that French SCOP operate in an environment which acknowledges specificities of worker cooperatives through an adequate legal status and through special tax incentives fostering workers' participation in ownership and profits. In July 2014, some additional policy measures were adopted by the French Parliament to further improve some supports to worker cooperatives alongside a better recognition of the "social and solidarity economy", somehow equivalent to a broad "third sector" distinct from the private capitalist and public sectors.

³⁸ Commission Européenne (2013, p .53)

³⁹ See Appendix 4 for a brief summary of all results

All this suggest that the comparative better performance of worker cooperatives is more likely to appear in an eco-system which allow the latter drawing the best from their very characteristics instead of just being constrained by rules and public policies generally designed for traditional companies.

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Appendix 1: Variables of the “augmented” production functions

This appendix lists the variables used in our analysis of French SCOPs and their definitions. Data used for these variables were all provided by the General Confederation of SCOP for their members for the years 2006, 2009 and 2012.

Continuous variables

The following variables take continuous values:

- AGE: the age of the SCOP;
- V: the gross added value of the SCOP, in euro;
- L: the average number of employees in the SCOP;
- K: the total equity of the SCOP, i.e. the sum of capital shares, legal and statutory reserves, retained earnings (that is to say, the net surplus from previous years retained and not allocated to reserves) and the profit for the year, in euro;
- LS: the proportion of workers who are co-owners/shareholders of the SCOP, in percentage;
- KLS: the average capital shares held by member-workers, in euro;
- COKLS: the share of net operating surplus allocated to collective reserves, namely the legal reserve and the development funds, per member-workers, in euro;
- PARTL: the share of net operating surplus allocated to workers, members or not, per worker, in euro.

Binary variables

The following binary variables take the value "1" when the cooperative belongs to this category, "0" otherwise.

Founding methods

There are four methods to found a SCOP:

- EXNIHILO: the company started under the SCOP form;
- REANIM: the company was operating under a different legal form from SCOP, temporarily ceased its activities and restarted under the SCOP form;
- TRANSFO: the company was operating under a different legal form from SCOP and has been transformed into a SCOP without a cease of its activities;
- TRANSMI: the company was operating under a different legal form from SCOP and has been transformed into a SCOP when the owner passed it down to the workers.

Regions

We chose the Nomenclature of Territorial Units for Statistics (NUTS), Level 1, to classify SCOP according to their region. According to this nomenclature, France is divided between eight spatial planning economic zones and a ninth zone containing the overseas departments. Nine binary variables thus reflect these geographical zones.

Fields of activity

We chose to keep the same classification as the one used by the CG-Scop. The latter is based on the French Activities Nomenclature (NAF) rev. 2, 2008 and classifies the SCOP in eight fields of activity/ industries:

- AGR: Agriculture, forestry and fishing
- INDUEX: Extractive industry, energy, water and waste management
- INDUMA: Manufacturing industry
- CONSTRU: Construction industry
- COM: Trade, automobile and motorcycle repairs
- TRANS: Transportation and storage
- SERV: Service industry including: Accommodation and restaurant; Information and communication; Financial and insurance activities; Real estate activities; Specialized, scientific and technical services; Administrative services and support activities, Arts, entertainment and recreation activities; Other service activities.
- EDU: Education, health and social work sector.

Legal forms

SCOP can choose between the legal form of Limited Liability Company⁴⁰ or Public Limited Company⁴¹ (with a board of directors or with an executive board).

SARL variable takes the value "1" when the SCOP operates under the legal form of Limited Liability Company and "0" when the SCOP works under the legal form Public Limited Company.

⁴⁰ The legal form of Limited Liability Company is called *Société à Responsabilité Limitée* – SARL in French.

⁴¹ The legal form of Public Limited Company is called *Société Anonyme* – SA in French.

Appendix 2: The production functions

If i represents the firm, t the date, x the elements of the vector X_1 and z the elements of the vector Z , we estimate thanks to our database the following models:

CD :

$$\ln V_{it} = \alpha_0 + \alpha_1 \ln K_{it} + \alpha_2 \ln L_{it} + \sum_j \alpha_{3j} x_{jit} + \sum_m^4 \alpha_{4m} z_{mit} + \mu_{it} ; \quad (1.1)$$

CES :

$$\ln V_{it} = \beta_0 + \beta_1 \ln K_{it} + \beta_2 \ln L_{it} + \sum_j \beta_{3j} x_{jit} + \sum_m^4 \beta_{4m} z_{mit} + \beta_5 \left| \ln \frac{K_{it}}{L_{it}} \right|^2 + \mu_{it} ; \quad (1.2)$$

Translog :

$$\ln V_{it} = \gamma_0 + \gamma_1 \ln K_{it} + \gamma_2 \ln L_{it} + \sum_j \gamma_{3j} x_{jit} + \sum_m^4 \gamma_{4m} z_{mit} + \gamma_5 |\ln K_{it}|^2 + \gamma_6 |\ln L_{it}|^2 + \gamma_7 \ln K_{it} \ln L_{it} + \mu_{it} . \quad (1.3)$$

We focused on the vectors α_4, β_4 or γ_4 that measure, in percentage, the impact on the added value of a one-unit change of the individual elements of the vector Z . This linear form allows us to have a direct evaluation of the effect of participation on the added value.

Appendix 3: Estimation results

In this appendix, we present the estimation results of our models. The first table refers to the models estimated for the analysis from a general point of view (without any size effect); the second table contains the estimated models for the analysis allowing for a size effect.

Table A3.a. : Impact of workers' participation on added value

	2006	2009	2012
const	10,3*** (21,3)	10,40*** (29,20)	10,5658*** (44,7592)
AGE	-0,000957* (-1,81)	0,001538* (1,792)	-0,000124226 (-0,2227)
EXNIHILO	0,00749 (0,211)	-0,01036 (-0,2762)	-0,0765369** (-2,3352)
REANIM	-0,0300 (-0,792)	0,007350 (0,1598)	-0,0576131 (-1,5309)
TRANSFO	-0,0695 (-0,827)	-0,09105 (-1,285)	-0,199185*** (-4,0869)
SARL	0,0227 (0,754)	0,04167 (0,9441)	-0,00127403 (-0,0370)
Ln L	1,10*** (10,6)	1,148*** (14,29)	1,16842*** (22,7674)
Ln K	-0,0719 (-0,702)	-0,1525* (-1,943)	-0,145983*** (-2,944)
LS	-0,101** (-2,29)	-0,1149** (-2,158)	-0,181482*** (-3,8782)
KLS	3,90e-06** (2,24)	3,397e-06* (1,946)	2,42173e-06 (1,5322)
COKLS	-5,38e-07 (-0,540)	-8,406e-07 (-0,4803)	-6,03775e-07 (-0,9529)
PARTL	2,79e-05*** (10,3)	2,451e-05*** (6,260)	2,2686e-05*** (8,1806)
$\left \ln \frac{K}{L} \right ^2$	0,0124** (2,24)	0,01865*** (4,106)	0,0184833*** (6,3872)
Sectoral binary variables	Yes	Yes	Yes
n	1219	1333	1436
R² adjusted	0,935	0,895	0,91

Heteroscedasticity corrected
Student statistic in parentheses
*/**/** indicates a significant test
at the threshold of 10/5/1
percent(s)
The variable SA is perfectly
correlated with the variable SARL;
the variable TRANSMI is perfectly
correlated with the variables
EXNIHILO, REANIM and
TRANSFO
Source: data from the CG-Scop

Table A3.b: The impact of workers' participation on added value by categories of SCOP size

	2006			2009			2012		
	L < 10	10 ≤ L < 50	50 ≤ L	L < 10	10 ≤ L < 50	50 ≤ L	L < 10	10 ≤ L < 50	50 ≤ L
const	12,1111*** (15,6387)	9,99355*** (44,2827)	8,731*** (15,98)	12,04*** (0,6406)	9,220*** (0,2452)	8,618*** (0,4475)	11,52*** (21,28)	9,297*** (47,20)	8,939*** (23,07)
AGE	-0,0018814* (-1,7886)	-0,00079 (-1,1237)	0,002596 (1,537)	0,0001396 (0,001700)	0,0001057 (0,0009085)	0,0007834 (0,001481)	0,001211 (0,7007)	-0,001940** (-2,573)	0,002293* (1,819)
EX NIHILO	-0,0054859 (-0,1196)	0,00792169 (0,1926)	0,01485 (0,1710)	-0,03098 (0,06048)	0,02776 (0,04170)	0,08891 (0,08456)	-0,1714*** (-3,058)	0,02266 (0,5879)	0,06545 (0,9054)
REANIM	-0,0416761 (-0,7059)	-0,0182036 (-0,3966)	-0,004843 (-0,05983)	-0,08807 (0,08819)	-0,008204 (0,04588)	0,1382* (0,07209)	-0,1138 (-1,350)	-0,001326 (-0,03322)	0,1042 (1,455)
TRANSFO	-0,0416761 (-1,1214)	-0,102951 (-0,6001)	-0,02279 (-0,06425)	-0,1642 (0,1020)	-0,07518 (0,1312)	-0,07415 (0,1983)	-0,3133*** (-3,723)	-0,07717 (-1,469)	0,01867 (0,1552)
SARL	-0,124829 (-1,0366)	-0,034586 (-1,0007)	0,2896** (2,553)	-0,2320 (0,2245)	0,04607 (0,03688)	0,03046 (0,1041)	-0,5537*** (-2,618)	-0,04038 (-1,271)	0,1055 (1,394)
Ln L	1,59339*** (9,2764)	0,85558*** (22,1081)	0,7164*** (9,931)	1,619*** (0,1443)	0,8317*** (0,03922)	0,7759*** (0,06236)	1,906*** (7,124)	0,8493*** (24,31)	0,7504*** (15,30)
Ln K	-0,48174*** (-2,8566)	0,09425*** (5,0318)	0,2034*** (4,794)	-0,4924*** (0,1347)	0,1482*** (0,01898)	0,2010*** (0,03551)	-0,3346*** (-3,498)	0,1664*** (10,44)	0,1838*** (5,557)
LS	-0,0954477 (-1,5020)	-0,0632844 (-0,9192)	0,1436 (0,9946)	-0,1083 (0,08429)	0,009516 (0,06904)	-0,01933 (0,1125)	-0,2434*** (-2,906)	-0,08625 (-1,379)	0,1204 (1,052)
KLS	3,0545e-06 (0,9639)	5,77e-06** (2,3908)	5,841e-07 (0,1772)	1,426e-06 (3,362e-06)	8,810e-06*** (2,440e-06)	1,784e-06 (2,271e-06)	-4,787e-06 (-1,568)	6,78e-06*** (3,560)	7,939e-07 (0,3438)
COKLS	6,913e-06** (2,1150)	1,613e-06 (0,9214)	-2,859e-06** (-2,111)	-2,630e-06 (4,711e-06)	5,947e-06 (3,831e-06)	8,803e-07 (6,980e-07)	1,005e-05* (1,883)	-3,637e-07 (-0,09271)	2,502e-07 (0,6578)
PARTL	1,34e-05***	4,01e-05***	3,28e-05***	2,405e-05***	2,950e-05***	1,699e-05**	1,83e-05***	3,22e-05***	1,634e-05**

	(3,6666)	(7,9467)	(3,042)	(6,649e-06)	(7,064e-06)	(7,030e-06)	(4,208)	(6,986)	(2,528)
$\left \ln \frac{K}{L} \right ^2$	0,036068*** (3,8221)			0,03808*** (0,007797)					
$\ln L^*$ $\ln K$							-0,148*** (-5,038)		
$ \ln K ^2$							0,214*** (3,523)		
$ \ln L ^2$							0,036*** (6,491)		
Sectoral binary variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
n	686	444	119	695	502	136	817	486	133
R² adjusted	0,795	0,798	0,8491	0,6865	0,7301	0,9193	0,7055	0,7897	0,8706

Heteroscedasticity corrected

Student statistic in parentheses

*/**/*** indicates a significant test at the threshold of 10/5/1 percent(s)

The variable SA is perfectly correlated with the variable SARL; the variable TRANSMI is perfectly correlated with the variables EXNIHILO, REANIM and TRANSFO

Source: data from the CG-Scop

Appendix 4: Brief synthesis of major results

Table A.4:

Mode of participation	Type of effects of participation on enterprise's performance	Justification	Influence of the enterprise size
Participation in governance	Contrasting effects although mainly negative	Decrease of the effectiveness of managerial input <i>but</i> indicator slightly satisfactory	Mode of participation non-significant because indicator slightly satisfactory
Participation in individual ownership	Positive and significant effects	Increase of human capital ; Increase of worker's effort to receive a higher dividend	Non-significant mode of participation in small businesses because this group is heterogeneous in terms of performance, due to undercapitalization characterizing a good deal of small cooperatives Less suitable participation mode for large companies since co-ownership, co-responsibility and co-benefits are diluted in more anonymous overall dynamic.
Participation in collective ownership	Non-significant effects	Allocation of funds to collective reserves more influenced by legal obligations and tax benefits than by the choice of the GA members to participate in the common effort; Competing with participation in individual ownership and profit-sharing	No notable differences across size categories
Profit-sharing	Positive and highly significant effects	Increase of workers' effort to receive a higher pay	No notable divergences across size categories

