

A measure of business insolvency probability

Una misura della probabilità di insolvenza aziendale

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Riassunto. La presente comunicazione, sintesi di un lavoro di ricerca in corso, vuole essere una prima verifica empirica della robustezza di una metodologia statistica implementata per misurare il livello di affidabilità di un collettivo di aziende e stimare la probabilità di default sulla base del merito creditizio e dell'osservazione del fenomeno nel tempo.

Keywords: reliability indicator, rating, default probability.

1. The methodology and the empirical analysis

This empirical analysis aims to study the strength of a relative reliability indicator and it calculates the business insolvency probability. This indicator offers a suitable judgment on the rating of a group of manufacturing firms located in Puglia and belonging to the same industry (manufacturing of upholstered furniture) and dimensional class. The data set is made up of twenty-two balance sheet ratios that summarize the principal dimensions of the business management. The distributive analysis of single variables allowed to build benchmarks¹ for a first comparison between firms. The factorial analysis in the principal components allowed to synthesize the starting variables, to isolate the most meaningful aspects and to reduce the number of elements to submit to evaluation; on the base of the factors obtained, the synthetic reliability indicator has been built considering the distances between the real values and the benchmark value: *the reliability company parameter*² and *the difficulty company parameter*³.

First of all, the results obtained by this methodology have been compared with those deriving from the application of a classical methodology - the discriminant analysis – in order to verify the right classification of firms. In the discriminant analysis, the number of modalities of the response variable was attentively fixed so that the groups are mutually exclusive and exhaustive among them. Results of discriminant analysis show that the 95 % of firms are correctly classified in three classes of higher reliability (middle reliability, reliable, sound) while for the two lower classes (not at all reliability and little reliable) the percentage of right classification fluctuates between 75% and

¹ They are determined, for each indicator, by the average value between the third quartile and the greater outliers – for the positive indicators – and between the smaller outliers and the first quartile – for the negative indicators.

² It is determined by the ratio between the sum of the synthetic indicators of performance of each factor – weighted both for the factorial weight and scores – and the sum of the factorial scores.

³ This parameter represents the difficulty that each firm affords to obtain a level of optimal performance; it is measured as the difference between the benchmark and the reliability parameter of firm.

79%. For the five classes together the average percentage of right classification is the 88% of the firms examined.

The default probability is closely related with the firm internal qualitative and quantitative variables and external variables such as the market, the industry and the territory; the synthetic evaluation of the credit risk cannot leave such variables out of consideration. On the basis of the frequency of the discovered failures (indicated with p) in the last five years in this industry, we want to come to a first evaluation of the default probability. Intended the reliability indicator as aleatory variable that assumes x determinations with probability equal to p and determinations $(1 - x)$ with probability equal to $(1 - p)$, it has been implemented to a Bernoulli probability model.

Tab. 1.1 – Distribution firms according to the discriminant analysis and the insolvency probability (per cent).

<i>Reliability and credit rating classes</i>	<i>Not at all reliability</i>	<i>Little reliable</i>	<i>Middle reliability</i>	<i>Reliable</i>	<i>Sound</i>
<i>Not at all reliable</i>	78,6	14,3	-	7,1	-
<i>Little reliable</i>	12,6	75,0	12,4	-	-
<i>Middle reliability</i>	-	2,3	95,0	2,7	-
<i>Reliable</i>	-	-	2,4	94,7	2,9
<i>Sound</i>	-	-	-	4,3	95,7
<i>Distribution of firms</i>	<i>32,4</i>	<i>13,5</i>	<i>2,7</i>	<i>10,8</i>	<i>40,6</i>
<i>Default probability</i>	<i>71,2</i>	<i>31,3</i>	<i>13,8</i>	<i>7,7</i>	<i>5,6</i>

Source: our classification based on the empirical research.

From the Tab.1.1, we observe that the absolutely unreliable firms have a probability of default equal to 71,2%, while, those more reliable show a probability of notably lower default.

Nevertheless, it is not quite said that firms with a middle-low credit rating are fated to fail; the default condition is strongly affected by the ongoing and structural analysis of firm behaviour and by the degree of confidence of agents on the industry we analyzed.

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