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**THE DETERMINANTS OF WORKERS' PARTICIPATION  
AND PRODUCTIVITY IN PRODUCER COOPERATIVES \***

by

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## I. Introduction

Several studies have established a positive relationship between participation and performance in producer cooperatives (PCs), see for example, Espinosa and Zimbalist (1978), Cable and Fitzroy (1980). A frequent criticism, however, is that they do not satisfactorily allow for the possibility of reverse causality. That is, rather than indicating the productivity enhancing effects of increased participation, the positive associations which have been identified instead may actually reflect the impact of cooperative success on the measured degree of participation. A major objective of this paper is to address this issue by developing a framework in which the relationship between participation and company performance can be empirically examined. A simultaneous model, in which the degree of participation and company productivity are jointly determined, is estimated. The results enable us to disentangle some of the complicated strands of causality and nevertheless to derive a positive significant relationship between worker's commitment to the firm and enterprise performance.

Our modeling builds on the existing literature in recognizing that a significant proportion of the labor force in these firms are actually hired hands rather than fully participating cooperative members. Moreover, it is a cardinal principle for much of the cooperative movement that all current workers who wish to must be freely admitted to membership status; that is, to join the cooperative's entrepreneurial group among whom decisions are made on the basis of one member, one vote. These characteristics contrast with the traditional assumptions of the labor-management literature: that all workers are members and that existing members determine the size of the labor force. Other analysts (e.g., Ben-Ner (1984), Miyazaki, (1984)) have concentrated on why self-interested current members might discriminate against some proportion



of the labor force, but in these free admission producer cooperatives (FAPCs), the membership choice is of interest in its own right. In the context of low membership fees and free entry the decision not to join can be associated with the onerous duties of entrepreneurship - the time and effort expended in collective decision-making.

In the following section we analyze the way that this burden will vary with the characteristics of the firm, of the industry and of the broader market environment. Given that additional shareholding yields no additional power over decisions because of the one-member, one-vote rule, a related issue concerns modelling why workers typically risk appreciably more than the minimum stake required to become a member. In section four we report tests of our propositions on the determinants of the membership ratio and the individually owned capital stake. Importantly this empirical work also provides a refutation of the degeneration life cycle hypothesis for FAPCs. Before discussing these results we briefly discuss the available data for 541 FAPCs in 1978 and 1979.

## II. Models

Our discussion focuses on the institutional arrangements for FAPCs such as those in the French cooperative sector. We commence with the choice problem for workers who have already decided to work in a coop and who must then decide whether to take up membership of the coop. This entails paying out a minimal capital stake, in return for which members receive an equal say in the management of the firm, including strategic decisions.<sup>1</sup> Members gain no explicit income return through capital appreciation - membership shares must be traded at their nominal value - though of course they do participate in company profits.<sup>2</sup> Once having decided to become a member, the worker has to make a second decision, namely how much capital to commit to the firm via their own



membership stake. Such investments earn yields substantially below market rates and, since the equity is not tradeable, the principal can only be recouped at par upon retirement from the firm.<sup>3</sup>

A growing literature points out that production possibilities at the enterprise level may be a function of the internal degree of participativeness because of improved labor morale and union management relations, reduced labor turnover and stronger group incentives. For example Cable (1986B) uses a prisoner's dilemma framework to show how, with management and unions each choosing between cooperation and conflict, private ownership is likely to lead to the Nash equilibrium of mutual conflict, an outcome which is Pareto-inferior to the cooperative solution. Moreover, the degree of participativeness in the firm, represented by a vector,  $Z$ , the specification of which is considered below, has been shown to vary significantly across different coops (see Vienney (1966), Espinosa and Zimbalist (1981), Long (1984) as well as between coops and traditional firms.

The proposition that more participatory cooperatives will be more productive, ceteris paribus (Vanek, (1975); Horvat, (1980)) has been supported by various studies (see Jones and Backus (1977), Jones and Svejnar (1985), Defourny, Estrin and Jones (1985)). One of the key issues in this literature has been to specify the degree of participation, i.e., vector  $Z$ . Most empirical work has drawn on the notion developed in the life-cycle theory of cooperatives (see Ben-Ner (1984), Miyazaki (1984)) that the proportion of workers who are members of the cooperative is an important proxy for the degree of participation. The argument is that PCs typically start up with a high ratio of workers to members. However, provided the firm is profitable, there exists an incentive for existing members to discriminate against potential new ones by substituting low-cost hired labor for high-cost additional members. If, in

turn, a trend growth in demand and profitability is assumed, the theory implies that over time the membership ratio will gradually decline and with it, presumably, the collectivist spirit and participatory fervor of the cooperative until the firm has degenerated into the traditional entrepreneurial firm. Hence the widespread use of the membership ratio as a proxy for  $Z$  on the right hand side of equations linking performance to the degree of participation.

One can immediately note a fundamental problem with this approach; that the membership ratio is itself endogenous and in fact will be inversely related to various measures of the success of the firm. In addition, the free admission rule in the French and Italian case casts serious doubt on the generality of this degeneration process; existing members are not able to choose the membership ratio though they may be able to influence it.<sup>4</sup> In principle, each membership choice is an individual decision by the relevant worker as to whether to assume some share of the collective entrepreneurial burden. Membership ratios remain an important indicator of worker involvement in the coop, but they are influenced by the success of the firm and other systematic factors analyzed below. Our approach instead involves the use of an internal market for membership model as an organizing framework. From this we derive an empirically implementable equation for the membership ratio which is then tested. Next this is placed in a simultaneous equation model jointly determining company performance and membership.

The internal market for membership approach in fact offers a more substantial justification for the use of the membership ratio as proxy for the degree of participation than the more traditional life cycle hypothesis. This is because the demand side of the market takes explicit account of the burdens of collective entrepreneurship for workers; the leisure foregone, the bearing of risk and the psychic costs of participating in lengthy and often complex



decision making procedures. The individual choice of membership, ceteris paribus, therefore indicates a certain commitment by each worker to the cooperative ideal. We can characterize workers as falling into two categories; those for whom the privately perceived benefits for participation more than offset the utility foregone from undertaking the entrepreneurial burden, and those for whom the reverse holds. In a given environment, the larger the proportion of the former category, the greater the "collectivist spirit" and the higher the ratio of members (M) to workers (N). A higher M/N, appropriately controlled for other determining factors, can therefore be associated with the "voice" and morale effects discussed above, and is likely to generate higher productivity via improved performance with respect for example, to absenteeism, industrial disputes, strikes, labor turnover, and attitudes to technical advance.

The supply side of the internal membership market is uninteresting since in FAPCs the supply of shares is perfectly elastic at the minimum stake. Analytical interest is therefore concentrated on the demand side. We assume  $M < N$  and that membership supply always adjusts to meet demand. Moreover, since in practice the minimum required worker stake is purely nominal, for convenience we assume it to be zero. Under these circumstances, the equilibrium membership ratio function can be written as:

$$M/N = f(\text{AGEN, PAY, F/N, R, AGEF, AGEM, IND, ORIGIN, LEG, REG}) \quad (1)$$

The characteristics of the arguments of equation (1) are analyzed below and definitions are given in the appendix.

The principal determinants of the membership ratio function can be classified into three broad types concerning the characteristics of the workforce, of the enterprise and of the economic environment, respectively. The most important determinant with regard to individual workers is human

capital. Improved levels of skill and general educational attainment seems likely to heighten workers' willingness and ability to participate in enterprise decision-making (Levin (1985)). Also if the degree of risk aversion is a decreasing function of human capital, this suggests that skilled workers would be more likely to undertake the risks inherent in the entrepreneurial role. In the empirical work which follows, average human capital in the cooperative is proxied by the average age of the labor force (AGEN) and average incomes paid to workers (PAY).

Turning to enterprise characteristics, life cycle theories provide a second reason for a relationship between the membership ratio and pay, in this case an inverse one. If we initially assume that existing members can exclude hired hands from membership, they will determine the size of the firm (N) to maximize their own pay, defined as revenue (R) minus fixed asset costs (r.F) and labor costs (w) per non-member (N-M), divided by the number of members (M). Provided  $M < N$ , they set employment to maximize

$$PAY = \frac{R(N,t) - r.F - w(N-M)}{M} \quad (2)$$

which yields the first order condition,

$$R_N(t) - w = 0 \quad (3)$$

where  $t$  denotes time. The coop therefore hires additional workers until the wage paid to the non-members, presumably a market determined rate for the job, equals their marginal product. From (2) we note that PAY is also a decreasing function of  $M$  if  $N > M$ . Hence in profitable coops - the condition for employment to exceed membership - incentives always exist for the existing membership group to try and reduce membership in order to increase PAY. If we assume that this incentive is stronger, the greater is the gap between PAY and the market wage, all other things being equal, we would expect the membership ratio to be inversely related to PAY. This story of course presumes that



existing members can influence the membership level, for example via their hiring practices or by misinforming hired workers about the likely costs of the entrepreneurial burden.

If we assume that revenue grows over time around a long run trend ( $\partial R / \partial t = R_t > 0$ ), equation (3) suggests that the number of workers will tend to increase and, for a given level of membership, the membership ratio will fall. Revenue is proxied in this study by value added. Large firms may also be perceived as being harder to control and manage, and therefore to impose a greater entrepreneurial burden on potential worker members, a second reason to predict an inverse association between  $M/N$  and  $R$ . Similar arguments are thought to apply to capital-intensive firms (where the ratio of fixed assets ( $F$ ) to employment ( $N$ ) is high) which are more alienating and therefore less attractive both to prospective workers and prospective members (see Gouldner (1966)).

Biological life cycle theorists suggest that the collective decision-making process may tend to atrophy as the firm ages (see Batstone (1982)). Hence the perceived benefits from membership for potential recruits may decline with time, which suggests a negative association between the membership ratio and the age of the firm ( $AGEF$ ). If managerial seniority is associated with increasingly rigid attitudes towards economic decisions then similar arguments will apply; this is proxied by the average age of managers ( $AGEM$ ).

The better is the general atmosphere in the firm, the greater are the perceived benefits of cooperation and the greater is membership demand. Large differences may be expected between industries ( $IND$ ) because of differences in the nature of the production process and in the speed of work. In an industry where teamwork predominates (e.g., consultancy) one would expect less alienation and a higher  $M/N$  compared with, say, process manufacturing. The

character of the firm (especially relatively young firms), may also be influenced by the nature of its creation (ORIGIN), for example whether it has always been a cooperative or was instead created from the rump of a capitalist firm. The direction of the effect is unclear here, since participation effects could be high in both small coops created from scratch and in large rescues. Also, French PCs choose between two different legal forms (LEG) and those initial principles may be associated with the internal atmosphere of the firm.

Finally, there may be a firm-specific externality to high membership, related both to the need for extra capital, which only new blood can provide, and for an enlarged membership base to spread the relatively fixed costs of participation; for example the total number of committee positions may be a constant. French PC rules prevent any formal internalization of this externality, for example by members paying non-members to join, but the creation by existing members of a participative atmosphere attractive to recruits may be one way around the problem. This effect is proxied by variables such as F/N, R, AGEN and AGEM.

Various studies point to the potentially critical role of the local environment (REG). Espinosa and Zimbalist (1978) find that attitudes towards cooperation in Chile vary across regions with differing degrees of political activity and different political affiliations while Thomas and Logan (1982) note the importance of ethnicity in Basque coops. It seems likely, therefore, that there will be a higher membership ratio in regions with a well-defined ethic of worker solidarity and perhaps also in which significant clusterings of PCs already exist. At the moment all those effects must be imperfectly proxied by regional dummies.<sup>5</sup>

The membership ratio is not the only easily available indicator of the degree of participation. While so far we have assumed that, on choosing to



become members, workers purchase only the minimum required stake, in fact they typically put in far more money than this. For exactly the same reasons as with the membership ratio, the average individual member's capital stake in equity and loans, called OWN, may represent a second indicator of commitment to the firm and therefore measure the degree of participation. However, as before we must control for the other principal determinants of average individual capital supply prior to using OWN as an element of the Z-vector. Cooperative experience and the literature on internal financing (see for example Ireland and Law (1982) or Stephen (1984)) suggest that five sets of factors are important: long term corporate soundness, the short term trading position, interest rate differentials and risk, investment opportunities and the membership ratio. The equation for OWN is as follows,

$$OWN = OWN(RES, DET, AGEF, AGEM; SURPL; INT, R, AGEN; PROF; M/N) \quad (4)$$

where the arguments and proxies are discussed below; variable definitions are summarized in the appendix.

Here the analysis is directed primarily towards the supply side. We follow the descriptive literature, (see for example Sibille (1982)) in assuming that the internal supply of funds is never constrained by the demand and in noting that the rates of return on individually supplied capital are fixed institutionally.<sup>6</sup> To a greater extent than for membership itself, the decision to participate financially will depend on members' perceptions of the firms' long-term financial status and short-term trading position. We include four proxies for long-term corporate soundness; collective reserves per head (RES), the debt-equity ratio (DET), the age of the firm (AGEF) and of managers (AGEM). Cooperatives are required to accumulate collectively owned reserves from profits and these represent the principal source of internal funding for the firm.<sup>7</sup> In addition to being a stock measure of the firm's financial situation,

Vanek (1971) has drawn attention to collectively owned reserves as a potential reason for the non-viability of cooperatives. This argument would lead one to predict a negative rather than positive relationship between OWN and RES.<sup>8</sup> The debt-equity ratio is a more conventional measure of financial soundness. Firm age is included to indicate the firm's ability to survive with research showing that coops are most at risk in their early years Perotin (1986) and that the coops' financial position is typically stronger after around 20 years of operation (Estrin and Jones (1986)). The average age of management (AGEM) is additionally included as a proxy for the experience and judgment of managerial group.

The firm's short-term trading position is measured by company profits (SURPL), which one might expect to positively influence the member's willingness to commit a greater proportion of her portfolio to the coop. However, in this case the supply situation may be complicated by the demand side; the cooperative could seek to borrow from members to cover short-term losses. Whilst it may be hard to induce members to risk their capital in firms which are fundamentally unsound financially, they may be responsive to short-term demand pressures to help tide the cooperative over current losses. Hence OWN could be high with both very high and very low levels of SURPL.

A further variable determining the internal supply of individually owned funds is the real interest rate differential as against similar risky investments elsewhere (INT). Worker-members are more likely to lend to the cooperative when the interest rate differential is small and therefore INT is low. Moreover the perceived riskiness of investing in one's firm is likely to be lessened if the firm is relatively large (proxied by R) and diversified and in the presence of an active supporting structure (see Vanek (1970)). Also a worker may decide to increase current financial commitment to the firm because



life-time utility will be enhanced. This effect will be relatively greater the longer the worker expects to be associated with the firm, and therefore will be inversely related to the average age of the labor force (AGEN).

The demand side cannot be ignored entirely because the supply of internal funds may itself be a function of the cooperative's investment opportunity set. Though coops cannot increase interest rates to attract additional internal finance, they can adjust labor remuneration over time so that members reap the benefits from productive investment via future earnings. Members will supply funds for any project which pays in increased future earnings more than the gap between the market opportunity cost of capital and the constrained return to funds invested in the coop. We therefore expect OWN to be higher, ceteris paribus, when the firm has higher financing needs, for technological reasons or to exhaust investment opportunities. Capital requirements and productivities are notoriously hard to proxy, but a first attempt in the cooperative context suggests current rates of return on assets (PROF). If these are high one might expect the coop to increase investment and therefore to require more funds from members.

The last independent variable in equation (4) is the membership ratio. One might expect a positive association between this and the average capital stake per member, because they are both indicators of the degree of participativeness. But while the membership ratio is based on the whole labor force and indicates the proportion who choose to become members, the average capital stake concerns the degree of commitment within that group of members. In enterprises with relatively few members, each member may have a high financial commitment. In others, most workers may have assumed the entrepreneurial burden, but the average financial risk being borne is small. Moreover, the higher morale and productivity of a small membership group could

improve the performance of the company despite the presumed indifference of the relatively large hired labor force; perhaps by as much as in a coop with more members but less commitment from members. Rather than moving together, the two measures could in fact be substitutes, and the relationship between them therefore remains an empirical issue.

The last equation we need to consider is the cooperative revenue function. In general, this can be specified as:

$$R = R(N; X; Z) \quad (5)$$

where  $X$  denotes a vector of other control variables for the production function, specified below but including fixed assets,  $F$ , and a demand perturbation term,  $t$ . The membership ratio and the average individually owned capital stake can be treated as separate elements of the  $Z$ -vector in equation (5) so that the augmented revenue function, can now be specified as

$$R = R(N; X; M/N, OWN) \quad (6)$$

Equation (6) can be estimated jointly with (1) and (4) for the simultaneous determination of revenue, the membership ratio and the average individually owned capital stake per member, on the assumption that employment as well as the capital stock is predetermined.<sup>9</sup>

Thus in the empirical work which follows, we first estimate equations (1) and (4) separately to investigate the hypotheses discussed above. Equations (1), (4), and (6) are then estimated simultaneously using two stage least squares methods. This allows us to examine whether the OLS findings for equations (1) and (4) as well as the results of other studies with single equation estimates of equation (6), carry over to the simultaneous equation case. The various hypotheses about the signs of coefficients are summarized as follows:



$$M/N = M/N(\overset{+}{AGEN}, \overset{+/-}{PAY}; \overset{-}{F/N}, \overset{-}{R}, \overset{-}{AGEF}, \overset{-}{AGEM}, \overset{-}{IND}, \overset{-}{ORIGIN}, \overset{-}{LEG}; \overset{-}{REG}) \quad (1)$$

$$OWN = OWN(\overset{+/-}{RES}, \overset{+}{DET}, \overset{+}{AGEF}, \overset{+}{AGEM}; \overset{+}{SURPL}; \overset{-}{INT}, \overset{+}{R}, \overset{-}{AGEN}; \overset{+}{PROF}; \overset{+/-}{M/N}) \quad (4)$$

$$R = R(\overset{+}{N}; \overset{+}{X}; \overset{+}{M/N}, \overset{+}{OWN}) \quad (7)$$

### III. Data and Institutions

France has a well-established PC sector employing some 35,000 workers in 1984 in around 1400 firms. The history of the sector and detailed institutional arrangements are discussed in Vienney (1966) and Sibille (1982). The empirical work which follows draws on information on 541 French PCs, all members of the central organization (GGSCOP), in 1978 and 1979. The economic activities of the group span nine industrial sectors and industry specific dummy variables are used to capture the effects of IND in equation (1) and of inter-industry differences in technology (an element of the X-vector in equation (7)).<sup>10</sup> In Table 1 we report the means and in parentheses the standard deviations of all the continuous variables in the six most important sectors in 1979.

On average most PCs in the sample are more than twenty five years old and the majority operate in the construction or printing trades. Coops in the electrical and particularly in the fast growing consultancy sectors are much younger and this is reflected in the average age of their workers and their management. Skill levels, reflected in PAY, are noticeably higher in the printing and consultancy sectors, both of which have on average smaller labor forces than in their industrial and construction counterparts; from only sixteen workers in consultancy to almost sixty in construction. But in construction, unlike in consultancy, there is high variation in the number of

workers. Value added is another indicator of enterprise size and at almost six million francs is largest in the electrical sector. Value added exceeds three million francs in all the remaining sectors except printing and consultancy. The printing and consultancy sectors are the most capital-intensive, with on average some twenty five thousand francs worth of equipment per worker in printing in 1979. The capital-labor ratio is relatively low in the service, electrical and consultancy sectors.

Turning to the indicators of financial soundness, collective reserves per head (RES) are substantial in the printing, mechanicals and electrical sectors, reflecting both capital requirements and the average age of the firms. The construction sector is in an intermediate position with some ten thousand francs per worker, while reserves are lower in the consultancy and service sectors. The debt-equity ratio is around unity in the construction, electrical and printing sectors, around two in the consultancy sector and even higher in mechanicals and services. Company profits (SURPL) are relatively high on average in electrical and low in consultancy with the remaining sectors displaying mean values of around 200,000 francs; however, the intra-sectoral variability is substantial. The average sectoral rate of return (PROF) tells a rather different story with the highest average return in mechanicals, of 32.3%, and the lowest in printing, at 7.1%. INT is a proxy for the opportunity cost of internally generated funds. However since it actually measures the flow of interest payments over the year divided by the stock of debt from all sources at the end of the year, it is highly sensitive to short-term changes in the firm's financial situation. This may explain the very high interest cost as a percentage of loans in the construction trade. Elsewhere INT ranges from around 20% in mechanicals, service and electrical to almost 60% in consultancy, though the intra-sectoral variation is very high too.



placed by authors such as Levin (1985) on the relationship between education and human capital on the one hand and participation/performance on the other. In the free admission context, it is also a fairly decisive refutation of the life cycle proposition that membership and therefore the membership ratio will be inversely related to PAY. This suggests that when coops have free admission to membership rules, existing members are either unable or unwilling to manipulate hired workers' choice as to whether to undertake the entrepreneurial burden.

Most of the remaining variables concern various aspects of the enterprise. Contrary to expectations, we are unable to discover a negative significant association between the membership ratio and the capital-intensity of production. Indeed in other unreported regressions we are unable to isolate a significant coefficient on this variable in any industry or year. It would appear that the membership choice is independent of the type of production process, proxied by the capital-labor ratio. M/N is however negatively related to the size of the firm, as measured by the log of the value added, significantly so in both years. This confirms what one would expect - that workers are less willing to become members of relatively larger and more alienating coops in which one presumes the burdens of entrepreneurship will be proportionately greater. It is also consistent with the proposition that employment in coops is an increasing function of demand so that, for a given membership level, the membership ratio declines. By implication, we confirm that the traditional backward sloping supply and employment function does not hold in the FAPC, because of the use of hired labor.

Contrary to expectations from biological life cycles, the membership ratio is an increasing rather than diminishing function of the age of the firm, significantly in 1979. This surprising finding is consistent with a gradual

absorption of the possibilities of and benefits from membership by the cooperative's labor force as time goes on.<sup>13</sup> There is however a very strong negative relationship between the membership ratio and the average age of the managers (AGEM) in both years. Though AGEM is not a good proxy for the managerial characteristics conducive to successful cooperation, the variable's persistent significance highlights the potentially crucial role of management in engendering a participative atmosphere.

All the remaining coefficients proxy for environmental effects. There are some inter-industrial differences in the membership ratio function, with positive significant coefficients on dummies for various branches of construction and for woodworking. However, no regional dummies are significant in either year, which is preliminary evidence against the determining role of the local environment in France. This is particularly interesting for Paris, since such a large proportion of coops are located in the capital and the SCOP headquarters are also based there. Finally, though not influenced by legal forms, membership ratios in French PCs are significantly lower in firms created as cooperatives from scratch. This suggests that ceteris paribus participativeness is relatively greater in firms converted from the capitalist to the cooperative mode of production and may help to explain the survival of rescues, particularly in the early years (see Perotin (1986)).

Turning to Table 3, our explanation of the individually owned capital stake is not as good as for the membership ratio. The estimates of equation (3) yield an  $\bar{R}^2$  of 0.19 in 1978 and 0.17 in 1979, with the majority of the independent variables not even weakly significant at the 90% level in either year. However even though the parameters may not be estimated precisely, since the equations themselves are significant at the 99% level, they therefore provide an adequate basis for testing the propositions summarized in equation



Finally we turn to the two dependent variables, M/N and OWN. The proportion of the labor force who become PC members varies considerably within and between sectors, ranging from almost 75% in the printing industry to less than 50% in construction, both sectors containing relatively large, old and capital-intensive cooperatives. But there is no obvious pattern here, since membership rates are also relatively high in the consultancy sector, with its rather small, new highly skilled-and-labor-intensive cooperatives and not markedly lower in the relatively large scale, unskilled and poorly capitalized firms of the service sector. Note that, in France, the workers' average financial stake is also quite high, between twenty and forty thousand francs per head or between one quarter and one half of average annual labor remuneration including bonuses. It is largest in the service and construction sectors, where there are low average levels of reserves and interest payments and high debt-equity ratios. But it is also on average lowest in the consultancy sector, with a very similar profile of financial variables to those of services, except perhaps for higher average interest payments.

The remaining variables in equations (1), (4) and (6) are proxied by dummy variables. French PCs are active in ten geographical areas of the country with the largest clusters being near the central SCOP in Paris (32% of our sample), in the West (16.5%), in the South East (11.5%) and in Provence (9%).<sup>11</sup>

The ORIGIN variables in equation (1) is proxied by dummies for three modes of cooperative creation - entirely new firms, firms which have been transformed from other legal firms into cooperatives and firms which have been revived from closure as cooperatives. In 1979 70% or more of French PCs were created in that form from scratch, and transformations represented some 15% of the total. Finally, French PCs can choose between two legal forms, SA, the standard legal format and SARL which offers some special opportunities provided the firm

remains small (see Sibille (1982)). More than 90% in most sectors have chosen the SA form though many of the new enterprises, particularly in the consultancy sector, have opted for SARL. A dummy (LEG) is included in equations (1) and (6) to pick up any relationship between formal structure, participativeness and performance.

#### IV. The Determinants of the Membership Ratio and the Average Individually Owned Capital Stake

We report in Tables 2 and 3 the OLS estimates of equations (1) and (4) respectively. In preliminary work we estimated the equations on a pooled data set covering all industries, with sector and branch specific dummies for the years 1978 and 1979. There were considerable changes in the financial circumstances of coops between 1978 and 1979, which were not immediately reflected in M/N or OWN (see Defourny, Estrin and Jones (1985)), and many new coops were formed in 1979 (some eighty net over and above the 440 that were operating in 1978). This leads to some important differences in the estimates across years and, in fact, F-tests generally fail to accept pooling the data over time. In the single year estimates (reported in Tables 2-3) firm size, proxied by value added, is entered into the equations log-linearly for comparability with the simultaneous equation systems discussed below.<sup>12</sup>

Commencing with the explanation of the membership ratio in Table 2, equation (1) fits reasonably well for cross-section work with an  $R^2$  of 0.41 in 1978 and 0.39 in 1979. It is also encouraging to note that the bulk of the estimated coefficients are significant in at least one of the two years, generally with the expected sign. If one starts with the worker characteristics' variables, AGEN and PAY, it can be seen that higher membership ratios are associated with higher levels of human capital, proxied by average age and in particular by workers' total pay. This seems to confirm the stress



Cable and Fitzroy (1980)).<sup>15</sup> The key issue is the relationship between the "degree of participation" and company performance as measured by value added, and the literature contains three competing hypotheses about the sign of the partial derivative,  $\partial R/\partial Z$ :

$$\begin{aligned} \text{A: } \frac{\partial R}{\partial Z} &> 0 \\ \text{B: } \frac{\partial R}{\partial Z} &< 0 \\ \text{C: } \frac{\partial R}{\partial Z} &= 0 \end{aligned} \tag{8}$$

Proponents of hypothesis (8A) include Vanek (1970), Espinosa and Zimbalist (1978) and Logan and Thomas (1982), all of whom stress the potential benefits to workers' performance from increased labor morale and commitment. Hypothesis (8B) on the other hand finds theoretical support from among others, Jensen and Meckling (1979), who point to managerial problems and poor decision-making in participative firms. Hypothesis (8C) is argued by Nelson (1981) and Leibenstein (1984). In our framework, one can distinguish between the hypotheses according to the signs and significance of the estimated coefficients  $\alpha_{4k}$  ( $k = 1, 2$ ) in equation (7').

Before proceeding to the systems estimates, we note the results of estimating equation (7') using ordinary least squares methods. The augmented production functions display extremely good fits in both years ( $\bar{R}^2$ s in excess of 0.65) and provide further support for hypothesis (8A), with the coefficient on M/N being positive and significant at the 99% level in 1978 and on OWN positive and significant in both years.

The results of estimating equations (1), (4) and (7') simultaneously are reported in Table 4. Commencing with the membership ratio, it can be seen that taking account of simultaneity improves the fit of the equations in both years, from 0.41 to 0.47 in 1978 and from 0.39 to 0.44 in 1979. It does not however

greatly alter the pattern and significance of the independent variables and therefore the interpretation of the findings. The main change concerns the coefficient on PAY in 1978, which as for 1979 is now found to be highly significant and positive. Our refutation of the degeneration life cycle hypotheses for FAPCs is therefore confirmed. In summary, we find the membership ratio to be positively related to the proxies for human capital and the age of the firm, but inversely associated with the size and origin of the firm and the age of managers. No significant effects are identified from capital-intensity or dummies for regional and legal differences.

Simultaneous equation methods act to marginally weaken the explanatory power of the equations for the individually owned capital stake. The main reason appears to be the diminution of the association between OWN and M/N for both years in the simultaneous estimates. One explanation is that the membership ratio was acting as a proxy for firm size. Since OWN is positively associated with size, M/N enters the OLS estimates with a negative sign, but the underlying structure emerges in the simultaneous equation estimates. The membership ratio and the individually owned capital stake are in fact independent of each other, after their separate and joint determinants have been taken into account. The absence of collinearity between the two elements of the Z-vector points to precision in testing hypotheses (8).

Both M/N and OWN are significantly associated with firm size, the former negatively and the latter positively. This relationship is found to be stronger in the simultaneous than in the single equation estimates of the capital stake function; the coefficient on  $\ln R$  and its t-value are raised in both years. Moreover the estimates in Table 4 establish the significance of the age of managers in determining OWN, with the predicted sign. Finally, the unsatisfactory OLS findings on INT do not carry over to the simultaneous



(4). Commencing with the proxies for financial soundness (and also perhaps financing needs), two of the three are positive and significant in 1978 and one of the three in 1979. However, the average individually owned financial stake appears to be unrelated to the age of the firm, a second piece of evidence against any simple life-cycle for French PCs. Moreover the positive coefficient on RES suggests that, contrary to Vanek (1971), cooperative members do not view large collectively owned reserves as a potential source of danger for the firm; rather it is an indicator of financial maturity. The important role of management is again highlighted by the significant coefficient of AGEM in both years. It would appear that the presence of older managers discourages workers from becoming members, but induces those who do join the collective to invest a relatively larger amount of their savings in the firm.

The strongly significant coefficient on SURPL in 1979 points to the relevance of the firm's short-term financial situation in determining OWN, and the impact of short-term losses on member loans may explain the insignificance of the coefficient in 1978. Perhaps surprisingly, the coefficient on PROF is insignificant in both years, though if data were available perhaps lags would improve the situation somewhat. The negative and weakly significant coefficient on INT in 1978 is at first sight puzzling though perhaps less so when the measurement problems noted above are taken into account. The average age of workers is insignificant in both years, though as Table 1 indicates there is little variation in this variable from firm to firm. For whatever reason, this means that we fail to identify any link between OWN and the variable proxying with inter-temporal effects. However the coefficients on the size of firm variable (R) and the membership ratio are both strongly significant (for R in 1979 only). Thus in contrast to that of membership decisions, the choice of capital stake is as hypothesized in equation (4)

positively associated with the size of firm. Moreover, we find evidence that membership ratios and individually owned capital stakes are substitutes. This is consistent with demand side pressures as well; coops with low levels of membership may require a higher average financial stake per member to cover financial needs.

#### V. Simultaneous Equations Estimates and Productivity Augmentation

Before proceeding to report our simultaneous equations results, equation (7) must be specified for empirical work. The underlying notion in equation (7) is that the standard determinants of value added - labor and capital - must be augmented in the coop case by various enterprise specific and environmental variables, the X vector, as well as the degree of participation, Z. There are three issues to be resolved; specification of technology and the arguments of the X and Z vectors respectively. Our approach with respect to the former two issues is similar to that developed in Jones and Svejnar (1985) and Defourny, Estrin and Jones (1985).<sup>14</sup> We therefore select between three forms of production technology, the generalized Cobb-Douglas (CD), Kmenta's (1967) linear approximation to the Constant Elasticity of Substitution (CES) function and the transcendental logarithmic function (translog). In practice, the CD form dominates for each year (F-tests fail to accept the CES or the translog for over CD). However translog does provide a better description of the data generation process for particular industries.

In logarithmic form, equation (7) is therefore specified as:

$$\ln R_i = \alpha_0 + \alpha_1 \ln N_i + \alpha_2 \ln F_i + \sum_j \alpha_{3j} X_{ij} + \sum_{k=1}^2 \alpha_{4k} Z_{ki} + \mu_i \quad (7')$$

The Z vector is of course proxied by the membership ratio and the average individually owned capital stake in this study (for other possibilities, see



equation case. Thus though the explanation of OWN is weaker, hypothesis testing is more successful in the simultaneous equations case. Individually owned capital stakes are found to be positively associated with diverse measures of corporate soundness, performance and potential such as RES, SURPL, DET and AGEM as well as company size, but unrelated to the age of the firm or of the labor force and in particular to the membership ratio itself.

Turning finally to the estimates of equation (7'), Table 4 reveals a common pattern for the augmented revenue functions with a good overall fit and high significant coefficients on the labor input but low ones on the capital stock. The insignificance of the capital coefficient helps to explain the dominance of the Cobb-Douglas form over the translog which attached weight to cross labor-capital effects. With regard to the X-vector, the industry dummies indicate inter-sectoral differences in the production process, but once again we fail to identify a significant biological life-cycle effect in the determination of value added. Looking at the system as a whole, we do find that older firms will be more productive, ceteris paribus, but via the indirect effect of enterprise age on the membership ratio rather than through a life cycle.

The most important results concern the sign and significance of the elements of the Z-vector. The coefficient on the membership ratio is found to be positive and significant in 1978 though not in 1979. This is consistent with the findings of the OLS estimates. One suspects that the underlying relationship may have been disturbed for 1979 by the entrance of large numbers of small and as yet unproductive coops with high membership ratios.<sup>16</sup> The results are stronger for the individually owned capital stake, the coefficients of which are found to be positive and significant in both years.

Hypothesis testing concerns the joint effect of M/N and OWN on value added. Hypotheses (8A) and (8B) can both be rejected in favor of hypothesis (8C) of no effect if the two elements of the Z-vector can be jointly excluded from the production function. This proposition is rejected at the 95% for both 1978 and 1979 on the basis of F-tests. Furthermore, since the signs on the significant coefficients are all positive, we must also reject hypothesis (8B) in favor of hypothesis (8A). Our findings therefore confirm the independent roles of membership ratios and individually owned capital stakes in positively augmenting output in French PCs, even when the simultaneous effects of size have been taken into account.

#### VI. Conclusions

This paper analyzes the behavior of FAPCs which hire non-member workers. The proportion of workers who choose to become members and the sums that they then choose to contribute to the firm over and above the minimum required stake are the new variables of interest, and our approach is tested on the French PC sector. The unexplained elements of participation in membership and in capital stakes can be associated with that key unmeasurable - workers' commitment - which many have suggested will influence the company's production possibilities. This is tested by estimating revenue functions augmented by the two participation variables. The findings establish that, despite the simultaneous nature of the problem, output is enhanced by increased workers' participation in both membership and in individually owned capital stakes.

An underlying theme of this paper has been the empirical relevance of simple income maximizing models along the lines of Ward (1957) and Meade (1972) and of the recent degeneration life cycle models of Miyazaki (1984) for FAPC cooperatives. The findings of equation (4) suggest that the use of hired labor does solve the "perverse supply" problem of backward bending supply curves, since for a fixed



membership the membership ratio is a decreasing function of demand. However since the membership also is not inversely related to PAY, our findings suggest that the free admission rule prevents existing members from discriminating effectively against potential recruits, at least in French coops.

The estimates of the participation equations yield findings which, importantly are broadly consistent with more descriptive studies (see for example Sibille (1982)). The workers' choice of whether to become a member of the coop is determined by skill and training, the size, history and age of the firm and the attitudes of the management. The positive effect of human capital on workers' willingness to undertake the entrepreneurial role, has been widely predicted (see Vanek (1970), Levin (1985)) and suggests a key role for educational policies in promoting a cooperative sector. The willingness of workers to join the participatory process seems to increase with the age of the firm, a life-cycle which can perhaps be associated with increasing worker-member familiarity and ability to solve entrepreneurial problems. A corollary may be that cooperatives will be particularly fragile in their earlier years, before the communal spirit driving the higher M/N ratios has fully emerged. This may explain the greater membership ratios, ceteris paribus, in coops converted from other types of organization in which solidaristic relationships between workers may have already been established. Rather than pointing policy in the direction of creating coops primarily from other organizations - these may have other financial or performance problems of their own that will adversely affect OWN - this suggests that coops should be supported in their early years until the participative process as well as the purely economic side of operations have been properly established.

Despite the importance of regional factors in the rise of coops elsewhere, we are unable to identify any regional pattern to the membership choice, nor any impact from the choice of legal form. This seems likely to reflect the strong

impact in France of the central organization, CGSCOP, in attempting to equalize the conditions faced by its member coops across the country.

The individual's choice of whether to increase their privately owned debt or equity in the cooperative is governed by diverse indicators of the company's performance in financial and operating terms. The specification at this stage is sketchy but the results indicate that PCs cannot rely on worker-members to provide funds when the need arises; capital stakes are positively rather than negatively associated with current profits and the debt-equity ratio. Moreover collectively and individually owned capital-stakes appear to be complements rather than substitutes; the coop cannot persuade workers to supply privately owned funds to make up for shortfalls in collective reserves or if their cooperative is in difficulties.

As suggested by organizational theorists (e.g., Long (1984) and case studies (e.g., Gunn (1984)), the role of management is crucial to the participatory process. Taking the average age of management as a proxy for skill and experience, our regressions reveal a tension between workers' willingness to involve themselves in the entrepreneurial role and management skill. This suggests that competent managers may tend to arrogate to themselves decision-making, thereby undermining the attractiveness and relevance of worker membership. On the other hand, sound management is positively associated with company performance and therefore with workers' willingness to invest in the cooperative. While presumably it is arithmetically feasible for high capital participation to substitute for low membership rates in the enhancement of output, this outcome puts excessive stress on the material rather than the psychic dimension of worker involvement and is therefore far from the cooperative ideal. The answer lies in training managers, both in managerial skills and in the ability to perform in a participative environment. Attempts to expand the cooperative sector prior to the establishment



of a stock of such managers is likely to lead either to the failure of high membership ratio coops due to managerial incompetence, or the evolution of successful coops in which workers participate primarily through high capital stakes rather than via any involvement in decision-making.

The most important result of the paper is the establishment of a positive significant relationship between output and the membership ratio and output and the individually owned capital stake. The former one might expect in the context of free admission where membership is likely to reflect commitment. The latter is more surprising because output enters the OWN function with a positive sign and M/N with a negative one. The OLS results of productivity augmentation could therefore in principle merely reflect collinearity and reverse causality. The simultaneous equation estimates establish that participation in membership and in capital are in fact independent. In fact the two variables reflect different dimensions of labor commitment and their apparent association derives from a common relationship with the age of managers and company size. There is actually simultaneous determination of output, the membership ratio and the individually owned capital stake in the context of separate productivity enhancement from both sources. Thus even after we have taken due account of the fact that workers want to invest more in successful firms, this willingness to participate financially in a firm of given potential indicates their commitment and acts to enhance production possibilities. This suggests that administrators designing cooperative rules should open up the possibility for workers to identify with the firm by supplying funds upon which they have a private as well as a collective claim. Individually owned capital stakes are not substitutes for participation in membership, but a distinct channel for participatory commitment in its own right, and one which yields comparable benefits for company performance.

### Footnotes

<sup>1</sup>It is important to note that the free admission principle which is dominant in France does not apply in all PCs. Existing members can exclude prospective ones in long established British PCs and in many clusters of American PCs such as the plywood coops. The free admission principle does however apply in the Italian and French PC sectors, respectively the first and second most important in the Western world (see Estrin, Jones and Svejnar, 1987).

<sup>2</sup>Also by French law, worker non-members (known as auxiliaries) must participate in company profits, though not necessarily on the same terms as members. A minimum of 25% of profits must be distributed to the labor force as a whole in income each year.

<sup>3</sup>Members may also make loans to the firm. Returns on loans approximate market rates and loans tend to be made for short periods.

<sup>4</sup>One might expect more sophisticated strategic behavior by existing members to discriminate against potential membership recruits in the free admission coop environment, for example hiring workers with characteristics consistent with a low probability of taking up membership. This might lead potential recruits systematically to distort the signals they offer recruitment committees. These possibilities will be the subject of future research; here we merely note that existing members may be able to influence membership ratios to some extent despite the free admission rule.

<sup>5</sup>Support from a national cooperative federation would probably also influence the membership decision favorably, which for a given cooperative density leads us to hypothesize a negative relationship between M/N and the distance from the national federation headquarters.



<sup>6</sup>French PC rules fix maximum rates of return on worker stakes (see Sibille (1982)).

<sup>7</sup>French PCs' collectives reserves are typically twice the size of privately owned capital in the consultancy, electrical and service sectors, and greater by a factor of six in the construction sector. (See Sibille, 1982).

<sup>8</sup>This is a generalization of the Furubotn-Pejovich argument on internal financing (see Furubotn and Pejovich (1970)) to the case where workers can reclaim the principal that they have invested when they leave the cooperative, but only receive a limited return upon it in the interim. Vanek (1977) argues that ownership rights problems associated with the collective nature of investment ". . .are so powerful in explaining the shortcomings of traditional or conventional firms of producer cooperatives and participatory firms that they offer an ample explanation of the comparative failure of these firms in history." (Vanek (1977), pp. 187).

<sup>9</sup>Estrin (1984) suggests that it is appropriate to regard the total level of employment as fixed in the short-run for a labor-managed firm because it is the workers themselves who are making the employment decision.

<sup>10</sup>The industrial sectors are consultancy, services, printing, electricals, mechanicals, construction, footwear and clothing, woodworking and agriculture. The construction sector is divided into six sub-sectors; large works, carpentry, plumbing, public works, metals and painting. For details of the numbers of firms in each sector, see Defourny, Estrin and Jones (1985).

<sup>11</sup>The remaining regional groupings are in Burgundy (3.7%), East (2.2%), North Picardy (7.8%), Central (5.0%), the Atlantic Coast (4.8%), and the South West (7.6%). The theoretical arguments would lead us to expect positive significant coefficients on dummy variables for regions with the largest clusterings and particularly those near CGSCOP headquarters in Paris.

<sup>12</sup>The OLS results are not substantially affected by entering value added in linear form.

<sup>13</sup>This process is perhaps more characteristic of the Yugoslav experience with self-management after 1952 (see Estrin (1984)).

<sup>14</sup>The augmented production function discussed below are similar to those in Defourny, Estrin and Jones (1985) with respect to the specification of technology. However, they differ in the treatment of the X-vector and the measures of participation. In particular, variables such as the regional effect or the legal form, which were previously analyzed as entering directly via the production function, now are viewed as affecting productivity indirectly via the elements of the Z-vector.

<sup>15</sup>Espinosa and Zimbalist (1978) and Cable and Fitzroy (1980) employ measures from a subjective index of participation, the general properties of which are unclear. Jones and Backus (1977) employ membership ratios and the number of workers on the company board. Estrin, Jones and Svejnar (1987) highlight the potential role of workers' capital stakes, entered via numerous proxies, and without controlling for simultaneity. For an alternative approach to the measurement of participation see Cable (1986A).

<sup>16</sup>This points further research towards a dynamic specification of the membership function to be estimated over a longer period.



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## Appendix:

### The Definition of Variables

AGEN	is the average age of the labor force, excluding managers, in 1979.
PAY	is the average annual remuneration per worker, comprising the average annual wage plus the average annual bonus via profit-sharing.
F/N	is the fixed assets, historic cost, per worker.
R	is value added.
AGEF	is the age of the firm in 1979.
AGEM	is the average age of the management of the cooperative in 1979.
OWN	is social capital owned individually by worker members plus total member loans divided by the number of worker members.
N	is the total number of workers.
M/N	is the proportion of workers who are members.
RES	is collectively owned funds divided by the number of workers.
DET	is total loans from workers, members and banks divided by collectively plus individually owned capital funds.
SURPL	is current operating profits.
INT	is the current interest cost of loans divided by total loans from workers, members and banks.
PROF	is current operating profits divided by total assets evaluated at historic cost.





Table 1: Means (Standard Deviations) of Key Variables by Sector, 1979

	Printing	Mechanicals/ Machine tools	Electricals	Consultancy	Service	Construction
No. of firms (max)	62	36	49	75	43	252
AGEN (yrs)	36.8 (5.1)	35.9 (4.3)	33.8 (5.2)	35.2 (5.8)	37.1 (6.8)	37.0 (5.6)
PAY	80.2 (27.1)	70.8 (23.7)	69.7 (22.8)	85.6 (45.1)	69.1 (39.8)	69.1 (22.5)
F/N	25.2 (27.2)	22.8 (23.5)	16.5 (20.6)	14.0 (14.2)	17.4 (22.7)	19.0 (83.2)
R	2470.4 (3945.4)	3468.4 (5473.5)	5974.8 (21477.4)	923.9 (948.9)	3872.9 (8394.2)	4817.3 (9103.)
AGEF (years)	32.1 (32.0)	22.6 (24.2)	17.3 (20.0)	6.2 (6.1)	21.7 (21.0)	26.2 (24.7)
AGEM (years)	43.0 (8.4)	43.3 (7.9)	40.5 (9.1)	38.5 (7.1)	42.5 (10.3)	43.5 (7.04)
OWN	24.2 (18.1)	24.0 (19.5)	29.4 (26.9)	22.7 (21.7)	37.8 (84.6)	30.5 (32.6)
I	26.8 (34.0)	37.6 (57.2)	49.7 (120.3)	16.2 (5.2)	44.4 (77.4)	59.5 (106.5)
M/N (%)	74.2 (18.6)	63.8 (24.9)	63.9 (28.8)	70.9 (26.1)	66.2 (35.7)	48.6 (25.2)
RES	14.2 (19.6)	16.0 (31.5)	15.4 (23.8)	7.0 (12.9)	6.1 (15.6)	10.6 (14.0)
DET	1.2 (1.2)	2.1 (3.4)	1.2 (2.1)	2.0 (3.9)	2.1 (3.7)	1.1 (1.7)
SURPL	206.2 (702.1)	265.1 (670.8)	132.3 (5693.9)	26.6 (185.5)	167.3 (1109.5)	215.9 (606.7)
INT (%)	0.37 (0.9)	0.24 (0.25)	0.24 (0.47)	0.59 (1.7)	0.21 (0.41)	1.42 (14.1)
PROF	0.07 (1.15)	0.32 (0.53)	0.21 (0.50)	0.15 (1.93)	0.10 (0.61)	0.25 (0.74)

All value variables are in thousands of French Francs

Table 2: OLS Estimates of the Membership Ratio Function (M/N)

	<u>1978</u>	<u>1979</u>
AGEN	0.106 (0.32)	0.376** (1.61)
PAY	0.908 (1.31)	0.644* (2.11)
F/N	0.02 (1.24)	0.011 (0.62)
lnR	-11.67* (8.68)	-10.14* (9.38)
AGEF	0.09 (1.39)	0.15* (2.41)
AGEM	-0.632* (3.76)	-0.834* (4.52)
IND	YES	YES
ORIGIN	YES <sup>1</sup>	YES <sup>1</sup>
LEG	YES	YES
REG	YES	YES
$\bar{R}^2$	0.41	0.39

\* denotes significance at 95% level:

\*\* denotes significance at 90% level:

<sup>1</sup> The coefficient on NEW was negative and significant at the 90% level.

Figures in parentheses are t statistics.



Table 3: OLS Estimates of the Individual Capital State Function(OWN )

	<u>1978</u>	<u>1979</u>
M/N	-0.381* (4.44)	-0.415* (5.35)
RES	0.360* (2.42)	0.154 (1.33)
DET	3.36* (2.30)	1.46** (1.74)
AGEF	-0.02 (0.23)	-0.06 (0.75)
AGEM	0.252 (0.93)	0.254 (0.86)
SURPL	0.0009 (1.32)	0.00034* (3.48)
PROF	0.486 (0.39)	-1.89 (1.13)
INT	-4.91** (1.88)	-0.17 (1.05)
lnR	4.13* (2.03)	2.07 (1.18)
AGEN	0.390 (0.81)	0.155 (0.43)
$\bar{R}^2$	0.19	0.17

\* denotes significance at 95% level

\*\* denotes significance at 90% level

Table 4: Simultaneous Equation Estimates of Augmented Production, Membership Ratio and Average Capital Stake Functions.

Variables	Augmented Production Functions		Membership Ratio Functions		Individually Owned Capital Stake Function	
	1978	1979	1978	1979	1978	1979
lnN	1.15* (15.87)	0.96* (8.75)	AGEN (0.21)	0.391* (1.64)	M/N (0.05)	-0.011 (0.06)
lnF	-0.03 (0.79)	-0.09 (1.61)	PAY (1.93)	0.158* (2.17)	RES (1.97)	0.303* (0.89)
M/N	0.013* (3.90)	-0.0004 (0.07)	F/N (1.24)	0.011 (0.61)	DET (2.37)	1.65** (1.08)
OWN	0.014* (5.55)	0.022* (5.34)	lnR (8.64)	-10.65* (8.98)	AGEF (0.09)	-0.01 (0.92)
AGEF	0.004 (0.80)	0.006 (0.94)	AGEF (1.39)	0.825* <sup>1</sup> (4.34)	AGEM (1.64)	0.48** (1.88)
(AGEF) <sup>2</sup>	-0.00006 (-1.10)	-0.00004 (0.52)	AGEM (3.72)	0.145* (2.33)	SURPL (0.81)	0.0027* (2.56)
$\bar{R}^2$	0.86	0.68	IND ORIGIN	YES YES <sup>1</sup>	PROF (0.16)	-2.29 (1.30)
			LEG	YES	-3.55 (1.30)	-0.09 (0.56)
			REG	YES	lnR (3.12)	7.04* (2.69)
			$\bar{R}^2$	C.44	AGEN (0.60)	-0.05 (0.12)
					$\bar{R}^2$	0.16

\* denotes significant at the 95% level

\*\* denotes significant at the 90% level

<sup>1</sup> The coefficient on new is negative and significant at the 95% level.



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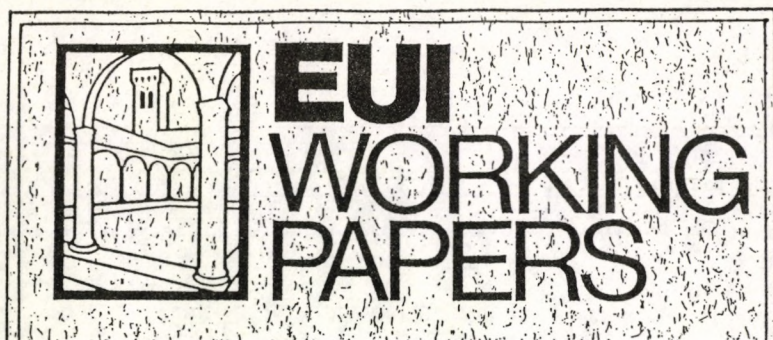


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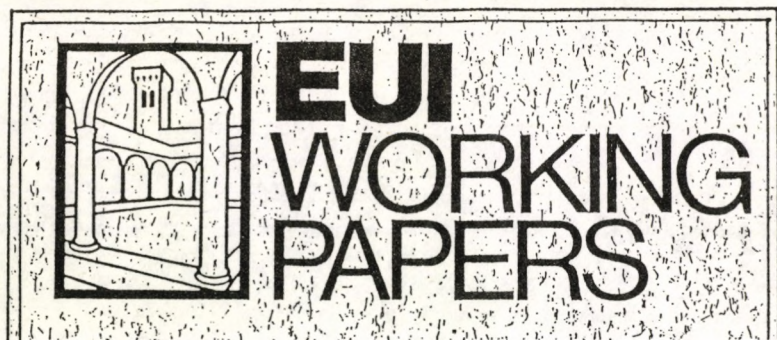
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