Demographic behaviour of Labor-managed firms and capitalist firms in Uruguay

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Preliminary version
(do not quote)

Abstract

This paper revisits the question of why there are so few labor-managed firms in capitalist economies. We analyze the processes of creation (entries) and destruction (exits) of labor-managed firms, compare to capitalist firms. We focus on macroeconomic conditions changes that affect firms favoring its creation or dissolution. And particularly if these changes affect labor-managed firms and capitalist firms differently. We use a panel data of the universe of Uruguayan firms in 31 activity sectors (ISIC 3 digits) with a strong presence of cooperatives, during the period 1996-2009. While part of the theoretical and empirical literature suggests that entries and exits of labor-managed firms follow a countercyclical pattern, we do not find evidence that support this hypothesis. Furthermore our evidence suggests that creation and dissolution flows of this kind of firms are rather driven by institutional factors.

1- Introduction

Firms are born, develop and potentially die. In this sense, we can say all economic organizations have a life cycle. On the other hand, firms can be distinguished according to who exerts its control. In any contemporary economy, most of the firms are controlled by capital providers. On the other hand, only a minority is led by its workers, usually assuming the form of worker cooperatives, also called labor-managed firms (in later LMF).

Which elements allow us to explain the low presence of labor-managed firms? Tend these firms to fail more frequently than conventional firms or is its creation relatively less frequent?

During the Uruguayan economic crisis of 1999-2003, several groups of workers resort to the cooperative tool as an employment alternative. In December 2009 were registered in Banco de Previsión Social (Uruguayan social security institution) 383 cooperatives of production with 17.287 workers. Of these, 193 firms were classified as LMF.[1] Following the trend that appeared in previous years it is expected even a higher presence of these firms in 2011.

In developed countries some studies indicate that the formation of cooperatives may be responding to a counter-cyclical pattern: the number of entries of such organizations would increased when the marcoeconomic context deteriorates. The present work aims to improve the understanding of the macroeconomic conditions that favored or would harm the process of creation of new cooperatives or their destruction.

2- Theoretical framework

Economic theory offers different explanations for the low presence of LMF in any contemporary economy. Part of the literature emphasizes the factors that block the creation of cooperatives, while another part emphasizes the bad performance of the LMF once created, which could explain a more frequent failure for LMF than CF.

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[1] A more detailed description can be seen at Burdín and Dean (2007).

The standard theory suggests that the determinants of entry or creation of LMF are the same as those for the CF. The entry of the latter is usually modeled as a function of the difference in the expected benefits (p), taking into consideration the risk, barriers to entry, growth of demand (g), the long run interest rate (r), the rate of unemployment (u), etc. (Geroski 1995). These determinants of entry of conventional firms could be summed up as:

$$Entries\ CF = E\ (p,\ g,\ u,\ r)$$

In order to consider the decision to create a LMF it should be considered the alternative of being hired by a CF and this decision will depend on the anticipated revenue for each option. In addition to these variables the decision will also depend on the risk of unemployment, the performance of alternative investments, the risk of bankruptcy and non-pecuniary factors such as preference for independence or risk aversion (Cressy 2000).

On the other hand, the relationship between entries of cooperatives and the economic cycle has been a frequent topic in the literature on labor-managed firms. The relation between both phenomena is explained by the increase in the number of potential entrepreneurs and the fall of the opportunity cost of entrepreneurial activities in relation to hired employment in a context of high unemployment. The creation of LMF can be an attractive alternative for workers who were dismissed with a set of specific skills to a industry (Dow 2003). However, unemployment could adversely affect the wealth level of workers, increase the risk aversion in them and strengthen the financial markets restrictions (Cressy 2000). Furthermore, Ben-Ner (1988b) pointed out that the restructuring of CF with financial problems would be easier in times of recession. Workers would be more willing to accept reductions in their income to ensure the viability of firms as a condition for greater security in employment. So, rather than give the owners such concessions, they will prefer to manage the company by themselves. In fact, Ben-Ner (1988b) points out that although recessions offer opportunities to the recovery of a firm by their workers, this type of entry is also more attractive for CF. Then, the predicted effect of the business cycle on the entry of LMF seems ambiguous, even though it would be likely that it is more counter-cyclical in the LMF case.

Pérotin (2006) also noted that the preference for cooperative forms would be highly widespread among people who supported the policies of the left parties. Therefore the probability of LMF entries may be influenced by the alternation in Government. The left government, even without subsidizing the LMF may create support agencies. In addition, the amount of potential members of cooperatives may increase when people increase their preferences for equality and question the status quo, and therefore vote for the left.

Legitimacy can also be generated by a higher density of existing LMF. As the number of a certain type of organization grows, it begins to be seen with more legitimacy and this results in a greater creation of organizations of the same type. Stephen C. Smith (2001) points out that some case studies of clusters of cooperatives have helped explain the success of them through its ability to generate a network of support institutions endogenously.

The determinants of the entry of workers cooperatives could be summed up as:

$$\textit{Entries LMF} = E\ (p,\ g,\ u,\ r,\ P,\ D,\ D^2)$$

Where P represents the political cycle, D the density of LMF and D^2 its square. This last variable is added to determine the possible existence of a non-linear relationship between the density of LMF and their creation.

On the other hand the theoretical literature has emphasized that the reasons that would explain the low presence of LMF in market economies are their own deficiencies which would translate into higher rates of failure. The conventional theory of CF exits explained their own failure considering the opportunity cost of keeping the business running and therefore evaluates the expected returns from alternative investments, as well as the income expected if hired in a CF (which means considering both wages and the probabilities of being unemployed). The literature on the failure of LMF has made emphasis on problems like the determination of the level of employment and wages, determination of the levels of investment, the collective decision-making process and the so-called phenomenon of "degeneration".

Regarding the conection between the economic cycle and exits of cooperatives, Ben-Ner (1988b) pointed out that the LMF could close during periods of recovery and growth since the increase of surplus distributed may be associated with increases in uncertainty, which increases the attractiveness of the conventional employment in a CF with a steady income. However it seems unlikely that a member of a LMF decide to close his business in a period of growth only to get a steady income. Even so it seems reasonable to think that in these periods the LMF lose part of its appeal now that the risks of unemployment has dropped. In the case of periods of recession it is not clear how much the LMF could fail. For example, LMF members might be willing to accept lower wages than common investors before closing the company. For this reason LMF exit rates could be lower throughout the economic cycle and the effect of recessions would be still ambiguous.

4- Related empirical literature

Some works have tried to empirically determine the relationship between patterns of formation of capitalist and cooperative firms and the economic cycle. The evidence is far from conclusive. Ben-Ner (1988a) noted that the increasing process of LMF formation in several European countries since the mid-1970s occurred in a context of relative economic stagnation and rising unemployment. However, both Russell y Hanneman (1992) considering the period 1951-1988 for Israel, as Staber (1993), using data from Canada in the period 1900-1987, did not find a significant relationship between the formation of cooperatives and the macroeconomic context. Recently Podivinsky y Stewart (2007) analyzed the determinants of the creation of cooperative firms in the United Kingdom for the period 1976-1985 and did not find a significant relationship between those entries and the economic cycle. While (Pérotin 2006) compared the patterns of formation of French CF and LMF in the period 1971-2002, finding that the entry of cooperative firms is counter-cyclical, rising in periods of slower economic growth and high unemployment. On the other hand, the author does not find significant differences in terms of the influence of the economic cycle on both groups of firms' dissolution patterns.

5- Empirical strategy

The study uses a longitudinal data set from the Uruguayan social security records (Banco de Previsión Social). These administrative records are available from 1996, which allows us to have information on firms from that date. The data set is a panel of monthly data with information on number of firms in the universe of Production Cooperatives (PC) registered between April 1996 and December 2009. Inasmuch the microdata are available by firm, the "story" of each of the cooperatives can be seen, identifying "birth" and "death". Also, and for the purpose of having a proper control group we use data from the universe of CF registered in the BPS to equal period in 31 industries (ISIC to 3 digits, Rev. 2). Some variables used in the econometric estimates were available only quarterly, then the estimates were done with quarterly data.

The Uruguayan legal form which is clearly closer to the theoretical definition of LMF is the Production Cooperative (PC). However, the adherence to the legal criterion is not entirely satisfactory since in this group coexist very different organizational types. In particular, it is a common practice of cooperatives to hire employees, which means a deviation from the theoretical definition.

To assess the degree of remoteness from the PC to the proposed definition we use as indicator the relationship between amount of hired workers and members in each cooperative. We opt for a demarcation criterion supported on institutional justification. The approach adopted was based on law No. 17.794 of 2004 which settled the requirements for PC to keep some tax advantages. In this respect, the CP where the employees/members ratio is less than or equal to 0.2 (admitting the presence of up to 2 employees in any case) were classified as LMFs.

On the other hand, to the extent that Uruguayan law prohibits the LMF to have less than six workers, we chose to exclude from the estimates the CF which do not get such figure.

This work uses a methodology similar to the one performed by Russell y Hanneman (1992), Pérotin (2006) and Podivinsky and Stewart (2007).[2] The equations for LMF and CF were estimated separately. The estimated coefficients are then compared.

Entries model:

$$E_{it} = f(g_{it-1}, u_{it-1}, r_{it-1}, P_{it-1}, I_{it-1}, D_{it}, D^2_{it})$$

where: u_{it} is the unemployment rate. r_{it} is the long-run real interest rate. D_{it} is the organizational density (the existing number of firms). D^2_{it} is the organizational density squared. P_{it} is a dummy variable which takes value one in the quarters where the left party is ruling, and zero otherwise. I_{it} is an indicator of the ideological orientation of society. It arises from the self-identification of the respondents on a scale of zero (far left) to ten (extreme right). The inclusion of these variables separately allows to distinguish the effects of the two reasons given by Pérotin (2006) by which the presence of a left-wing Government can promote the formation of cooperatives. E_{it} is the number of entries, the number of new firms registered during the quarter t. All independent variables have been lagged a year except for density, according to the literature on the subject that assumes that the creation of a firm is not instant and it takes some time.

Exits model:

$$S_{it} = f(g_{it}, u_{it}, r_{it}, P_{it-1}, I_{it-1}, E_{it-2})$$

where: S_{it} is the number of exits and the explanatory variables are the same as those used in the model of entries. This variable is included in order to consider the fact that an increase in the entries of firms in previous periods increases the number of potential firms that can fail.[3]

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[2] A complementary analysis used in this study can be found on (Burdín 2010; Burdín 2011). The first of these works discusses the determinants of survival of LMF and CF, while the second examines the impact of wage inequality in the processes of formation of LMF.

In this case the levels of creation and the number of closures is resulting from a process that is distributed independently Poisson subject to the values of the explanatory variables. Therefore, in each period, the logarithm of the number of entries and exits is a linear function of independent variables. Formally, it is assumed that the levels of creation y_i are observations of a discrete variable distributed independent Poisson with parameter, μ_i

$$f(x_i, y_i) = \frac{e^{-\mu} \mu_i^y}{y_i!}$$

In this case the mean and the variance of the parameter is given by the following exponential function.

$$E(y_i|x_i) = V(y_i|x_i) = \mu_i = exp\ (x'_i\ \beta)$$

x is the vector of exogenous variables, β is the vector of parameters to estimate and μ_i is the expected number of creations or failures. Therefore the elements of β represent semielasticities.

Finally, quarterly dummy variables are included for controlling the seasonality of the data. We also include the payroll tax collection of the BPS. The inclusion of this last variable is justified in the fact that the dataset have its origin in the social security record. Then the number of entries and exits of firms might be affected by this variable, which has a pro-cyclical behavior. If we do not include this variable, a low response of the dependent variables to changes in GDP could be hiding an attenuation effect due to changes in the tax burden that would alter the formalization of business decisions. It should be clarified that which is identified as entries or exits in the database is the moment of formalization of the company and his exit from the BPS records.

The information used could lead to some problems of measurement in the variables of interest. A potential limitation concerns the possible existence of differential under-reporting capabilities depending on the type of firm. The information used could be underestimating the

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[3] One of the variables mentioned in the section on theoretical background was not included. Expected profits variable was not included for not counting with this indicator nor some other variable that worked as an acceptable proxy.

number of firms, not capturing informal situations. Although, there is no evidence that the phenomenon of underreporting is less problematic in the case of cooperatives, as this research seeks to find differential responses between LMF and CF in relative terms, it is not a problem that both types of firms have different levels of under-registry if the observed differences are stable over time. Notwithstanding, it is problematic if with certain changes in the economic environment, the levels of underreporting vary differently for both type of firms.

It is not possible to observe other attributes of firms and the decision-making process. For example, the presence of employees not registered, the existence of capitalist partners with control rights or political influence of members depending on the capital. All of this examples would be violating the conceptual definition of LMF. In this sense, there may be some gap between what is considered conceptually as a LMF and our operationally definition. On the other hand we cannot distinguish cases of mergers or takeovers among CF, which appear as deaths of them when clearly it does not have to be a failure of the firm.

6- Macroeconomic and political context

Between 1996 and 1998, the Uruguayan economy grew at relatively high rates, in line with what happened during almost the entire decade of the 1990s. However, the deterioration in the regional context and the weaknesses of the pattern of growth in previous years came together to explain the beginning of a recessionary period in 1999 and the crisis in 2002. Only in that year economic activity shrank by 11%.

This process impacted in the labor market. The unemployment rate rose consistently, reaching 20%. On the other hand, the purchasing power of average private wages had a slight tendency to increase until the year 2000, the time from which it began to fall. This fall, which continued until early 2004, was particularly pronounced in the year 2002.

Since 2003 the Uruguayan economy begins a period of recovery, with a gradual increase in real wages and a drop in unemployment. The expansive period, which started in 2003, has continued without interruption until the final available records (year 2011), consolidating the

longest period of growth in the last 50 years. The 2009 average unemployment rate was the lowest since it is calculated.

Uruguay has traditionally been governed alternately by two right or center-right parties (Partido Colorado and Partido Nacional). The 2004 election was won for the first time by a left party (Frente Amplio) and was re-elected in 2009. Indexes produced from ideological self-identification have shown a tendency to shift to the left of the society during the last two decades.

7- Results

This section has an initial description of the evolution of birth rates and mortality according to type of firm followed by the econometric results.[4] According to what table 2 shows, LMF birth rates are slightly higher than those exhibited for CF in most of the years considered. Specifically, the average rate of formations was 10.0% and 8.5%, for LMF and CF respectively, in the period 1997-2009.

Table 2: Entry rates according to type of firm 1996-2009

	CF	LMF
1997	12.5%	7.2%
1998	10.5%	14.1%
1999	9.3%	7.0%
2000	8.6%	9.1%
2001	8.9%	10.9%
2002	7.7%	8.0%
2003	10.6%	10.5%
2004	11.8%	12.2%
2005	10.8%	11.9%
2006	8.6%	10.6%
2007	8.1%	12.2%
2008	5.8%	9.7%
2009	1.3%	3.5%

Source: Author calculations using data from the BPS

Since the economic crisis of 2002, the formation of cooperatives was at rates relatively higher than those undertaking conventional firms. This result is in line with some of the theoretical predictions discussed in section 3.

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[4] A more detailed description of the evolution of birth rates, mortality rates and rates of net entries by type of enterprise creation can be seen at(Burdín y Dean 2010).

However, we should consider that the births of LMF were relatively marginal. Considering the total number of firms created in the studied industries, births of LMF barely reach 2% of the total births (see table 3).

Table 3: Number of entries and exits of CF and LMF

	CF		LMF			
	Entries	Exits	Entries	Exits		
Año				Totals	Dissolutions	Degenerations
1996	1124	257	20	13	6	7
1997	1410	552	14	21	10	11
1998	1257	694	28	20	7	13
1999	1175	930	15	17	10	7
2000	1117	1119	20	11	8	3
2001	1156	1311	25	14	14	0
2002	991	1354	19	19	18	1
2003	1326	1083	25	20	17	3
2004	1452	863	29	13	9	4
2005	1388	1020	30	20	15	5
2006	1153	978	28	19	15	4
2007	1119	1099	33	32	27	5
2008	816	995	27	24	21	3
2009	190	553	10	7	6	1

Source: Author calculations using data from the BPS

Taking into account the total number of firms, the comparative evolution of exits rates shows that the LMF exhibit a similar performance to the CF. The average mortality rate was 7.4% and 7.7% for LMF and CF respectively (table 4).

Table 4: Exit rates according to type of firm 1996-2009

	CF	LMF
1997	4.9%	10.9%
1998	5.8%	10.1%
1999	7.4%	7.9%
2000	8.6%	5.0%
2001	10.1%	6.1%
2002	10.5%	8.0%
2003	8.6%	8.4%
2004	7.0%	5.5%
2005	7.9%	7.9%
2006	7.3%	7.2%
2007	8.0%	11.8%
2008	7.1%	8.6%
2009	3.9%	2.5%

Source: Author calculations using data from the BPS

The LMF exits include cases of dissolutions and cases of "degenerate cooperatives", since strictly an organization ceases to exist when it dissolves or when it becomes a different

organization type (Ben-Ner 1984). Cases of degeneration represent 27% of the deaths of LMF in the period. However, if the cases of degeneration are not considered as "deaths", assuming a less restrictive point of view, the LMF exhibit a mortality rate average lower than the CF, 5.6% versus 7.4% for the period.[5]

The balance of births and deaths of firms is summarized in positive or negative net creation processes. In 2009, the number of LMF was 45% higher than that recorded in 1996. The LMF exhibit consistently positive net creation rates, exceeding the CF, mainly from the year 2000. This behavior occurred in two very different general economic contexts. The first one, from 2000 to 2002 - as noted above - it meant fewer opportunities for employment and wages fall in the capitalist private sector. While the second, 2003 until 2009, corresponds with the period of greatest economic expansion in Uruguay in the past 50 years.

Tables 5 and 6 summarize the results of the econometric estimates. Each of them show estimates of the coefficients for the capitalist firms and estimates of the coefficients for workers cooperatives.

As we can see in table 5, it is only significant to explain the birth of the CF the interest rate and GDP. This result shows a clear pro-cyclical behaviour of the entries of conventional firms. This behavior is the expected by most part of the theoretical literature and is in line with the available empirical evidence. However, the absence of correlation between the birth of these firms and the unemployment rate is striking.

Table 5. Entries equation estimates

	CF	LMF
Interest Rate	-0.338***	0.300
	(0.123)	(0.362)
Unemployment Rate	0.024	-0.025
	(0.018)	(0.032)
GDP	0.018**	0.020**
	(0.007)	(0.009)
Left in Government	0.133	0.380
	(0.145)	(0.376)
Ideological Index	-0.196	-0.892**
	(0.164)	(0.431)

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[5] A comparison of theoretical models on degeneration of LMF based on empirical evidence from Uruguayan cooperatives can be seen at Dean (2011).

Density t-1	0.004**	0.190**
	(0.002)	(0.082)
Density^2 t-1	-0.001*	-0.001**
	(0.000)	(0.000)

Notes to Table 5:
Robust estimated standard errors are in parentheses. In addition to the variables listed above, the estimates include quarterly dummies and the quarterly social security payroll tax collection.

In the case of workers cooperatives it is observed a similar behavior in some aspects. The birth of such firms would not be affected by changes in the interest rate. Noticeable, this could be showing less dependence or reduced access of the LMF to the credit market in order to fund the creation of new firms.

Regarding the effect of political and ideological changes we can see that the presence of a left-wing Government since 2005 does not seem to have affected positively the birth of LMF (nor the CF). This result could be explained by the fact that the government of the Frente Amplio in the period 2005-2009 did not implement any kind of policy that favored the LMF. However, it does appear to be relevant, in order to explain the entries of LMF, the effect of the ideological changes in Uruguayan society. The estimated coefficient which tries to capture this effect was not significant in explaining the birth of the CF but it was of the worker cooperatives. The observed negative sign would be indicating that an ideological shift in society to the right would negatively impact the births of the LMF.

On the other hand the results of the effects of the two main variables that capture the changes in the economic cycle on LMF entries are worth to be noted. First of all variations in the rate of unemployment do not seem to significantly affect the birth of this type of firms. Secondly, it is estimated a positive effect of increases in GDP over the creation of new LMF, which in addition would not be significantly different from the estimate for CF. Both results contradict the hypothesis of LMF counter-cyclical behavior predicted in the model of Ben-Ner (1988b).

On the other hand, it is in line with the theoretical literature previously commented, the estimated result of the effect of the firms' density on the entries of new LMF. This coefficient is positive and significant for the LMF (although the incremental effect is decreasing). This result would be showing the importance of institutions of support and cooperation for the emergence of new cooperatives, in an economy whose institutions have been shaped to the

needs of capitalist firms. However, the results obtained for CF are the same (although the estimated coefficients are lower).

As shown in table 6, in the case of the CF changes in unemployment rates and GDP are significant to explain the disappearance of this type of firms. An increase in either one of these two variables will have a positive effect on the dissolution of these firms. The first of these results shows a pro-cyclical behaviour of the exits of these firms, in line with the literature on the subject. However, it draws our attention that the same outcome is observed in the estimate effect on changes in the GDP. Whereas, the estimated effects of the interest rate, the presence of a left wing government or ideological changes in society, are not significant.

<div align="center">Table 6. Exits equations estimates</div>

	CF	LMF	Dissolution of LMF	Degeneration of LMF
Interest Rate	0.089	-0.174	0.021	-1.374**
	(0.106)	(0.207)	(0.259)	(0.669)
Unemployment Rate	0.123***	0.092*	0.236***	-0.157**
	(0.018)	(0.048)	(0.064)	(0.079)
GDP	0.026***	0.034***	0.067***	0.007
	(0.006)	(0.012)	(0.020)	(0.009)
Left in Government	0.015	0.333	0.290	-0.294
	(0.097)	(0.256)	(0.250)	(0.644)
Ideological Index	-0.121	0.292	-0.159	0.797
	(0.110)	(0.289)	(0.318)	(0.574)
Entry t-2	-0.001	-0.036**	-0.017	-0.073**
	(0.001)	(0.018)	(0.023)	(0.031)

Notes to Table 6.
Robust estimated standard errors are in parentheses. In addition to the variables listed above, the estimates include quarterly dummies and the quarterly social security payroll tax collection.

In the case of cooperatives, the estimated coefficients that are significant, exhibit the same signs that in the case of the CF. With the exception of the coefficient of birth of firms two periods back. In particular may be noted a positive effect between GDP growth and death of cooperatives. At first instance this fact could be interpreted as a support to the hypothesis of counter-cyclical behavior of the CF. However, once it is verified that estimates are the same for the CF, it could not be insured that cooperatives exhibit this behavior as opposed to conventional firms. Rather, it should be explored which is the explanation that the Uruguayan firms in general show this behavior.

It could be speculated that the similarities found in the behavior of the exits of LMF and CF are due to the fact that in the first group of firms we found mixed two types of exits (by dissolution and degeneration). Certainly, Ben-Ner's (1988b) hypothesis about the counter-cyclical behavior of the LMF considers cases of firms that failed and closed. That is why we estimated the equations of LMF exits separately for both types.

These estimates seem to confirm the result that the variables that explain the closing of the LMF are the same as in the CF. At the same time these separated estimations explains the presence of the negative sign in the estimation of the coefficient of the entries of firms two periods back in the case of LMF. This coefficient is expected to be positive for both types of firms. The negative sign observed is rightly explained by the presence of LMF exits due to degeneration. And this type of exits do not have to be positively correlated with that variable.

8- Concluding remarks

This document studied the existence of different responses of the processes of creation and destruction of firms to changes in macro-economic and institutional variables comparing capitalist and cooperative firms of workers. Estimates were made using a panel of Uruguayan firms from work history records of the BPS.

The resulting evidence does not support prevailing assumptions about the counter-cyclical behavior of birth and death processes of worker cooperatives. The effect of product variations and unemployment rate on the entries and exits of LMF is equal to that observed for the CF.

On the other hand, the evidence suggests that organizational density may be more important to explain the birth of new LMF, this meaning the number of existing cooperatives and the ideological changes of the society. These variables are trying to capture the legitimacy of this type of company which can be generated by a greater presence of the existing LMF or ideological changes. As it was pointed out, a greater presence of cooperatives could generate endogenetically a network of support institutions. This network would be of particular

importance for the LMF since these are inserted in economies dominated by institutions accustomed to interact with capitalist firms.

The results are consistent with part of the empirical literature but contradictory with other, indicating that this is an issue where still further research needs to be conducted, certainly a deeper research that respond to the limitations of this analysis. For example, an indicator of the expected profitability of entrepreneurs is here unavailable. On the other hand, we should consider the limitations arising from the available data. As it was already discussed, the criteria used in the operational delimitation to classify the LMF has its own limitations, to which we must add change processes within the firms that are identified with the creation of a new venture or its dissolution when, in reality, it only changes the legal form of the company.

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