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EXTENDED ABSTRACT

THE PREDICTION OF BUSINESS FAILURE IN THE HOSPITALITY BUSINESS

Antonio Alvarez-Ferrer
University of Rovira i Virgili. Tarragona
antonio.alvarez@urv.cat
https://orcid.org/0000-0003-1136-9412
Fernando Campa-Planas
University of Rovira i Virgili. Tarragona
fernando.campa@urv.cat
https://orcid.org/0000-0001-7175-6698

1. INTRODUCTION

This study aims to analyse bankrupt companies in the hospitality business in Spain, from 2007 until 2017, using formulas to predict business failure that can be applied to this type of economic activity. The development of insolvency prediction models began in the United States in the sixties, with the pioneering studies of Beaver and Altman. After years of methodological improvements and studies applied to different sectors, it still has not been possible for the scientific community to reach a unified method. Therefore, for the purpose of this study, the Altman Z formulas of 1968 and 1983 are used and compared with the formula of Amat, Manini and Renartof 2017. The two Z-Score methods applied to the credit contest companies in the hospitality business in Spain show us a high percentage of coincidences in the business activity before the official declaration of the contest, being Altman's method the one that obtains a better approximation to the total number of bankrupt companies.

Concepts such as economic, financial and legal failure are analysed. In addition to this, this paper also reviews the literature on Z formulas proposals to predict business failure and the previous methodological proposals for the development of the prediction of business failure in the hospitality business.

The review of the literature reveals that there has not beengreat research done in the field of bankruptcy in the hospitality business and if we search among the vast number of studies (published, written, done…) since 1965, very few of them were applied to this specific business. There are some authors who have done research on how the bankruptcy situation can be predicted in the hospitality business. A clear example of one of these authors is Vargas (2015), who conducts a study to assess the ability to predict bankruptcy in the business sector in Costa Rica by comparing the models of Beaver (1966), Ohlson (1980) and Altman (1968, 1983). Another author who has analysed the validity of Altman's method in the prediction of bankruptcy in the hospitality business in Greece is Diakomihalis (2012). Inthe United States, Gu and Gao (2000) conducted a study to detect

potential bankruptcy in the hospitality business employing the Multiple Discriminant Analysis (MDA) as a statistical technique.

Following the line of work related to the hospitality business, we find that the study conducted by Vivel-Búa et al. (2015), reveals the non-existence of studies in hotel bankruptcy in Spain. Another country where has done a recent study on the subject analysed is Jordan; Jawabrech et al. (2017) used the Altman's method to predict situations of insolvency in hospitality business companies in Jordan.

2. METHODOLOGY

In order to obtain the necessary information to elaborate this assignment, a search of articles related to the subject under discussion has been made in SCOPUS (2018), another search for quantitative data in the Statistics National Institute (INE, 2018) and fieldwork with bankrupt companies through SABI (2018).

The search strategy criteria marked in SABI, taking into account the options provided by the database to obtain credit contest companies, has been the following:

- *Criterion 1*: All companies.
- *Criterion 2*: Spain, suspension of payments companies and bankruptcy companies
- *Criterion 3*: CNAE 2009, 5510, hotels and similar accommodation

The keywords introduced in SCOPUS that have been used for the search in the literature review have been the following: business failure, creditors' contest, formula Z, hospitality business, prediction of business failure. These are the terms that have been considered to be most related to companies with difficulties and can be used to better define the status of a company with financial issues. Regarding the information obtained from the INE, this study established its beginning in 2007 and lasts until 2017.

The two methods chosen, the formulas of which contemplate their application to the service sector and also include the hospitality business, are two: the first one is by Altman (1968, 1983), considered as the forefather of these predictive techniques: and the second one is by Amat et al. (2017) who define a new Z formula with fewer ratios and make an appropriate prediction of bankruptcy.

In order to compare which formula achieves a greater approximation of success of the companies that are in bankruptcy proceedings, those developed by Altman between 1968 and 1983 are used and detailed below:

$$Z_1 = 0{,}012\ (\text{Working capital} / \text{Assets}) + 0{,}014\ (\text{Retained Earnings} / \text{Assets}) + 0{,}033\ (\text{EBIT} / \text{Assets}) + 0{,}006\ (\text{Net Worth} / \text{Net Worth} + \text{Liabilities}) + 0{,}999\ (\text{Sales} / \text{Assets})$$

If $Z < 1{,}81$ high bankruptcy probability.

If $Z > 2{,}99$ low bankruptcy probability.

If values are between $1{,}81 < Z < 2{,}99$ the company would be in an uncertain or doubtful situation.

Z_2 = 0,717 (Working capital / Assets) + 0,847 (Retained Earnings / Assets) + 3,107 (EBIT/ Assets) + 0,420 (Net Worth / Net Worth + Liabilities) + 0,998 (Sales / Assets)

If Z < 1,23 high bankruptcy probability.
If Z > 2,90 low bankruptcy probability.
If values are between 1,23 < Z < 2,90 the company would be in an uncertain or doubtful situation.

Z_3 = 6,56 (Working capital / Assets) + 3,26 (Retained Earnings / Assets) + 6,72 (EBIT / Assets) + 1,05 (Net Worth / Net Worth + Liabilities)

If Z < 1,10 high bankruptcy probability.
If Z > 2,60 low bankruptcy probability.
If values are between 1,10 < Z < 2,60 the company would be in an uncertain or doubtful situation.

Secondly, the model of Amat et al. (2017), formula called Z_{AMR} from now on, due the abbreviation of Amat, Manini and Renart, the 3 authors of the referred study,which is defined as follows:

Z_{AMR} = - 3,9 + 1,28 (Current Asset / Current Liabilities) + 6,1 (Net Worth / Net Worth + Assets) + 6,5 (Net Profit / Assets) + 4,8 (Net Profit / Net Worth)

If the value is > 0 indicates that the company has a high probability of not going bankrupt.
If the value is < 0, indicate that the probability of insolvency of the company is very high.

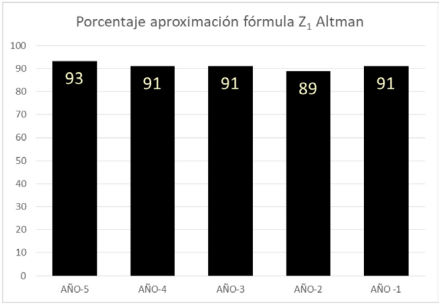
3. RESULTS

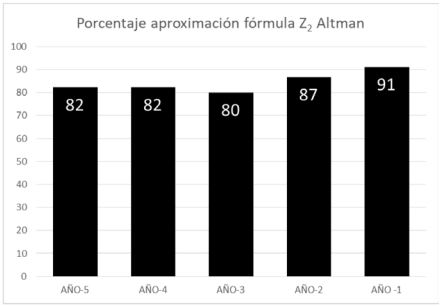
The results are showed in charts 4, 5, 6 and chart includes7 details of the results of formulas Z_1, Z_2, Z_3 and Z_{AMR} application to the 45 companies selected from the 56 bankrupted companies of the hospitality business that were in credit contest proceedings in Spain between 2000 and 2017. The eleven companies discarded were,discarded as a result of not having the data that would allow the necessary calculations.

Of the credit contest companies in Spain, the approximation percentage of the 4 formulas are the following: 91% of formulas Z_1 and Z_2 in year-1, 82% of Altman's Z_3 formula and 78% of Z_{AMR} formula, which leads us to state that, in this case, Altman's formulas are the closest ones to hospitality business in their 3 versions. Therefore, the one with the highest percentage of success is Altman's Z formula of 1968 (Z_1) among the other Altman's formulas and also among Z_{AMR} formula of 2017 in the 5 analysed tests in the credit contest companies.

Charts 4 and 5

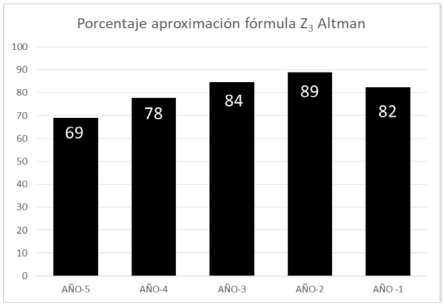
APPROACHING PERCENTAGE OF Z_1 AND Z_2 FORMULA

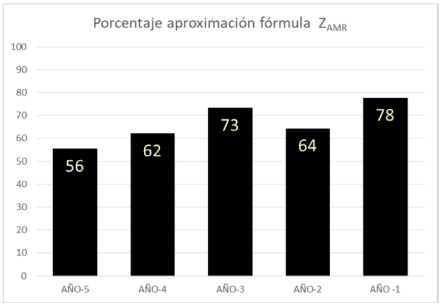




Source: Own preparation based on figures from SABI data and Z_1 y Z_2 formulas.

Charts 6 and 7
APPROACHING PERCENTAGE OF Z_3 y Z_{AMR}





Source: Own preparation based on figures from SABI data and Z_3 y Z_{AMR} formulas

The results obtained in our study comparing the Altman Z formula with the Z_{AMR} are the following:

1. Altman with his Z_1 formula obtained an approximation of 95% of the total companies that declared themselves in credit contest. In our study, we have obtained an approximation of 91.1%, 91.1%, 82.2% with Z-Altman formula and 77.8% with Z_{AMR} formula.

2. Applying Altman's Z_1 formula in the previous 3 years, 65% of the 66 companies analysed present losses. In our analysis of the 45 companies in the hospitality business, in year-1, 64% of companies show losses, 58% in year-2, and in, 53% year-3

The long-term prediction, according to Altman, does not provide acceptable results and demonstrates that from the third year the prediction decreases below 50%. The results obtained in our study show that Altman's Z formula in the hospitality business has

remained above 80% and overcome 90% in Z_1 and Z_2. On the other hand, with the Z_{AMR} formula, we can observe that predictions always mark results below 80% reaching 56% in the fifth year.

The gaps detected are the resolution time of bankruptcy proceedings, the difference between the number of bankrupt companies and dissolved companies and also the increase in companies dissolved the year before the start of the crisis as a prediction of it. Future lines of research, should be oriented in analysing the duration of bankruptcy processes in hotel companies and their impact on the continuity or not of a bankrupt company, taking into account that the longest it takes, the more likely to end up in dissolution. The second line of research should be focusto find an explanation of why dissolved companies are 4 times higher than the credit contest ones and if the hospitality business follows the same proportion as shown in other companies. The third line of research should consider the analysis of the increasing number of dissolved companies that occur the year before the official declaration of the crisis and analyse whether it can be considered as a predictor of new crises or not.

6. CONCLUSIONS

One of the priorities of this study has been based on contributing to the scientific community on the prediction of business failure in the hospitality business. Additionally, it has been possible to demonstrate the short existence of previous literature on hotel bankruptcy in the Spanish context, this being one of the reasons that justify the realization of this study.

In accordance to the conclusion that some analysed authors have reached,bankrupt companies have a smaller size and less years in business, lower values of profitability, liquidity, activityand percentage of own funds over current assets. In addition to this, they have higher values in the indebtedness variables and percentage of current assets over total assets. The bankruptcy probabilities in small and medium enterprises hotels maintain a positive relationship with indebtedness and economic structure, and a negative relationship with profitability, activity, age and size. Companies that obtain better profitability are not so exposed to a possible credit contest situation. However, high indebtedness increases the possibility of bankruptcy due to not being able to meet the payment obligations. As a whole, the variables that have a greater incidence in bankruptcy are low or negative profitability, a high level of indebtedness, low self-financing capacity and low or no creation of resources. It can also be said that the duration of credit contest proceedings is of great importance. It has been verified by SABI and the data provided in the 2017 Bankruptcy Yearbook of the Association of Property and Commercial Registrars of Spain that the duration of bankruptcy proceedings can last up to 7 years.

Another conclusion is that, it is essential to mention that 18% of the credit contests are at first considered economically infeasible. Only 7.48% of the credit contest companies conclude their process successfully and, in addition, 92.52% of companies end up in liquidation after one to seven years, as described in the previous paragraph. If we look at the study carried out, of the 56 hotel companies in bankruptcy in Spain, only 4 are still active, which means that only 7.14% of the total number of companies in the hospitality business

have managed to straighten the direction of the company and, quite possibly thanks to the credit contest procedure, have been able to continue their economic and business activity.

The main goal of this study has been to verify if the authors' formulas proposed to predict insolvency could detect the companies of the hospitality sector in Spain that according to SABI, were in bankruptcy proceedings. It can be confirmed that Altman's Z_1 and Z_2 formulas have a higher predictive performance to detect bankruptcy in advance than formulas Altman Z_3 and Z_{AMR} of Amat et al. Altman formula Z_1 allows predicting between 1 and 5 years before the bankruptcy situation, so it can be said that it is aaccurate tool for economic and financial management for companies in the hospitality sector as analysed with the 45 companies. From a practical point of view, the application of Altman's Z_1 formula in the hospitality businesscan be useful to make business decisions because, when facing situations where prior analysis is necessary, it can allow a company in hospitality business to discover relevant situations and problems on time and therefore help companies to act in advance.