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Industrial and Labor Relations Review, Volume 45, Issue 2 (Jan., 1992), 323-338.

Stable URL:
http://links.jstor.org/sici?sici=0019-7939%28199201%2945%3A2%3C323%3ATVOEFE%3E2.0.CO%3B2-1

THE VIABILITY OF EMPLOYEE-OWNED FIRMS: EVIDENCE FROM FRANCE

SAUL ESTRIN and DEREK C. JONES*

This study examines data on French producer cooperatives for the years 1970–79 to test the widely accepted theoretical prediction that employee-owned firms either will fail as commercial undertakings or degenerate into capitalist firms as the proportion of hired workers who are not members of the cooperative firm increases. Contrary to this prediction, the authors find a high rate of survival among the producer cooperatives studied, with many cooperatives still healthy after fifty years of operation, and they find no evidence of degeneration—either in terms of the proportion of hired workers, productivity, profitability, or capital-intensity. The findings do, however, suggest that the firms' financial structure became increasingly inefficient with age.

In recent years, economists have developed theories implying that employee-owned firms (EOFs), of which important examples are producer cooperatives (PCs), will all either fail as productive units in the long term or convert into another form of enterprise. Disagreement remains over the determinants of these processes, with economists citing the structure of ownership and capital formation (Vanek 1971) or the use of hired labor (Miyazaki 1984; Ben-Ner 1984), and sociologists and organizational behaviorists often arguing that such organizations evolve in distinct stages related to chronological age. Theories based on the latter framework, in which political structures and processes are the key variables (for example, Russell 1985; Webbs 1920), sometimes yield less pessimistic predictions of ultimate outcomes than do theories based on economic variables. Since the past decade has witnessed increased numbers of EOFs in many countries (see Ben-Ner 1988), in no small part because of legislative initiatives designed to encourage them, the pessimism of many of these theories as to the long-term survival potential of labor managed firms (LMFs) should at least give pause for thought among policymakers.

As many have noted (see, for example, Stephen 1984), the empirical base underlying these theories is very slim.[1] To enable

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[1] For example, Miyazaki (1984) and Ben-Ner (1984) derive their empirical generalizations almost exclusively from the U.S. experience. But as some have noted (for example, Jones 1979, 1984), one must be cautious in drawing generalizations based on the available evidence for the U.S., since the data are

Industrial and Labor Relations Review, Vol. 45, No. 2 (January 1992). © by Cornell University.
0019-7939/92/4502 $01.00

more informed model building and to assist in the empirical analysis of these issues so as to provide policy guidelines that can aid the establishment of stable sectors of EOFs, there is an urgent need both for a more robust body of factual information and for evidence on hypotheses drawn from existing theories of long-run survival and transformation. In this study, using a rich new body of data for an important example of EOFs—namely, French producer cooperatives—we try to establish some "stylized facts" and to investigate diverse hypotheses on these issues.

Institutions

Theorists interested in employee-owned firms typically focus their attention on the effects of different aspects of the internal organizational arrangements within EOFs. Of special interest are the ways in which employees share in ownership, decision-making, and profits. After providing details on these matters, we continue by giving some feel for the scope and nature of the French PC sector.[2]

French PCs are owned by their members, all of whom are workers or ex-workers in the firm. Membership confers rights in company decision-making via the election of representatives to the firm's governing General Assembly on a one-member, one-vote basis. The General Assembly determines the broad outline of corporate policy, especially in large companies. Day-to-day administration is delegated to a management board, the composition of which must by law be two-thirds workers. The law only requires members to hold one share, though the membership often vote to impose additional financial requirements. The law provides that employees have the legal right to apply for membership, but they do not have to become members to be employed in the cooperative and therefore to gain access to the profit-sharing bonus. In fact, a relatively large proportion of the labor force do not join. The proportion of workers who are members of the firm (M/L) varies from about 70% in the consultancy and printing sectors to below 50% in the construction industry.[3]

Because of the one-member, one-vote rule, capital ownership beyond the stipulated minimum confers no additional influence over corporate policy. Moreover, members' shares are paid only a limited return and on departure are repaid at the initial purchase price. Even so, there is considerable variation in the actual capital provided by worker-members, which could indicate their financial commitment to the cooperative. The worker's individual ownership stake, normalized with respect to the total assets of the firm (SHARE), displays considerable dispersion both between and within sectors and ranges between an average of 10% in electricals to 62% in consultancy.

The bulk of working capital in French PCs comes from "collectively owned reserves" formed by a mandatory allocation of at least 15% from annual profits and loans, primarily from specialist financial institutions. Either because of credit rationing or because of an unwillingness to become too dependent on outside funds, however, cooperatives also take considerable loans from their own members. Although these loans earn interest and are generally of short duration, they nevertheless represent another way in which workers can demonstrate their commitment to the firm. The proportion of total loan capital lent by worker-members varies considerably between and within sectors, from around 15% in mechanicals to more than 50% in the newer firms in consultancy.

The articles of incorporation of French

patchy and the experiments have been small in scale and unrepresentative of co-ops elsewhere.

[2] See also Defourny, Estrin, and Jones (1985), Estrin, Jones, and Svejnar (1987), Vienney (1980–1982), and Demoustier (1981).

[3] The data on which the empirical part of this paper is based are discussed more fully in "Empirical Strategy and Results," below. In this section, the data used to describe institutional practices in French PCs are derived from observations for the total population of all (541) firms existing in 1979 for which data are available.

PCs explicitly stipulate a minimum degree of profit-sharing with the labor force. At least 25% of company profits must be distributed in each year to the workers, whether or not they are members, though the precise amount is left to the enterprise governing body, and members can earn more bonus than nonmembers. On average in 1979, bonuses were largest in the electrical sector, amounting to some 2,000 francs (about $500) per head, and smallest in the service sector (340 francs). In 1979 bonus payments represented about 13% of the total income from work of the average worker in a French PC. The minimum bonus paid was zero, but the maximum rose to about 40% of total income in 1979. The coefficient of variation across the entire sample in 1979 is 259%.

The ratio of loans (external and from members) to equity in the firm (either collectively or individually owned)—D/E—is a fairly traditional measure of financial structure. In 1979, that ratio had an average value of about one in construction, electricals, printing, and the footwear and agricultural co-ops and about two in mechanicals, services, and consultancy. The other indicator of capital structure highlighted by theory is the proportion of total assets in collective ownership (COLL). The sectoral average for this variable also varies considerably, from 16% in services and agriculture to more than 30% in construction, footwear and clothing, and the manufacture of boxes.

At the end of the 1970s, construction firms had the largest number of workers—around 60 on average—with electrical companies not far behind. Mechanical engineering and service PCs had around 40 workers on average, printing co-ops 30, and the relatively small consultancy firms only 16. The electrical sector is relatively capital-intensive and labor productive, with a capital-labor ratio (K/L) in 1979 of some 50,000 francs (about $12,200) per head, and output per head of 120,000 francs ($29,270). The capital-labor ratio in 1979 was some 30,000 francs ($7,320) per head in printing, and around 15,000 ($3,660) in the remaining sectors except consultancy, in which it was below 10,000 francs. As one would expect, labor productivity (Q/L) follows the same pattern as the capital-labor ratio, and output per unit of capital displays a reverse ordering, ranging from 6.3 in the labor-intensive consultancy sector to 2.3 in electricals.

French PCs are dispersed throughout the country, with major clusters in Paris, the West, and the South East and Provence accounting respectively for some 32%, 16.5%, and 9% of the total in 1979. The records of the central federation, Confederation Generale Sociétés Coopératives Ouvrières de Production (CGSCOP), to which most PCs in France belong, offer three categories for the formation process of French co-ops: (1) the creation of entirely new firms; and firms that have been changed from other legal forms into co-ops, either (2) without any break or (3) after a period of closure. In 1979, the majority of French PCs in every sector had been created *de novo*, with sectoral averages ranging from 67% in mechanicals construction and in electricals to 88% in services. Transformations comprise some 10% of the total in every sector. There are also two legal forms—Société Anonyme (SA), which is appropriate for most firms, and Société Anonyme à Responsabilité Limitée (SARL), which offers advantages for smaller co-ops (Vienney 1982). SA and SARL are important control variables in our cross-sectional equations.

French PCs have traditionally been concentrated in three broad sectors: construction, printing, and mechanical engineering. In 1970, these sectors contained 54%, 14%, and 6% of the firms in our sample, respectively; in 1979 the corresponding figures are 47%, 12%, and 7%. During the 1970s, three new groups—diverse consultancy agencies, general services, and electricals—grew considerably, and by 1979 they comprised some 14%, 8%, and 9% of our sample, respectively. The remaining firms were in clothing and footwear, woodworking, and food processing. The French PC sector was very dynamic during the later years of this period, with, for example, some 80 new PC firms being created between 1978 and 1979. (Few PC firms, however, were

created through the transformation of firms that had closed during the 1970s.) Entry was particularly rapid in the consultancy sector, the mechanical sector, and the electrical sector, where firm numbers increased by approximately 45%, 39%, and 31%, respectively. It was rather more sluggish in services (11%) and printing (9%).

On average, the oldest PCs were in printing and construction and the newest in electricals and (particularly) consultancy. There was, however, considerable variation with respect to average age in the older sectors. In construction, 30% of firms were less than 5 years old in 1979, whereas 17% were more than 50 years old. The average age of the labor force was typically higher in older firms. In fact, in a univariate regression (in logs) between age of firm and age of the labor force (using the entire data set of 541 observations for the year 1979), the estimated parameter on the age of the firm is 0.035 with a t-value of 7.34, and the partial correlation coefficient between the two variables is 0.318.

Hypotheses on Survivability and Degeneration

Hypotheses on the alleged tendency of EOFs either to fail as commercial undertakings or to transform into non-EOFs have been developed in many disciplines, including economics, sociology, political science, and organizational behavior. A comprehensive review of this literature clearly is impossible in this paper.[4] Instead, we highlight those influential hypotheses on survivability and degeneration that can be tested using measurable variables for which data are available. The main reason for this focus is that our data are based on a large longitudinal data set, and such data sets do not have the detail typical of case studies.[5]

The propositions we consider may be grouped under three related headings. Two categories of hypotheses are pessimistic, predicting (1) the non-survivability or tendency to self-extinction of EOFs and (2) the inevitable tendency of EOFs to degenerate. The third hypothesis more optimistically stresses the benefits to physical and human capital accumulation of participatory structures.

Ever since the Webbs,[6] the notion of the importance of *bureaucracy*, especially when applied to democratic organizations, has recurred in the literature on EOFs. To the extent that this theoretical framework is valid, PCs will eventually succumb to Michels's (1962) "iron law of oligarchy." As such, the tendency for PCs to degenerate is seen as one instance of a syndrome that has been found to exist in other democratic organizations. (For labor unions, see Edelstein and Warner 1975; for German works councils, see Hartmann 1979.)

But for PCs this problem allegedly looms larger than for most other organizations. It is argued that firms in which workers elect managers and sit on the board of directors will be unable to survive. Although actual degeneration may assume several forms, central to the process is a restriction of co-op membership and the use of hired labor. As such, the Webbs (and others who have argued in a similar vein, such as Blumberg [1988]) predict that over time, the fraction of the work force who are members (M/L) must decline. Many of these theorists do not seem to stress any mediating variables. Consequently, if AGE represents the age of the firm, and the second order term in age of the firm is included to allow for non-linearities in the degenerative process, an appropriate test of this key hypothesis of degeneration (and ultimately of survivability) is[7]

[4] For more extensive reviews, see Russell (1985) and Stryjan (1987).

[5] In particular, we cannot devote as much discussion as we would like to the rich and differing socioeconomic processes that are involved in the diverse theories.

[6] Still earlier, Beatrice Potter (1890), the future Mrs. Webb.

[7] In order to focus on the variables of primary interest, we omit controls for industry, mode of

$$(1) \quad M/L = a_1 + b_1 AGE + c_1 AGE^2$$

Some economists see the matter as a little more complex. They argue that most ownership arrangements within LMFs will have various undesirable outcomes. Vanek (1971) predicts that the existence of collectively owned assets and the failure to charge a scarcity price for their use will lead to allocational inefficiencies and ultimately to self-extinction, even in firms that are based on control by workers. The forces causing self-extinction allegedly arise mainly from the tendency to underinvest. This theory has been criticized (Stephen 1984), but it still exercises influence. (See Bonin and Putterman 1987 for a survey.) It predicts that the EOF will gradually *self-extinguish*; to be precise, as the firm ages, it will become progressively smaller, less productive, and less capitalized. Hence, if size is proxied by a variable such as the total labor force (L), value added per worker (Q/L) proxies productivity, and K/L measures the capital-labor ratio, this survivability hypothesis can be tested by

$$(2) \quad L = a_2 + b_2 AGE + c_2 AGE^2$$

$$(3) \quad Q/L = a_3 + b_3 AGE + c_3 AGE^2$$

$$(4) \quad K/L = a_4 + b_4 AGE + c_4 AGE^2$$

As before, the second order term in the age of the firm is included to allow for nonlinearities in the degenerative process.

A second major theme in the literature predicting the demise of EOFs is *ownership and financing arrangements*. (See Furubotn and Pejovich 1970.) In this regard, authors differ both on the preferred forms of ownership and on the ultimate outcomes. For example, whereas some espouse *individual* ownership stakes (for example, Oakeshott 1978), others believe that individual ownership stakes will have unfavorable effects. Most pertinent is the view that degeneration results from worker members in PCs having no clear conception of the place of capital (Holyoake 1906, for example). PCs based on *individual ownership* will submit to the impulse to hire nonmembers and thereby degenerate, essentially back to close approximations of the capitalist form (where M/L is tiny, say < 0.2). Thus, over time, the proportion of members to nonmembers is expected to fall faster in firms in which the ratio of assets owned by individual workers to total assets is higher.

Most economists (such as Furubotn and Pejovich, 1970) do not favor *collective* ownership structures; others, however, see substantial positive effects resulting from collective ownership (Wiles 1977; Rothschild-Whitt 1979; Kanter 1972). In particular, some see PCs avoiding degeneration best when there are "commitment mechanisms." These mechanisms are designed to foster commitment to the group and can take many forms, only one of which is collective ownership; others include structures designed to ensure frequent interaction of the group.[8] Collective ownership is also argued to appeal to collective self-interest; moral incentives and peer group controls are deemed to work more effectively in an environment in which collective ownership is the norm. Consequently, according to this view, collectively owned PCs will be slower than individually owned ones to introduce non-owner workers.

Degeneration may take many forms, but a cutting off of co-op membership is

origin, and legal form. Reflecting our institutional discussion, however, for this and subsequent hypotheses we expect the posited relationship to hold only when such controls are in place.

[8] In his historical study of U.S. PCs, Shirom (1972) finds evidence for the emergence of inegalitarian patterns of decision-making in the midst of democratic organizational forms. In particular, he argues that a relatively stable managerial stratum emerged. Not only are his secondary data on defunct PCs somewhat thin (Jones, 1979), however, but other subsequent case studies using primary data on extant co-ops do not always support Shirom's views (e.g., Rothschild-Witt 1979). That is, a tendency to degenerate into undemocratic modes need not always arise, and even when it does, the source of this degeneration may be different from that suggested by Shirom. Equally, although all of these studies point to the desirability of testing degeneration hypotheses by using longitudinal panels of large samples where such complex social processes are monitored and accurately measured, such data unfortunately are not available, and in these circumstance, variables such as M/L arguably are of fundamental significance.

clearly a crucially important example of degeneration, and the degree of collective ownership often is a strong indicator of the power of commitment mechanisms.[9] We can, therefore, test these competing degeneration hypotheses on the effects of ownership by

$$(5) \quad \text{M/L} = a_5 + b_5\ \text{AGE} + c_5\ \text{AGE}^2 + d_5\ \text{SHARE} + e_5\ \text{COLL},$$

where we expect a negative coefficient on SHARE (fraction of total assets owned individually by workers) and a positive one on COLL (fraction of total assets owned collectively by members).

Both Ben-Ner (1984) and Miyazaki (1984) argue that EOFs will degenerate in an environment in which there are alternative employment opportunities. This prediction is very similar to that of the Webbs, except that the Webbs viewed *all* PCs as impossible organizations that would fail, whereas these competing theories predict that only successful firms will degenerate. We can discriminate between these hypotheses by partitioning the sample on the basis of a success criterion (for example, the ability to earn a surplus) and then examining whether or not the process of degeneration is different for the two groups as they age.

These negative theories ignore the growing body of empirical work that finds a positive impact of diverse forms of participation on productivity. (For example, see Blinder 1990.) Various rationales have been given for expecting employee ownership (perhaps in conjunction with other participation arrangements, such as profit sharing) to enhance the productive efficiency of the firm, but in sketching the bare bones of an alternative theory here, we focus on the theme of skill enhancement.[10] Employee ownership can serve as a powerful motivator, especially when work is autonomous. In firms with employee ownership, employees may be especially likely to use their existing skills, which constitute a form of firm-specific human capital, in the interests of the firm, and also likely to quicken the rate at which they accumulate such skills. Moreover, given existing members' broad appreciation of these benefits of participation, it seems likely that such worker-members would encourage not only the process of individual capital subscription beyond the minimum necessary for membership but also (and especially) the process of collective-capital accumulation. These considerations imply that there may be firm-specific externalities to high membership, related not only to the need for extra capital, which new blood can most easily provide, but to the advantage of spreading among more members the relatively fixed costs of participation (such as membership on committees).

This approach yields completely different predictions from those reviewed earlier. First, it does not imply that demise will be automatic. Second, if the productivity effects of participation are pronounced, we would predict a positive relationship between the proportion of the workers who are members and success indicators such as labor productivity (in contrast to the implications of equation 2). Third, clear understanding of the benefits of participation by worker-owners would give them a powerful motivation to encourage a process of internal capital accumulation. These implications lead us to test for life-cycle effects in measures of capital structure. The simplest specifications are

$$(6) \quad \text{D/E} = a_6 + b_6\ \text{AGE} + c_6\ \text{AGE}^2$$

$$(7) \quad \text{COLL} = a_7 + b_7\ \text{AGE} + c_7\ \text{AGE}^2,$$

where D represents enterprise debt and E denotes equity including individual *and* collective ownership shareholdings, so that D/E is the cooperative debt-equity ratio.

[9] Our data do not allow us to examine the influence of such factors as variations in collective sentiments (Russell 1985). Note that we exclude some indicators that have assumed importance in studies of other employee-owned firms but that *cannot* have any importance or interesting longitudinal variation in French PCs. For example, the law prevents the distribution of ownership from becoming markedly unequal, and the price of membership cannot vary much either.

[10] For a review of these arguments, see Estrin and Jones (1990) and Jones and Pliskin (1991).

Finally, these arguments suggest the possibility of industry differences in the tendency to degenerate. The perceived benefits of cooperation, and therefore membership demand, will be greater in those industries, such as consulting, where invisible assets are of more significance. In such industries, hired labor may be less readily substitutable for self-employed labor than in other industries, where invisible assets are likely to be relatively small. Thus, our third test of this alternative approach is to look for industry differences.

Empirical Strategy and Results

Data and Empirical Strategy

Reflecting the discussion in the preceding sections, our aim is not to rigorously test hypotheses derived from formal models.[11] Rather, we provide evidence on a range of hypotheses that are drawn from diverse disciplines and that can be considered under three related headings: survivability/self-extinction; degeneration; and links between accumulation and productive efficiency.

The empirical work is based on a large body of enterprise-level data that has been broken into two data sets, one longitudinal and the other cross-sectional. The first is a *panel* data set and contains annual *data for all (283) PCs in France that existed throughout the period 1970–79.* This data set enables us to monitor the evolution of key variables over time for this population of "continuous" PCs. No longitudinal data base of similar length or size is available for EOFs anywhere else. The second data set, which we examine because there was a considerable amount of entry into the French PC sector during the period (especially in 1978 and 1979, when there was strong economic growth), contains observations for the *total population of all (541) firms existing in 1979* for which data are available.[12] This *cross-section* enables us to analyze the whole age range (rather than just the ten years of the panel) and, by allowing additional controls such as for industry, allows us to test different hypotheses[13] from those we investigate using the panel data set.

Our principal aim of developing a set of "stylized facts" about EOFs is accomplished primarily in Table 1. There, for the panel of PCs, we present arithmetic means for the eight variables that figure prominently in the various theories for each of ten years in three age groupings: firms less than five years old in 1970, firms between 5 and 50 years old in 1970, and firms greater than 50 years old in 1970.[14]

As outlined in the previous section, we test hypotheses on the basis of equations (1)–(7). The general approach is to employ multiple regression techniques in estimating cross-sectional equations in which variables of interest are related to the age of the firm and other relationships, such as ownership structures and industry effects. These results are reported in Table 2.[15]

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[11] In another paper (Estrin and Jones 1990) we rigorously test hypotheses drawn from a formal economic model of the co-op life cycle.

[12] The data in the panel data set for 1970–77 were processed by J. Defourny at CIRIEC, University of Liege, from data made available to him on a confidential basis by CGSCOP. The data for 1978 and 1979 were also initially collected by CGSCOP but were processed by the authors. Readers interested in obtaining similar data should contact the CGSCOP directly.

[13] Since our data contain only firms that had survived until 1970, there is some "right-censoring" bias in the sample. The potential bias, however, is not as strong as it might seem because of the large number of births during the sample period *and* the fact that PC discontinuations tend to be concentrated in the early years of enterprise life (Perotin 1987; Staber 1989). Also, only four PCs were discontinued during 1970–79. Hence, our results very closely approximate what was happening to all French PCs during that period.

[14] With so many variables under consideration, the choice of the age groupings is somewhat arbitrary. This particular tripartite division is chosen because it corresponds approximately to the phases of PC creation, that is, pre–Second World War, inter- and postwar, and recent. The "less than 5 years" category also picks up new creations. When the number of firms in any category is fewer than ten, the observation is omitted. All nominal variables have been deflated by the relevant industrial deflator to a 1970 base.

[15] All regressions were estimated using SAS. Copies of the regression results are available from Professor Saul Estrin, L.S.E., Dept. of Economics, Houghton St., London, WC2A 2AE.

Table 1. Panel Data Set: Means of Key Variables by Age Group and Year, 1970–1979.

	M/L			*SHARE*			*D/E*			*COLL*			*Q/L*			*L*			*K/L*		
Year	*a*	*b*	*c*	*a*	*b*	*c*	*a*	*b*	*c*	*a*	*b*	*c*	*a*	*b*	*c*	*a*	*b*	*c*	*a*	*b*	*c*
1970	60	38	50	0.44	0.23	0.26	—	1.18	0.31	—	0.24	0.38	11.6	14.3	21.7	18	74	68	5.8	7.3	11.5
1971	61	39	52	0.37	0.25	0.24	—	1.31	0.58	0.04	0.30	0.39	13.2	15.2	24.6	21	79	52	8.2	7.8	14.2
1972	58	39	51	0.33	0.24	0.19	—	1.24	0.67	0.03	0.31	0.39	12.9	16.5	25.0	23	84	55	8.2	8.3	14.2
1973	55	42	51	0.35	0.25	0.19	3.40	1.04	0.69	0.09	0.34	0.39	15.6	17.9	25.5	26	84	—	10.2	8.7	14.6
1974	60	43	56	0.31	0.24	0.18	2.80	0.73	0.80	0.08	0.35	0.38	15.9	16.5	27.7	22	93	—	10.9	7.6	15.2
1975	59	44	55	0.41	0.20	0.16	1.80	0.94	0.96	0.11	0.37	0.38	15.3	16.0	25.9	25	95	—	9.5	7.8	14.3
1976	58	44	52	0.47	0.21	0.17	1.63	0.86	0.63	0.14	0.37	0.61	18.0	15.5	25.5	24	91	—	11.6	7.2	13.4
1977	58	39	51	0.42	0.22	0.23	1.16	0.99	0.69	0.17	0.35	0.36	15.8	15.6	23.6	32	97	53	8.9	7.1	10.7
1978	59	46	60	0.30	0.33	0.20	1.16	0.72	0.67	0.25	0.44	0.50	17.2	16.7	19.9	31	93	46	8.7	12.8	10.0
1979	60	50	64	0.29	0.24	0.22	1.17	0.72	0.59	0.23	0.44	0.51	15.7	16.7	21.7	30	95	57	8.1	11.5	10.5

Age Categories: a = less than 5 years old; b = 5–50 years old; c = greater than 50 years old. A dash denotes no or few observations due to missing values. For definitions of variables, see the text.

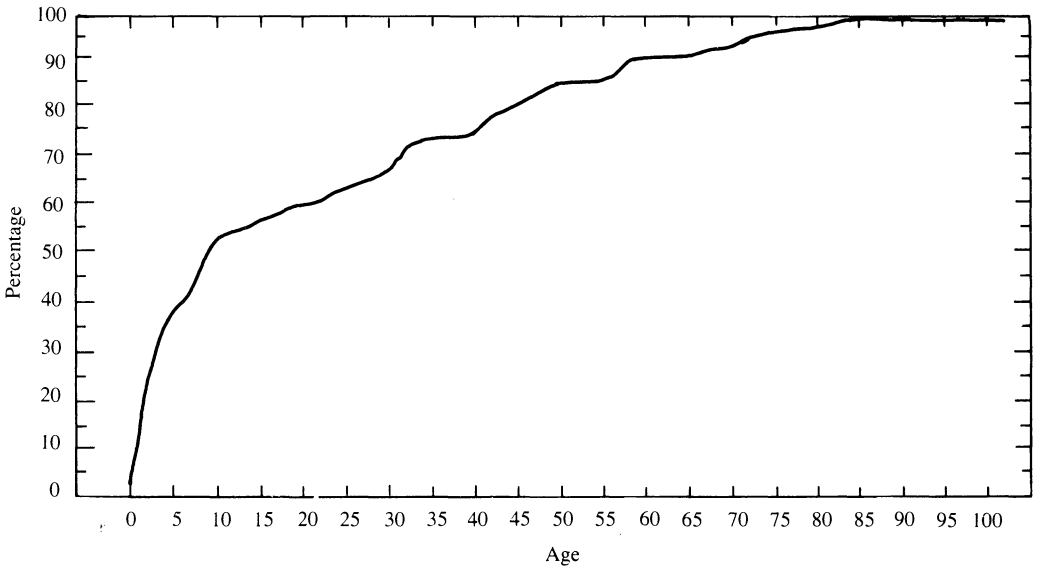

Figure 1. Cumulative Frequency Distribution: French Producer Cooperatives by Age of Firm, 1979.

Survivability/Self-Extinction

Between 1970 and 1977, only four French PCs failed.[16] The effects of this small morality rate on the age distribution are shown in Figure 1, which plots the cumulative frequency distribution by age for 1979. In part, this figure reflects the massive recent entry of PCs in the late 1970s—more than 30% of firms were less than 5 years old in 1979. More important, it confirms that many PCs were able to survive for long periods of time—more than 30% of firms were more than 30 years old. Such a high proportion of long-lived PCs constitutes strong evidence in its own right against the view of automatic PC degeneration.

We continue by considering the evidence bearing on the first hypothesis—the alleged inability of PCs to continue as democratic organizations. The panel data indicate that although initially there is degeneration, in the sense that the proportion of the worker members (M/L) declines with age, on average this stage is followed by regeneration (Table 1). Thus, in every year, the proportion of workers who were members was lower in middle-aged firms (aged between 5 and 50 years in 1970) than in either very young or relatively mature EOFs. Moreover, though the time series dimension is to some extent influenced by cyclical factors, we observe that among the young firms, M/L tended to remain approximately constant or to decline slightly over the years, whereas the trend was distinctly upward among the middle-aged and mature firms, particularly the former.

This relationship is confirmed by using the cross-sectional data, which, when explaining the proportion of workers who are members by a quadratic in the age of the firm (equation 1), always yield a weak parabolic relationship in which M/L initially declines until the firm reaches about 45 years of age, then begins to rise again—a U-shaped life-cycle pattern. A typical estimate for this model is reported in Table 2, row (1). In this estimate, we also

[16] Death rates among all small firms, and especially PCs, are highest in the first years after formation, and the bulk of firms in the panel data set were already well established (more than 70% of the firms in the sample were more than 10 years old in 1970). Exit rates are appreciably higher in the French PC sector as a whole if one takes account of new entrants, though not markedly different from exit rates of private firms in the same period (see Ben-Ner 1988; Perotin 1987).

Table 2. Tests of Hypotheses of Degeneration and Survivability: French Producer Cooperatives, 1970–79.

Dependent Variable	AGE	AGE^2	SHARE	COLL	M/L	*Legal Form Dummies*	*Mode of Creation Dummies*	*Significant Industry Dummies*	*F*
					A. Whole Sample				
1. M/L	−0.575***	0.0068***	—	—	—	Yes**	Yes**	−Construction	5.55
	(0.171)	(0.002)							
2. L	2.147***	−0.0188***	−6.538	−0.279	−0.546***	Yes	Yes	+Construction	2.76
	(0.658)	(0.189)	(8.431)	(13.409)	(0.190)			+Electrical	
								+Boxes	
3. Q/L	0.399	−0.0035	−4.728	−2.871	0.157***	Yes	Yes***	−Construction	2.51
	(0.266)	(0.0032)	(3.406)	(5.447)	(0.077)			−Boxes	
								+Public Works	
4. K/L	0.0151	.0003	—	—	—	Yes	Yes	+Carpentry	2.83
	(0.195)	(.0024)							
5. M/L	−0.505***	0.0063***		−4.389	—	Yes*	Yes*	−Construction	5.41
	(0.176)	(0.0021)		(3.61)					
6. D/E	0.484	−0.0007		—	—	Yes	Yes	None	0.5
	(0.047)	(0.006)							
7. COLL	0.0111**	−0.00007***		—	—	Yes	Yes	+Consultancy	3.42
	(0.0026)	(0.00002)						−Service	
					B. Partitioned Sample: Dependent Variable = M/L				
8. Loss Makers	−1.260***	.0165***				Yes	Yes*	−Construction	3.06
	(0.508)	(.0071)							
9. Profit Makers	−0.368*	0.0049**				Yes	Yes**	−Construction	7.99
	(0.202)	(.002)						−Mechanicals	

* Significant at the .10 level; ** at the .05 level; *** at the .01 level.

consider the effects of variables capturing legal form (SARL), mode of creation, and industry. These controls provide some interesting insights into the complicated process of degeneration and regeneration. There are positive and significant coefficients on dummies for revived and transformed firms, indicating that, relative to firms established from scratch as EOFs, degeneration is slower in those PCs that represent transformation or resuscitation of erstwhile capitalist firms.

This result conflicts with the typical finding for contemporary PCs (Cornforth 1983). A positive and significant coefficient is also found for a dummy controlling the legal form chosen by the co-ops with a smaller minimum number of members. Consistent with other studies (for example, Rothschild-Whitt 1979), this finding shows that, other things equal, the process of degeneration will be arrested in smaller firms. In general, the industry dummies do not indicate that there are significant sectoral differences. The only exception is in construction, where there is a large and strongly statistically significant effect. These findings are probably largely owing to the effects of a greater responsiveness of output (and therefore labor) in construction than in most other industries in a boom year. (See Berman and Berman [1989], who similarly show the effects of countercyclical product market forces in their study of plywood PCs.)

Evidence against the thesis that PCs cannot survive can be inferred from the index of the size of the firm (L), labor productivity (Q/L), and capital intensity (K/L). Both employment across age categories in each year and employment within age groups across years reveal an inverse U-shaped pattern. Young firms were typically quite small but grew fast, with their level of employment doubling within ten years. Middle-aged firms were much larger and also tended to grow quite fast. Firms aged over 50, however, were slightly smaller than their middle-aged counterparts, and actually shrank by about 16% over the period.

In contrast, Table 1 suggests life cycles in capital intensity and labor productivity. Capital intensity tends to rise with age both at a moment and through time, though there is slight evidence of the relationship peaking among the youngest firms and in the later years of the sample. Labor productivity is highest in the oldest firms and lowest in the youngest age grouping in each of the ten years. Firms in the middle category hold an intermediate position. These differences, however, are small, and for the most part they are not statistically significant at the 10% level.

These findings are confirmed by regressions reported in Table 2. There is an inverse U-shape trajectory of employment as the firm ages, with a maximum labor force after around 59 years (Table 2, row 2), and this process is not significantly influenced by variables reflecting the origins of the firm or financial structure. There are, however, large sectoral differences, with the growth of the labor force, other things equal, being especially strong in construction, electricals, and boxes. Interestingly, labor forces were smaller, other things equal, in firms in which worker membership was highest. As Table 1 would suggest, however, neither capital intensity nor labor productivity is characterized by a strong life cycle; the coefficients on the quadratic in the age of the firm are insignificant at even the 10% level in both regressions. Also, there is evidence that productive efficiency was higher in firms that did not begin life as EOFs but rather were transformed or revived from failed capitalist firms. It should be noted that even the evidence against a life cycle for these latter two variables runs counter to the hypothesis that the firms will be unable to survive.

Degeneration

To examine the view that ownership structures may mediate the degeneration process, we estimate equation (5) including the proportion of capital owned collectively and individually on the right-hand side of a worker-membership ratio equation. The results are reported in the fifth row of Table 2.

These estimates reaffirm the existence

of a U-shaped relationship between the membership ratio (M/L) and the age of the firm, reaching a minimum M/L after about 40 years. As in row (1) of Table 2, the origin of the firm and the particular legal form have significant effects, and the only significant control for industry is a dummy for construction. On the other hand, the results for SHARE and COLL do not lend support to either of the arguments underlying equation (5). The coefficient on the proportion of individually owned assets is positive and weakly significant (at the 10% level) rather than negative as predicted by those who expect high individual share ownership to accelerate the process of degeneration. There is also no support for the view that collective ownership will act as a commitment mechanism and will facilitate higher worker membership. In fact, we find a negative, though statistically insignificant, relationship between the two variables.

To examine whether degeneration is, as sometimes claimed, a phenomenon affecting all EOFs or rather a process confined to successful firms, we partitioned the cross-section data set between firms that were making a positive surplus and those that were not. We then re-estimated various specifications of the M/L equation such as equations (1) and (5). Representative results for these exercises are reported in part B of Table 2, rows (8) and (9).

The most powerful finding emerging from these exercises is that degeneration is strongest for loss makers. This result is reflected in the comparative values of the AGE and AGE^2 coefficients in the two subsamples, the second order term being significantly different at the 95% level. Alternatively, one can compute the partial derivative $\delta ML/\delta A$ for the two subsamples, calculated at a particular age. Thus, if AGE = 10, $\delta ML/\delta A$ for loss makers is -93, compared to -27 for profit makers. At AGE = 20, the comparable values are -60 and -17, and at AGE = 30, -27 and -7. Similar results emerge even when no controls are included, though the pattern becomes even stronger with the addition of controls such as SHARE and COLL, as in the reported regressions. All of these findings contradict the Miyazaki instability proposition.

The Alternative Theory: Accumulation and Productive Efficiency

The positive significant coefficient on the membership ratio in equation (3) in Table 2 shows that productive efficiency was higher in EOFs in which the membership ratio was higher. This result reaffirms earlier findings for French PCs (Defourny, Estrin, and Jones 1985) as well as for participatory firms in general (Blinder 1990). Moreover, the positive coefficient on individual ownership stakes in the membership ratio equations provides support for the alternative theory that enhanced productive efficiency leads to a positive (rather than, as is commonly posited, a negative) relationship between membership choice and capital contribution. The finding that degeneration was strongest in loss makers also lends support to the alternative theory.

An implication of this alternative theory is that there should be a life cycle in capital structure, something not predicted by the other theories. One important indicator of capital structure is the overall ratio of debt to equity. An examination of the panel data in Table 1 suggests clear patterns. Average values for the debt/equity ratio are consistently highest for the youngest firms and lowest for firms in the oldest age group; for firms in the two youngest age cohorts, the ratio declines as firms age. Because the variances and the mean values are typically very large, however, the average values reported in Table 1 are often not statistically significantly different from each other. This interpretation is confirmed by the regressions reported in Table 2, row 6, which do not reveal a similar picture on the cross-section data. There is no life cycle effect, and neither the origin of the firm, the legal form, nor the industry appears to have any systematic influence on this measure of capital structure.

A second indicator of capital structure is

the proportion of the assets that are collectively owned. From Table 1 we see that this ratio is always largest in oldest firms and, in all cases, the ratio of collectively owned assets to total assets rises with time and the differences are typically statistically significant. The regression reported in Table 2, row 7 confirms that there is a statistically significant relationship between collective ownership and the age of the firm. The regression also reveals that the quadratic has an inverted U-shape, with collective reserves reaching a maximum after only around 79 years and then gradually declining. There is also some evidence of the expected industry differences.

Conclusions and Implications

A major purpose of this paper has been to assemble "stylized facts" on the life cycle of producer cooperatives (PCs) to guide future theoretical and empirical work. Our findings are consistent with the following picture of the co-op life-cycle.

The PC is founded as a relatively small and undercapitalized productive organization, which has to rely disproportionately on workers' own funds. Other studies have suggested that co-ops are most at risk in their early years, perhaps the first three years after formation (see Perotin 1987). The threat to survival manifests itself in the capital structure, but as the co-op begins to earn surpluses, these can be used to accumulate collective reserves and reduce workers' equity stakes. Hence, as average collective reserves rise, the debt-equity ratio and individual workers' capital stakes proportionately fall. The accumulation of reserves appears to be sufficient to finance the increase in fixed assets required to maintain the optimal capital-ratio at gently rising levels of employment, though some co-ops reach some maximum size and then stop growing altogether. Either way, older cooperatives become capital-rich and unwilling to exhaust their accumulated funds in either internal growth, which could threaten the cohesiveness of the collective, or diversification, which brings little benefit to workers since their capital holdings are non-tradable.

A second purpose of the paper has been to compare the evidence for France with the predictions of major theories. Our findings do not support the view that PCs are bound to fail. The prediction of rapid demise is refuted both by the low mortality rate of French PCs during the 1970s and by the ability of many French PCs to survive for more than 30 years. Moreover, the economic outcomes implied by the "self-extinction" forces of the Vanek model do not square with the observed tendencies of French PCs to grow in size over time and in certain cases to maintain labor productivity and the capital-intensity of production. Also, we do not find strong evidence for degeneration—at least of the type implied by major theories. There is evidence that the membership ratio falls during the early years, but this phase is usually followed by a process of revival. Also, and at variance with the predictions of most degeneration theorists, we find that during those periods when degeneration is present, it is strongest in loss making firms.

Our results bear a superficial resemblance to those of the only published empirical piece that we are aware of on life cycles in French PCs, that by Batstone (1982). Batstone finds that initially PC firms are small, with high membership ratios. As growth occurs, the membership ratio falls, but later it rises again while the firm shrinks in size. Although our findings on the behavior of the size of the firm, using the disaggregated data set, are similar to Batstone's, we are unable to confidently draw similar inferences on the changes in other indicators of worker participation over the life cycle. But our description of the life cycle process in French PCs is richer and deeper than Batstone's. For example, he argues that the funds available to firms eventually shrink as the firm ages, whereas we find no such thing; and he does not draw attention to the changes in capital structure that apparently are central to the life-cycle process and are at work as the

firm ages, nor does he discuss what is happening to firm performance.

Most of our findings on the salient features of the life cycle for French PCs differ markedly from the characterization of degeneration/life cycles implied by studies of employee-owned firms elsewhere. Thus, for contemporary U.S. employee-owned firms in taxi-driving and refuse collection, Russell (1985) finds evidence of degeneration, as others have for plywood PCs (for example, Berman 1967) and defunct U.S. PCs (for example, Jones 1979). But even in the United States there are important examples of PCs that have neither degenerated (in the sense of reversion to conventional organizational forms) nor, apparently, exhibited a life cycle similar to that of French PCs. (For example, see Gunn [1984] for accounts of reforestation co-ops, and Jones and Schneider [1984] for an evaluation of the self-help production co-ops of the 1930s.) Other important illustrations of the absence of degeneration are the Mondragón PCs (for example, Bradley and Gelb 1982; Whyte and Whyte 1988) and Italian PCs (Jones and Svejnar 1985). Unfortunately, in neither of those two cases do we have enterprise-level data for a sufficient number of years to permit inferences about behavior over time.

The long-surviving and economically successful PCs in the French industrial sector bring into doubt the pessimistic predictions of Miyazaki, Ben-Ner, and Furubotn and Pejovic. From our own work on French PCs, as well as our reading of the evidence drawn from other studies (which, in view of the often limited nature of the underlying data, is usually necessarily preliminary), we conclude that the contention of many theorists that employee-owned firms will necessarily degenerate in a capitalist environment is false. To some degree, it seems that theories based on U.S. experiences have dominated theory creation. We conclude that, depending in large part on the particular institutional arrangements within the co-op, a variety of life cycle patterns can be expected to emerge. To account for this diversity, probably what is needed is a broad, multifaceted model that includes both economic and social variables and is not wedded to a single traditional disciplinary perspective.

The policy implications of our study are interesting. Provided they have the appropriate organizational structure and internal rules (and perhaps also legal and statutory support), it would appear that producer cooperatives and employee-owned firms in general are a viable enterprise form within capitalist economies over the long run. Our finding that PCs that formerly were capitalist firms can work well suggests, further, that policies to "cooperativise" ailing capitalist (or state-owned) firms may represent a sounder strategy than many have suggested.

The key problems PCs face are not degeneration, bankruptcy, or liquidation, but the over-accumulation of collectively owned assets and the under-utilization of external debt as the company matures. Individual firms stop growing and fail to take full advantage of their good collateral position, though they survive perfectly successfully in the marketplace. The difficulties we have isolated reflect not on the internal organization of the co-op, but rather on employee-owned firms as a sector, which will fail to grow as quickly as its capitalist counterparts. A solution might rest in the formation of an inter-cooperative capital market in which the collective assets of aging firms could be used to finance the creation of new producer cooperatives.

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