**Abstract**

Young businesses are very vulnerable during first stage of life. There are many causes that can lead to premature extinction of companies. The purpose of this paper is to verify if the level of risk that enterprises face in their first year of life affects their survival. To this end, an empirical survey has been carried out on Italian companies established in 2009, 2010 and 2011. In order to reduce the influence of undercapitalization on the survival of the firms in the first stage of life, only companies with a share capital $\geq €50,000$ were included in the sample. Furthermore, only companies not belonging to a private or public group were included in the sample. This is to in order to eliminate the influence of the financial strength of the public and/or private holding on the survival of the companies examined. The study has highlighted that these companies with a strong capitalization (with a share capital $\geq €50,000$) have very high survival rates at five years; furthermore, their survival is not affected by an operating and financial risk higher than average. Therefore, the high vulnerability rate of young firms seems to be mainly caused by undercapitalization rather than the risk rate they face.

**Keywords:** risk, start-ups, survival rates of young firms

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*Domenico Nicolò is the author of the Background, the 2nd and the 4th sections, Ivan Nania is the author of the 3rd section.*
1. BACKGROUND

In the first stage of life, companies undergo a severe selection (Dun and Bradstreet, 1988; Knaup and Piazza, 2005, 2008).

Since business survival rates at the first stage of life are very low in different countries and in different industries, as well as in time (birth year), high vulnerability is a distinctive feature of young firms (Nicolò, 2015 a and b Nicolò, 2017).

Why are young businesses so vulnerable?

Among the conditions that most affect the vulnerability of enterprises during the first stage of life, the literature emphasized the following:

- context variables (Mintzberg, 1973, Dubini and Schillaci, 1988, Moore, 2006, Adner and Kapoor, 2010, Moss Kanter, 2012), in particular the degree of consistency of the strategy with the structure of the industry in which they operate (Biggadike, 1976; Miller e Camp, 1985; Cooper, et al., 1986; Cooper, 1993; Sandberg, 1986; McDougall et al., 1992);

- the characteristics of the founder (s) (Child, 1972; Kirzner, 1979; Carland et al., 1984; Gartner, 1985; Katz and Gartner, 1988; Miles et al., 1988; Storer, 1988; Shaver and Scott, 1991; Åstebro T. and Bernhardt I., 2003) gender (Birley, 1989; Brush, 1992), risk tolerance (Brockhaus, 1980) and fear of failure (Cacciotti and Hayton, 2015, Cacciotti et al 2016, Kollmann et al. (Brockhaus and Horwitz, 1986, Gatewood et al., 1995), education, professional competence and entrepreneurial experience (Weick, 1972, Sandberg, 1986, Bird, 1993, Chandler and Hanks, 1994; Rasmussen and Sørheim, 2006);

- the activities carried out by the founder (s) before and after the start-up, the duration (Gartner, 1988, Bygrave, 1989, Timmons, 1990, Vesper, 1990, Longsworth, 1991, Van der Ven and Poole, 1995, Van de Ven and Engleman, 2004, Carter et al., 1996) and the sequence with which these activities are carried out (Gartner, 1985; Delmar and Shane, 2002; Liao et al., 2005);

- strategic alliances with reputable partners (Chang, 2004);

- participation in the business plan competitions (Cannice, 2004; Wen & Chen, 2007; Russell et al., 2008; Bell, 2010; Ross & Byrd, 2011; Ruisi, 2015) and business incubation programs (Dagnino, 2015) to accelerate the process of building the company’s reputation.

Regardless of the specific causes that in individual cases may result in a cessation of an enterprise, such an early extinction reveals that in the pre-startup stage the founders did not draft a business plan or did not properly evaluate the expected results (Ansoff et al., 1970; Bracker et al.; Bracker and Pearson, 1986; Grinyer et al., 1986; Ramanujam et al, 1986; Haswell and Holmes, 1989; Venkataraman et al, 1990; Buttà 1995, 2003; Davis and Olson). A business plan based on credible and accurate assumptions and estimates highlights the mistakes in the designing and launch of the new business, especially when such errors are so serious as to bring about such an early extinction of the enterprise. Dot-com, for example, has very high rates of fallibility in the early years because their founders often do not evaluate
sustainability on the basis of an analytical plan, but start the company on the basis of ephemeral signs of appreciation such as, for example, “like”, visits to websites, etc. (Porter, 2001)

If a business plan is not prepared or if it is not properly valued, it is very likely to underestimate the company’s financial needs and find out the crisis when it is too late to counteract it effectively. Our previous research on 668 failed companies in Italy has shown this relationship between early enterprise extinction and information shortages resulting from the inadequacy of the information system: approximately \( \frac{1}{3} \) of the observed companies ceased to exist in the first ten years of life and the almost all of them operated under severe lack of information because they did not use management control programming systems (Nicolò, 2011).

The lack of corporate reputation is the source of weakness common to young companies, distinguishing them from those found in later life stages. They do not have a history that can witness the ability to keep their commitments and their high failure is well-known (Damodaran, 2009). For these reasons, young companies have significant difficulties in building strong bonds of trust with stakeholders. As soon as the first difficulties arise, these fragile bonds break down and the enterprise faces the crisis because of the lack or shortage of the human, technical and financial resources it needs to carry out its business (Nicolò, 2015 a and b, Nicolò, 2017).

Early extinction of young businesses, therefore, has a common (or general) cause, which is the lack of corporate reputation, and many different specific causes, depending on each case, that produce unpredictable effects on the performance of the companies.

This paper examines one of the most important specific causes of business survival: the operational risk and financial risk at birth. In particular, this study aims to assess whether companies that have a higher operational and financial risk profile than average, are more vulnerable in their first years than other companies.

The first section describes the research problem, the objective, the hypotheses and the method used.

The second section shows the results of the empirical survey conducted on three cohorts of companies born in 2008, 2009 and 2010 with a share capital \( \geq \) €50,000.

Finally, conclusions are drawn on the results of the survey.

2. RESEARCH QUESTION, HYPOTHESES AND METHODOLOGY

In order to verify whether the operational and financial risk of the companies at the time of their birth affects the chances of overcoming the first stage of life, we measured the leverage (annual change in operating result / annual change in revenues) and leverage (total asset / net equity) with reference to the first business activity for companies born in 2009, 2010 and 2011.
To reduce the influence of the economic cycle on the results of the survey, this research examined the companies born in three different years.

The following three cohorts 2009-13, 2010-14 and 2011-15 were then defined. For each cohort, the business and financial risk of companies at birth and their survival / extinction at five years were compared.

The companies in each cohort were classified in the following four risk classes:

1. high operational risk and high financial risk;
2. high operational risk and average financial risk;
3. medium operational risk and high financial risk;
4. average operational risk and medium-sized financial risk.

The distinction between high and average risk, both in terms of operational risk and financial risk, has been made with regard to the median. The underlying idea is: operational risk and / or financial risk cannot be considered high, medium or low, but only in relative terms, i.e. in relation to the median. In this sense, the risk was assumed as high if it falls within the 25th percentile of companies with higher risk rates or as average if it takes values that are located in the two 25th percentiles respectively upper and lower than the median.

In order to focus on the most significant enterprises, among the Italian companies belonging to the three cohorts, only those with a share capital ≥ €50,000 were examined. In this way has been reduced the number of companies that have ceased to exist in the first five years due to undercapitalization rather than because of a high financial and operational risk.

Only “autonomous” companies, such as those not belonging to a private or public group, were included in the sample. This is to consider only companies whose survival depends on their ability, not on the financial strength of the holding. For the same reason, public companies were also excluded.

The companies for which a bankruptcy or liquidation procedure began in the first five years after the birth, were included in the class of non-survivors. These procedures generally take a long time, sometimes even years. Considering the survivors of these companies, which will certainly cease to exist, would have altered the results of the investigation.

3. THE RESULTS OF THE EMPIRICAL SURVEY ON ITALIAN COMPANIES

In order to study the relationship between operational and financial risk and survival of enterprises in the first stage of life, we selected the companies born in Italy in 2009, 2010 and 2011.

We included in our sample only the autonomous firms, excluding enterprises controlled by other companies, State and municipalities.
To investigate the relationship between risk rate and business survival in the first stage of life, only larger companies were examined, with a minimum share capital \( \geq €50,000 \). In this way, small companies which generally cease to exist because undercapitalization, rather than for other causes, such as their operational and financial risk rate, were excluded from the sample.

We considered as survivors the companies active in the fifth year after birth but only if no bankruptcy or voluntary liquidation procedure was initiated in the first five years of life.

This paper aims at studying the relationship between the initial level of risk of each firm and its survival in the five years after birth.

Our aim was to study the relationship between the initial level of risk of each firm and the latter one’s possibility to survive after five years.

We used the operational leverage as the proxy of operational risk, as the ratio between the annual variation of operative income and the variation annual of revenues. This indicator explains the relationship between fixed costs and operational risk rate.

We measured also the impact of initial level of financial risk on the chances of the young firms to survive five years after their birth. So, we used the financial leverage as a proxy of firm’s financial risk, as the ratio between total asset and net assets.

We centered the distribution of our sample around the median, and we classified as medium risky the firms with an operational and financial risk rate, in the 25\(^{th}\) percentile above and below the median. We classified as high risky the ones with an operational and financial risk rate in the higher 25\(^{th}\) percentile of our sample.

This study aims at determining whether a higher risk rate increases the probability that the firms fail in their first stage of life. Than we decided to mix the different level of the financial and operational risk rate in order to study if there is a relationship between the different combination of operational and financial risk and the possibility of firms to survive after five years.

In the following tables, we present our results for each cohort of firms:
In this first cohort, the five-year survival rate is 93.45%, 1170 out of 1252 firms in the sample. Such a high survival rate of five years is justified in the light of the selection criteria of the sample which, as already mentioned, led us to include in the analysis only companies with a share capital $\geq$ €50,000.

Of these survival companies, only 219 (18.72%) were faced with a high level of both operational and financial risk rate, and 404 (34.53%) firms were faced a medium risk rate.

Survived after five years 219 out of 233 (93.99%) firms born with both high financial and operational risk rate; 404 out of 430 (93.95%) of firms born with both a medium level of leverage, survived after five years.

34.53% of surviving enterprises show an average financial and operational risk rate, while 18.72% of the survivors show a high financial and operational risk rate.

Source: Elaboration on data provided by AIDA, Bureau Van Dijk

### Table 1

#### Survival rates - Cohort 2009-2013

<table>
<thead>
<tr>
<th>Survival</th>
<th>Financial risk rate</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>high</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>Operational risk rate</td>
<td>high</td>
<td>219</td>
<td>365</td>
</tr>
<tr>
<td></td>
<td>% 18.72%</td>
<td>31.20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>182</td>
<td>404</td>
</tr>
<tr>
<td></td>
<td>% 15.56%</td>
<td>34.53%</td>
<td>1170 93.45%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dead</th>
<th>Financial risk rate</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>high</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>Operational risk rate</td>
<td>high</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>% 17.07%</td>
<td>35.37%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>% 15.85%</td>
<td>31.71%</td>
<td>82 6.55%</td>
</tr>
</tbody>
</table>

Source: Elaboration on data provided by AIDA, Bureau Van Dijk

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Survived after five years 219 out of 233 (93.99%) firms born with both high financial and operational risk rate; 404 out of 430 (93.95%) of firms born with both a medium level of leverage, survived after five years.

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Table 2

<table>
<thead>
<tr>
<th>Survival</th>
<th>Financial risk rate</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational risk rate</td>
<td>high</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>240</td>
<td>400</td>
<td>640</td>
</tr>
<tr>
<td>%</td>
<td>18,77%</td>
<td>31,29%</td>
<td></td>
</tr>
<tr>
<td>medium</td>
<td>181</td>
<td>457</td>
<td>638</td>
</tr>
<tr>
<td>%</td>
<td>14,16%</td>
<td>35,76%</td>
<td>1278</td>
</tr>
<tr>
<td>Dead</td>
<td>Financial risk rate</td>
<td>total</td>
<td>%</td>
</tr>
<tr>
<td>Operational risk rate</td>
<td>high</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>25</td>
<td>35</td>
<td>60</td>
</tr>
<tr>
<td>%</td>
<td>25%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>medium</td>
<td>13</td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td>%</td>
<td>13%</td>
<td>27%</td>
<td>100</td>
</tr>
<tr>
<td>total</td>
<td>1378</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Elaboration on data provided by AIDA, Bureau Van Dijk

In this second cohort, we have 1378 born firms with a survival rate of 92,74%. 265 firms (19,23%) started their activity with a high level of both operational and financial leverage, and 484 (35,12%) firms with a medium risk rate.

The 90,56% of firms born with both high level of leverage survived after five years; the 94,42% of firms born with both a medium level of leverage survived after five years.

Table 3

<table>
<thead>
<tr>
<th>Survival</th>
<th>Financial risk rate</th>
<th>total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational risk rate</td>
<td>high</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>165</td>
<td>256</td>
<td>421</td>
</tr>
<tr>
<td>%</td>
<td>17,88%</td>
<td>27,74%</td>
<td></td>
</tr>
<tr>
<td>medium</td>
<td>151</td>
<td>351</td>
<td>502</td>
</tr>
<tr>
<td>%</td>
<td>16,36%</td>
<td>28,03%</td>
<td>923</td>
</tr>
<tr>
<td>Dead</td>
<td>Financial risk rate</td>
<td>total</td>
<td>%</td>
</tr>
<tr>
<td>Operational risk rate</td>
<td>high</td>
<td>medium</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>26</td>
<td>77</td>
<td>103</td>
</tr>
<tr>
<td>%</td>
<td>13,54%</td>
<td>40,10%</td>
<td></td>
</tr>
<tr>
<td>medium</td>
<td>34</td>
<td>55</td>
<td>89</td>
</tr>
<tr>
<td>%</td>
<td>17,71%</td>
<td>28,65%</td>
<td>192</td>
</tr>
<tr>
<td>total</td>
<td>1115</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Elaboration on data provided by AIDA, Bureau Van Dijk
In this last cohort, we have 1115 born firms, the smallest number in our sample. This cohort we have a survival rate of 82.78%. We can see that the 17.13% (191 firms) of firms started with a high level of both operational and financial risk rate, and 36.41% (406 firms) with a medium level.

The 86.38% of firms born with both high level of leverage survived after five years; the 86.45% of firms born with both a medium level of risk rate survived after five years.

It is interesting to notice that, again, firms that presented a high level of leverage, and of risk as a consequence, have a higher survival rate, but with a very small difference compared to the other two cohorts.

In our opinion, the empirical results we presented do not allow us to affirm that there is a strong relationship between, the initial level of operational and financial risk and the possibility that the firm survive after five years. However, it is interesting to notice that firms that start with a different level of leverage with respect the majority of the other ones have a higher survival rate. This could mean that firms that start different are more able to adjust their behaviour to the changes of the market.

4. FINDINGS AND RESEARCH PERSPECTIVES

Our previous research has revealed that the average five-year survival rate of Italian companies for 2004-09, 2005-10, 2006-11 cohorts is 53.46%. For the same three cohorts the average five - year survival rate of European companies is 61.36% whereas for US’s firms it is 52.10% (Nicolò, 2015).

In the three cohorts examined in this paper, the five-year survival rates of enterprises are much higher: 93.45% for the cohort 2009-13, 92.74% for the 2010-14 cohort and 82.78% for the cohort 2011-15. That’s because only enterprises with a relatively high capitalization (which have been started with a share capital ≥ €50,000) have been included in the sample. In this way, small enterprises have not been included in the study, which have very modest five-year survival rates, especially because they are under-capitalized. In this way, research focused more on the relationship between the operational and financial risk of business in the first year of activity and their survival / termination in the first five years of life.

Our sample consists of a relatively small number of companies (1253, 1378 and 1115 in the three cohorts examined) also for another reason: it only includes autonomous companies, such as ones not controlled by other companies, State or municipalities. The latter were excluded from the analysis because their survival is facilitated by the benefits of being part of a private or public group.

The examination of the three cohorts of companies revealed that:

a) among the companies with a higher risk rate (both operational and financial) in the first year of life, survivors are more than those that cease to exist in the first five years of life;
b) the risk rate in the first year of life does not affect the survival of businesses in the first stage of life. In the three cohorts examined, the five-year survival rates of companies with higher risk rates are similar to ones of companies with average risk rates: in the first cohort (2009-2013), 93.99% of firms with a high birth risk profile and 95.95% of those with an average risk profile at birth; in the second cohort (2010-2014), 90.56% of firms with a high risk profile and 94.42% of those with an average risk profile survived; In the third cohort (2011-2015) of firms with a high risk profile survived 86.38%, while those with a medium risk profile survived 86.45%.

These results should not be surprising: it is well-known whether fixed asset investments and debts are relatively high, on the one hand, they are a source of risk that jeopardizes the survival of businesses, on the other hand, especially in firms with adequate capitalization, they can boost business performance.

The results of this study may be related only to companies established in Italy in the three-year period 2009-2011, with a share capital $\geq$ €50,000 and autonomous because not belonging to private or public groups.

Subsequent research will examine the relationship between the operational and financial risk rate of the first year of business activity and survival of enterprises in the first stage of life in different countries and industries.

Smaller companies, with a share capital $\geq$ €50,000, are more vulnerable than those examined in this study, especially at the initial stage of life. It will be interesting to measure how much these small businesses are most affected by the level of operational and financial risk they face when starting their business, compared to those with a higher capitalization. If companies with a high risk and those who are facing a medium risk have similar five-year survival rates, it is clear that the high vulnerability of young businesses is mainly caused by undercapitalization rather than the risk rate they face. To counteract the high vulnerability of young businesses, therefore, adequate capitalization is needed.

REFERENCES


