Entry, Growth and Survival of Manufacturing Firms

Alessandro Arrighetti

ABSTRACT. This paper examines the interactions between entry size, growth rate, and probability of survival of firm. Standard microeconomics states that firm growth stems from relative efficiency differentials and that growth positively affects the likelihood of survival. Therefore, the selection hypothesis is unable to explain how a wide number of small newly born firms can survive at length even without growth and how an even larger set of firms with a higher than average growth rate exits the market in the first few years after the foundation. It is shown that one way out of these apparent paradoxes is to relax the hypothesis of a one-to-one link between initial relative efficiency and survival, and then develop a model based on different entry modes and growth patterns of the newly born firms.

1. Premise

The relationship between entry mode, growth, and probability of survival of the firm remains one of the most remarkable issues of industrial demography. Numerous works have underlined the existence of a negative correlation between size and growth and age and growth, while other contributions have argued a positive relationship between size and survival and growth and survival. There is therefore no satisfactory explanation for the economic mechanism that influences such relationship.

There are in fact two elements that appear particularly uncertain: a) the identification of the factors that influence the growth of a newly founded firms; b) the evaluation of the role that the entry size and the conditions of initial efficiency play in the survival. This study aims to make a contribution in this direction.

The main point of this work can be synthesized thus: if, as current economic theory maintains, the growth of the firm is based on the presence of differentials of efficiency with regard to competitors and the growth influences significantly the survival, how can we explain the numerous cases of firms that begin small and survive without growth and the even more numerous cases of firms with a higher than average rate of growth, that do not however survive after the first few years of activity?

The work is sub-divided in two main parts: in the first part, paragraph 2, the most important interpretative schemes of the phenomenon are discussed and the elements of partial innovation introduced in the analysis are illustrated. In the second (paragraphs 3–8) an attempt is made to verify the hypothesis concerning the link between size, growth and survival.

2. Size and entry mode

According to the traditional microeconomic framework, at birth the firms are characterized by different endowment of efficiency, but by a single path of growth. Indeed it is foreseen that the most efficient firms increase their size and rapidly succeed in controlling a market share large enough to minimize the probability of failure. The less efficient firms, on the other hand, don’t grow, they progressively lose the initial market shares and then are forced to leave the industry. The highest likelihood of survival is linked to the firms that develop higher growth rates: in synthesis firms grow because they are efficient and survive because they grow.

The model developed by Jovanovic (1982) appears to be a useful representation of the
process described above. This model leaves out, as we know, the diversity of the initial sizes of the firms. Indeed it is taken for granted that the process of entry is simultaneous for all the productive units. In addition, the entrants are of an infinite number and with size close to zero. The firm is oriented towards a traditional goal to maximize the profits

$$\max(q_{jt}, c(q_{jt}, x_{jt}^*)$$

(1)

where $q_{jt}$ represents the output of the firm and $x_{jt}^*$ is a random variable that suggests the degree of inefficiency of the single firm defined on the basis of the information elaborated before the start-up of the same firm and therefore before $x_{jt}^*$ can effectively be verified and compared with that of their competitors. If the profits $P_{jt}$ turn out to be higher than $P_{jt}^*$ (average industry profit) this means that $x_{jt}^*$ is exceptionally low. In the next period the firm is, therefore, induced to evaluate $x_{jt+1}^* < x_{jt}^*$ with the outcome of increasing the output and accelerating the growth.

The following considerations are derived:

a) in the phase succeeding start-up, independently of when the interfirm comparisons are realised, the population of firms is subdivided into efficient and inefficient firms. The efficient ones can be identified on the basis of their capacity to yield an above average profit;

b) growth is a function of the profit differentials and is strictly correlated with the level of efficiency reached by the single firm;

c) firms that do not grow are inefficient units in comparison with the others and are at constant risk of being excluded from the industry since the growth of the efficient firms is based on reducing the market shares owned by the former;

d) newly founded firms grow more than older ones. Indeed older firms have already carried out sequential adjustments and the variation of $x_{jt}^*$ is already stabilized.

Starting from the prescriptions of the examined model, we can conclude that the survival ($S_{jt}$) appears unaffected by initial size, but it is heavily conditioned by growth.

If the most efficient enterprises do not grow, in fact, it means that the market isn’t able to perceive the advantages provided by the most efficient units and, therefore, mechanisms of economic selections are shown to be paralyzed.

On the other hand, whenever the selective mechanisms are active, the relationship between growth and survival in the examined model can be depicted as:

$$S_{jt} = s(G_{jt})$$

(2)

with

$$G_{jt} = -g(D_{jt}^* - D_{jt})$$

(3)

where growth ($G_{jt}$) is an inverse function of the difference between the initial size ($D_{jt}$) and the minimum optimal size of the industry ($D_{jt}^*$). Only the firms with $D_{jt}^* > D_{jt}$ can be rated efficient and they are therefore able to activate the mechanism of size growth.

As it has been noted (Frank, 1988; Bates, 1990), in general the work by Jovanovic presents realistic elements. Nevertheless, in regard to the analysis of the start-up phase (the first 4–5 years of life), parts of the conclusion that are implicit in this model seem unable to satisfactorily explain the link between growth and survival.

The following are the weakest features:

a) unlike the prescriptions of the analytical scheme described above, a larger number of firms, that are born small, survive at length even without growth in size;

b) although size evolution of the firms is characterized by uneven trends (high increases are followed by same high decreases), this unevenness is often harmless to its survival. This kind of trend isn’t encompassed in the model examined;

c) in many cases the check for efficiency in the newly born enterprise is long-lasting and sometimes extends over a multiyear period. Especially in the industries characterised by high fixed costs, it is expected that the initial profits may remain very low or even negative even long term. In such circumstances a firm is likely to be forced to postpone the control of its own relative efficiency. Meanwhile it must behave as if it provides positive (minimum) differences of competitiveness relating to the other firms in the industry and is thus stimu-