



**Investigation Of Probability Of Business Failure /Bankruptcy Of Private Units On Health That Operate In Greece Through Models Of Forecast Of Probability Of Business Failure**

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***Abstract***

The present article concerns the investigation of probability of business failure /bankruptcy of private units on health that operate in Greece. It examines also the economic situation of private units on health.

At the bibliographic review are presented the models of forecast of bankruptcy of enterprises, which are mathematic models that try to locate intense marks in operation of enterprise that forebode the bankruptcy.

In inquiring level will be analyzed the sector of private services on health through application in something of these models and from the research through questionnaires



and interviews in the executives of sector on health. Through the article it is expected to be “exported” useful conclusions about the critical factors of business failure /bankruptcy of enterprises.

**Keywords:** Business Failure, bankruptcy, insolvency, private sector of health in Greece, Models of forecast of bankruptcy.

## 1. Introduction

An unsuccessful enterprise has been defined by the economic literature in many ways. Yet, the most frequent of them are three, and, even though they are often used interchangeably, still they have different meaning (Altman, 1983).

These terms are business failure, insolvency and bankruptcy. Failure, according to economic criteria, in the words of Altman, means that the performance of the fund is extremely lower than the current performance of other similar investments. The term insolvency is a more technical term and it depicts negative performance of an enterprise (Gilson et al., 1990, pp. 425-458). It is usually used when an enterprise is unable to pay off its current liabilities and faces a lack of liquidity (Uhrig-Homburg, 2005, pp. 1509-1534).

Lastly, the term bankruptcy is used in two forms. The first one is used for the negative net value of an enterprise. The second form of bankruptcy is mostly a status where an enterprise gives in the bankruptcy law and it either proceeds to the liquidation of its assets or it proceeds to restructuring (Bibeault, 1982)

Bankruptcy is the legal status of a salesman or a commercial company, when it is “permanently and entirely” unable to satisfy its creditors. Practically, bankruptcy is a “collective procedure” provided in cases of default of an enterprise. When bankruptcy is declared, the creditors cannot indict individual measures against the debtor, and thus they connect with a group. This group interests are represented by a “trustee”, in order to achieve an overall divestment of the debtor’s assets and the fairness of all the creditors. The Bankruptcy Law is regulated by the law 3588/2007 (which is referred to as the Bankruptcy Code) and it applies to bankruptcies declared after the 16th of September 2007. This law replaced the until then Bankruptcy Law and the recovery law that was established with the articles 525-707 of the Commercial Law, the emergency law 635/1937 and law 1892/1990.

The law 3588/2007 with which the Bankruptcy Code was validated, applies to bankruptcies declared after the 16th of September 2007. It describes and defines in detail the stages of the



procedure of bankruptcy, both of a legal and a natural person. The necessity for modernization of the procedures regarding bankruptcy led to the execution of the New Bankruptcy Code. It is important to highlight that there is a special reference to an attempt to “rescue an enterprise and avoid bankruptcy” through the restructuring plan. The main elements of the New Bankruptcy Code are:

- The enhancement of the role of the bankruptcy creditors.
- The satisfaction of the creditors on a pro rata basis, through, either the restructuring plan, or the bankrupt estate.
- The acceleration of the procedures of liquidation and distribution of the bankrupt estate with the immediate beginning of the settlement as soon as the inspection of the credits is completed.

## **2. Business Failure Factors**

Business failure and bankruptcy in general is the result of a complex combination of ineffective management which didn't make the correct decisions, of a general negative economic circumstance, such as the depression, and also events that could affect the development of a field.

In order to trace the possible factors that lead an enterprise to Bankruptcy, a series of microeconomics variables must be analyzed thoroughly and cumulatively, such as financial ratio, accounting figures, share prices for listed enterprises (Altman, 1983).

### **A. Inability to Cover Short-Term Liabilities**

The red flags of the aggravation of the financial condition of an enterprise are the gradual weakening of its cash position and specifically the aggravation of the relation between the cash flow from operational activities and the capital outflow. To cover the difference between inflow and outflow the enterprise is called to resort to short-term borrowing, with more and more odious, based on the general aggravation of its condition, terms. The coverage of the above “gap” of the cash flow with short-term borrowing capitals that demand more and more amounts for the coverage of the financial expenses is the main cause of bankruptcy of enterprises. Even though the enterprise might show increased turnover for a period of time, this exact inadequacy of Circulating Assets to produce the necessary cash (“oxygen”) in order to cover the short-term liabilities and to provide enough working capital not only might dissipate but it can also “poison” the further course leading even in bankruptcy.

### **B. Ineffective Management**



In order for an enterprise to deal with liquidity problems it will have to take a series of measures such as:

- I. Divestment of parts of the Fixed Assets not entirely necessary for the smooth resumption of its activities.
- II. Sale and leaseback of assets.
- III. Attempt to contain the operational expenses.
- IV. Attempt to replace the short-term debt with a long-term one.
- V. Increase of the capital stock.
- VI. Mutual agreement with the creditors for an extension to the expiration of the debts since the temporary burden of the creditors is temporary preferable (avoidance of legal expenses) to the bankruptcy and liquidation of the enterprise.

The inability to detect on time and overcome the problems efficiently by not taking measures can lead with mathematical accuracy to financial suffocation and eventually to Bankruptcy.

At the same time, the commission of crimes by the management, such as the intentional suspension of payments in order to terminate its commercial activities even though there is no serious financial problem and the intentional conveyance of activities for example abroad, has a negative impact to the course of an enterprise.

### 3. Models Of Forecast Of Bankruptcy

Since 1960, the prevention from financial failure of enterprises (bankruptcy) has particularly concerned the financial academic society. Dozens of researches have been done in order to improve the models to forecast the bankruptcy of enterprises. The most important statistical techniques that have been used are:

- The univariate analysis.
- Multivariate analysis, such as the discriminant analysis.
- Logit – Probit analysis.

In order to improve the results new methods were used as well, such as the ELECTREM Method (Elimination and Choice Translating Algorithm).

In 1967, Beaver presented the first attempt to develop a new model regarding the forecast of bankruptcy. He used as a sample 79 enterprises that failed financially and paired them off with healthy enterprises. From the 30 variables he analyzed in his research the most important seems to be the *Cash Flow / Total Debt*.



In 1968, Altman worked on the forecast of bankruptcy using a multivariate discriminant analysis (MDA). The most important variables for Altman seem to be: 1) *Current Capital/Total Capital*, 2) *Capital Employed/Total Capital*, 3) *Earnings before interest and taxes/Total Capital* 4) *Purchasing power of share/Book value of share* and 5) *Sales/Total Capital*. Altman's research functioned as the basis for many researches after, but the continuous change in the financial reporting standards (FRS), as well as the generally accepted accounting principles (GAAP) reduced the model's ability to forecast.

Deakin (1972) tries to present an alternative research from those by Beaver and Altman. He studies 32 failed enterprises and he matches them to successful ones, by using as basic features the field they belong to, the financial extent, and also the time periods of the data. It seems that the indicator *Cash Flow / Total Debt* is extremely important.

A different research was presented in 1972 by Edmister. It was the first model of forecast of bankruptcy exclusively for small enterprises. A similar research by Blum in 1974, studied 115 enterprises that declared bankruptcy in comparison with 115 successful enterprises. The features he used were the industry, the sales, the employees and the accounting period.

In 1975, Libby tried to also take into account the human factor in his research, referring to the ability of the employees, who provide loans, to exploit correctly the financial indicators. He paid special attention to the liquidity, the activity, the profitability, the financial leverage and the cash position. In the same year, Elam tries to study if he can forecast the bankruptcy of enterprises that use time sharing.

In 1976, Wilcox wants to show with his study how someone can quantify the risk of financial failure through the games theory. Two years later, Deakin in his new study tries to evaluate the influence, the frequency and the nature of the incorrect rating of an enterprise, based on his previous study, and on the study by Libby.

In 1977, Altman along with Haldeman and Narayanan try to "structure" a new model to rate the enterprises as bankrupt or not. Thus, the Zeta Model is presented. MDA seems to prevail, but it is slowly replaced by less statistically demanding methods, like the Logit and the Probit. Yet, the necessity for more improved and more precise methods, led to the development of decision support models that also used quality variables.

In the last years, except for the statistical methods, the method of Neural Network was also developed, which was based on the science of intelligent technology, and also to the artificial intelligence.



#### 4. Research Methodology

The research of this paper was made by combining secondary and primary research. The secondary research focuses on the application of the model of forecast of bankruptcy of Greek private clinics. The model we used was Altman's and the data of the research came from the published Financial Statements of the enterprises of the sample.

The sample of the research consists of 10 in total private health units that have Greece as their registered seat and have legally operated at the period 2007-2011. It must be highlighted that these units are listed or belong to an association of listed enterprises to the Athens Stock Exchange.

The model that was used to the analysis is the most recently revised model by Altman (1993) and is described by the function:

$$Z_{it} = 6,56X_{1it} + 3,26X_{2it} + 6,72X_{3it} + 1,05X_{4it}$$

Where,

$X_1$ : Net Working Capital/ Total Assets

$X_2$ : Retained Results/ Total Assets

$X_3$ : Earnings before interests and taxes/ Total Assets

$X_4$ : Market Value Equity/ Total Liabilities

$Z_{it}$ : Z-score of clinic  $i$  ( $1 \leq i \leq 60$ ) for the year  $t$  ( $1 \leq t \leq 5$ ). The possible rates and the respective interpretation of the Z-scores are:

- $Z < 1.10$ : zone of imminent bankruptcy
- $1.10 \leq Z \leq 2.60$ : grey zone or zone of ignorance
- $Z > 2.6$ : zone of good financial position

The primary research was done with the use of questionnaires and personal interviews. The findings of the research came from primary analysis of the data of the questionnaires. The structure of the questionnaire has four parts. The total number of the questions amounts to 31. The sample of the primary research consists of 10 private health units that have Greece as their registered seat. 56 executive members of private health units participated in the research from various levels of hierarchy. The principal goal was to approach members of the senior Management (15%), then employees of the Financial Director (COF's, Finance Department etc). Due to the greater convenience to the access of data, the executives who participated in the





research are actively involved in enterprises that operate with registered seat or branches in the prefecture of Thessaloniki. The data was collected in April 2013.

## 5. Listing And Analysis Of Selected Research Results

### 5.1 Commentary and analysis of secondary research findings

Table 1 shows the gathered results regarding the Z-scores during the period 2007-2011 of the 10 enterprises that participated in the research.

**Table 1:** Gathered results regarding the Z-scores of the enterprises of the research during the period 2007-2011.

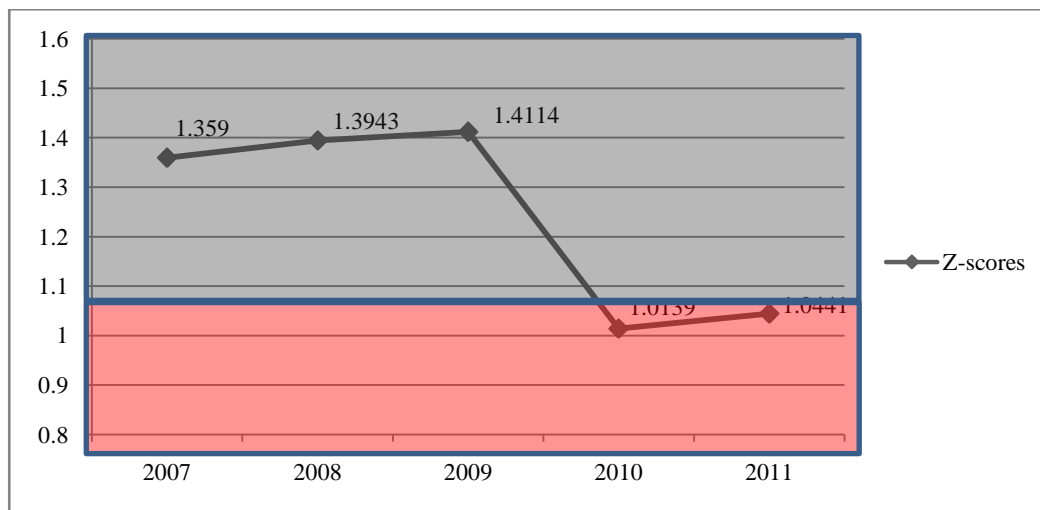
Variable	N	Minimum rate	Maximum rate	Mean	Median	Standard deviation
Z-score <sub>2007</sub>	10	-4,19	5,14	0,69	1,85	3,26
Z-score <sub>2008</sub>	10	-4,74	3,75	-0,26	-0,32	2,76
Z-score <sub>2009</sub>	10	-5,05	4,87	-0,09	0,65	3,08
Z-score <sub>2010</sub>	10	-4,64	1,13	-1,79	-1,79	2,37
Z-score <sub>2011</sub>	10	-6,15	2,18	-1,90	-2,05	2,75

On average, the Z-scores of the enterprises of the field are constantly moving downward around the period of 2007-2008, then upward around 2010 and continue the fall in the last two years.

As seen in the Fig. 2, around 2010 a great fall occurred in the mean of the Z-scores on the rank of 28%. Moreover, we can see that on average the enterprises of the field are on non acceptable Z-score levels (<2.6) through all the years of the analysis except for 2007.



More particularly, the period 2007-2011 falls into the grey zone ( $1.10 \leq Z \leq 2.60$ ), while the period 2010-2011 to the zone of imminent bankruptcy ( $Z < 1.10$ ). In summary, there are indications that the probability of bankruptcy of private health units was high before the financial crisis/ debt crisis (2007-2009), while it has increased notably during the crisis (2010-2011).



**Fig. 2.** Time development of the Mean of the Z-scores of the enterprises of the field.

The ranking of the 10 health units is presented with the mean of the Z-score of the examined period as the criterion.

**Table 3.** Z-scores of the examined private health units of the research.

S/N	Brand Name	2007	2008	2009	2010	2011	MEAN
1	LETO S.A.	3,36	3,75	4,87	1,01	-0,95	2,41
2	EUROMEDICA – AROGI S.A.	5,14	-0,47	0,94	1,13	2,18	1,79
3	HYGEIA S.A.	2,83	-0,16	2,30	0,58	1,87	1,48





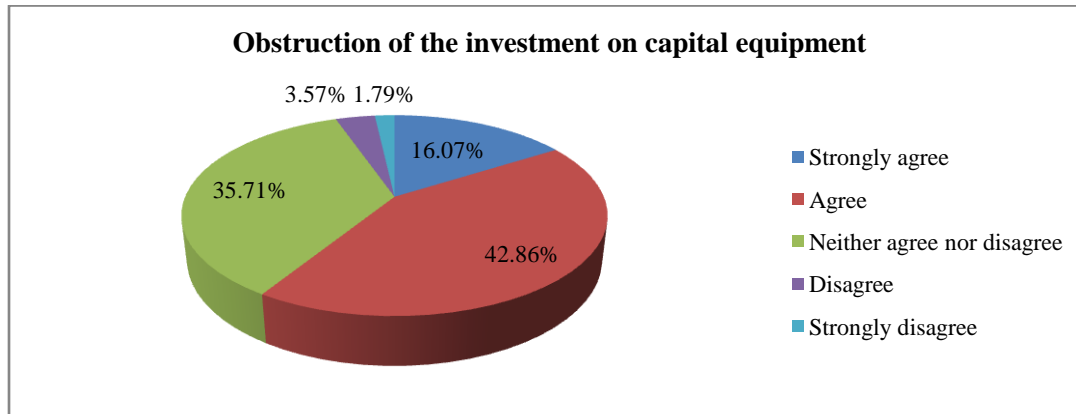
4	ATHENS MEDICAL	2,23	2,16	2,09	-0,19	-0,20	1,22
5	MITERA PRIVATE GENERAL MATERNITY GYNECOLOGICAL & CHILDREN CLINIC S.A.	2,65	2,63	1,45	-1,28	-2,79	0,53
6	EUROMEDICA S.A.	1,47	0,88	0,35	-2,96	-5,16	-1,09
7	KYANOUS STAVROS S.A.	0,13	-0,53	-1,49	-2,29	-1,30	-1,10
8	ATHENS BIOCLINIC S.A.	-2,81	-3,76	-3,75	-4,64	-3,00	-3,59
9	PIRAEUS BIOCLINIC S.A.	-4,19	-2,36	-2,64	-4,59	-6,15	-3,99
10	THESSALONIKI BIOCLINIC S.A.	-3,89	-4,74	-5,05	-4,64	-3,50	-4,36

As seen in the table 3, first in the ranking is the maternity-gynecological clinic Leto S.A. which belongs to Hygeia group. Still, Arogi S.A. has presented the highest Z-scores in the years 2007, 2010 and 2011. On the other side, the clinics of Biomedicine group are at the three last places and their Z-scores have negative rates in all the years of the analysis.

## 5.2 Commentary and analysis of primary research findings

Below follow some basic findings from the analysis and the commentary of answers to selected questions from the questionnaires of the research (we sought mainly for information regarding the most basic impact of the current financial crisis on the financial operation of the private clinics).

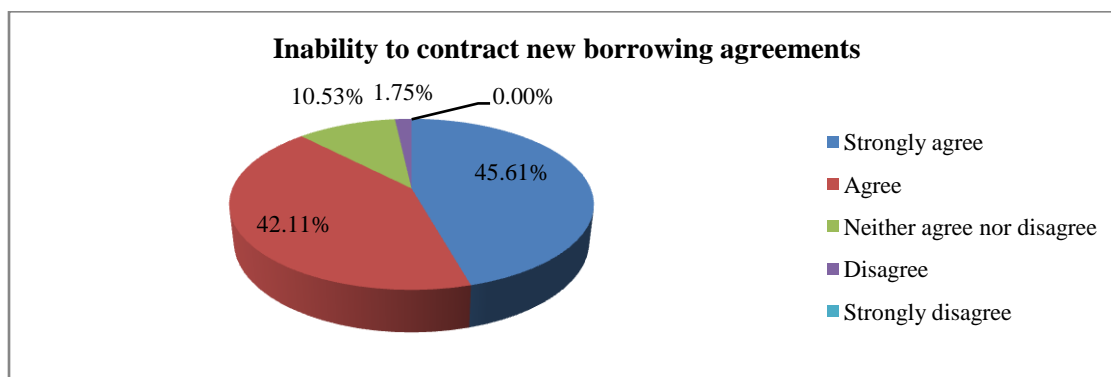
### A. Obstruction of the investments on capital equipment



**Fig. 4.** Obstruction of the investment on capital equipment.

In this question we search for the degree of agreement of the respondents with the statement that “the investments of the enterprise on capital equipment are obstructed”. The majority of the respondents showed a great degree of agreement (42.86%), while another important percentage stated that they agree moderately (35.71%). On the two opposite sides, 16.07% stated that they strongly agree with the suggestion and just the 5.36% that they disagree (3.57% and 1.79% respectively).

#### B. Inability to contract new borrowing agreements



**Fig. 5.**

Inability to contract new borrowing agreements.

In this question we search for the degree of agreement of the respondents with the statement that “Our company is unable to contract new borrowing agreements for the funding of its investment”. The majority of the respondents showed a strong degree of agreement (45.61%),



while another important percentage stated that they agree (42.11%). Overall, in this question the percentage of the respondents that disagree is extremely low.

### C. Liquidity problems

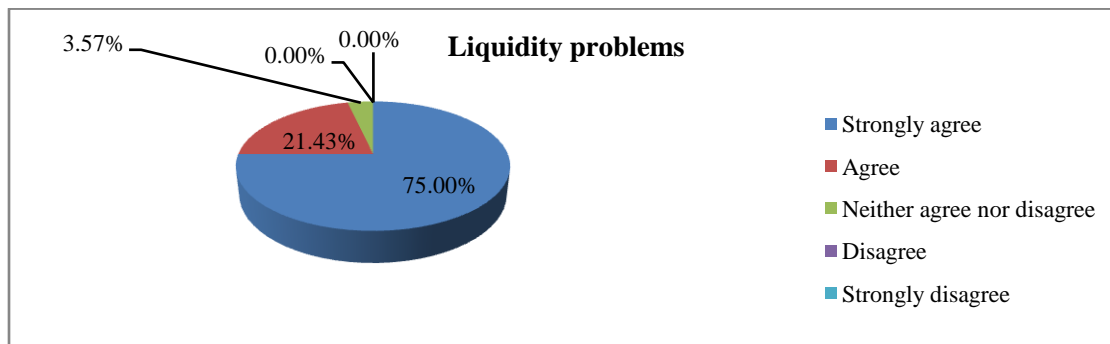


Fig. 6.

### Liquidity problems

In this question we search for the degree of agreement of the respondents with the statement that “Our company faces serious problems of liquidity”. The overwhelming majority of the respondents showed a strong degree of agreement (75%), while another important percentage stated that they agree (21.43%). It’s very impressive the fact that there are no executive members of private clinics who disagree with this statement. The analysis shows that the problems of liquidity prevail amongst the negative impacts of the financial crisis to the private health units that operate in Greece.

### D. Unresolved receivable claims

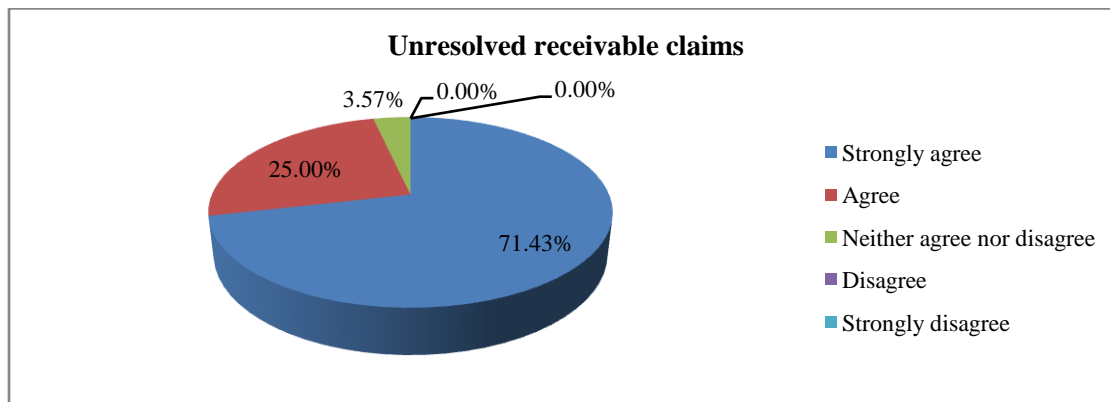


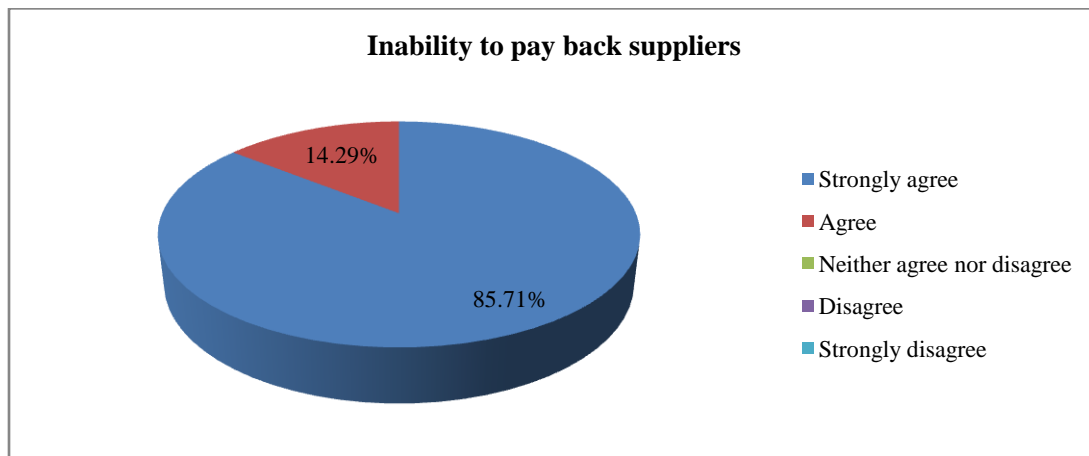
Fig. 7.

### Unresolved receivable claims.



In this question we search for the degree of agreement of the respondents with the statement that “On the current basis, important remaining of accounts receivable are pending”. The overwhelming majority of the respondents stated again a great degree of strong agreement (71.43%). Overall, the results are in a great agreement with the results from the previous question.

#### E. Inability to pay back suppliers



**Fig. 8.** Inability to pay back suppliers.

In this question we search for the degree of agreement of the respondents with the statement that “On the current basis, it is impossible to pay back the suppliers”. The results are impressive since the respondents showed exclusively a great and strong degree of agreement (85.71% and 14.29% respectively). Combining this with the previous two questions, we come to the conclusion that the private clinics face constant and intense problems with the repayment of the suppliers, while on the same time they are unable to collect on time their claims (from Hospitals and insurance funds). This situation creates very intense problems of liquidity, financing and cash “gaps”.

#### F. Used models

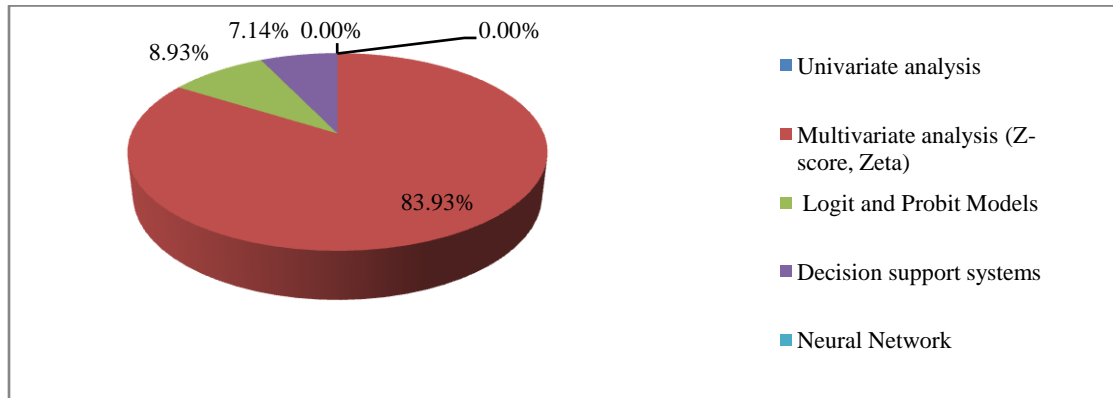


Fig. 9.

Used models of forecast of bankruptcy.

Regarding the models of forecast of bankruptcy, the private health units of the sample use mostly models of multivariate analysis and this is because they are objective and easy to apply. In a smaller scale the models of probability (Logit and Probit) are used, as well as the more advanced models of decision support.

In general, the respondents trust to a great degree the results of these models. In particular, 55.36% of the respondents consider them extremely reliable, 16.07% very reliable, 19.64% moderately reliable and only 8.93% a little reliable.

From the analysis of the answers to the questionnaires it is concluded that five are the most important policies of financial restructure that private clinics use and in particular:

1. *Factoring*: This technique provides liquidity to private health units, which may discount claims (mostly from insurance funds) to domestic banks.
2. *Leasing of equipment and cars*: This policy is applied many years in private clinics and it is an alternative form of funding of the high investments that the examined companies have to receive especially in equipment and means of transport.
3. *Increase of the capital stock*: With this policy the private clinics try to enhance their capital base and to ensure equity fund for the necessary investments. The policy is effective and low risk, however it has negative results in the return on equity (ROE) of the companies of the field.
4. *Liquidation of bonds and participations*: This policy is the ultimate attempt of the companies of the field to improve the liquidity and the general image of credibility.
5. *No distribution of dividends*: In the cases of some companies it is mandatory not to distribute since the accumulated losses of the last two years don't allow distribution. On the other side, some companies choose not to distribute the profits in order to create reserves for the future.



## 6. Conclusion

There is no doubt that the global financial environment is inextricably linked to and influenced by the financial crisis of the last three years. Furthermore, it is commonly accepted that the particular crisis has influenced the real economy with negative impacts almost on the whole range of the enterprise activity. At the enterprise level, this crisis creates a series of adverse conditions, such as the decrease in the demand for products and services, pressure for lower prices and higher credit, while many problems are arising regarding the collection of claims, and also regarding the settlement of liabilities since at the same time the funding by the banks is problematic and deficient. All of the above create, as general consequence, problems to the increase of the enterprise profitability and, many times, to its retention to the minimum acceptable levels.

On the empirical part of this paper, we searched for the problems that afflict the field of the private health. These problems are mostly financing and operational, but a big part of them comes from the government policies. The companies of this field constantly attempt a financial restructure and through it they aim for a competitive advantage. However, the condition of some companies is so bad that we can't talk about anything else but survival. The restructure that the private clinics attempt has potential on the condition that there is stability in the structures both on the internal and the external environment.

At the level of the probability of business failure, the findings of the research show that after the outbreak of the crisis this probability has been rapidly increased. Yet, it must be highlighted that business failure isn't very common on the field of private health. The policies suggested in order to ensure viability are the following:

- *More effective management of the uncollected claims:* This domain includes again the concept of factoring, which can stabilize the liquidity of the private clinics. However, the claims coming from the government (insurance funds) are difficult to be settled through this method.
- *Abolishment of counterproductive and dysfunctional units/departments- Merging of departments:* With this policy the examined companies will achieve economies of scale and will widen the cost advantages.
- *Inclusion in the article 99 of the bankruptcy code:* This policy will give "breaths of liquidity" for the next two years to the companies that will choose it, yet the final inclusion depends exclusively on the Greek justice system.
- *Promotion of generic products:* The executives of this field suggest that their companies should enter the generic products market since there is a clear policy of the State towards





that direction. The results will mostly relate to the turnover and in general to the annual financial results.

Lastly, we can conclude that there are two factors to avoid the probability of business failure of private clinics:

1. *External factors:* These factors mostly relate to the general financial environment and the variable legal framework regarding the operation of this field. In order for the above policies to be successful, it is necessary to stabilize the financial environment on a central level and to establish laws that don't invalidate the operation of the field of private health.
2. *Internal factors:* These factors relate mostly to the organizational culture and the psychology of the people that work in these companies. The examined companies will have to take full advantage of their human resources through a healthy organizing structure.

## 7. Suggestions

It is the appropriate time, due to the current crisis, for the enterprises to face the particularly important short-term risks of liquidity and funding and to prepare for a potential extended economic depression. The techniques that are suggested in this paper for the retention of the business performance are the bellow:

- ✓ Investment on innovative products and services.
- ✓ Development and retention of valid financial forecasts.
- ✓ Search for alternative sources of funding.
- ✓ Restructure / merging / abolishment of departments or/and clinics in order to search for profitability.
- ✓ Tracking of the most important risks and development of the proper ways to handle them.
- ✓ Assurance of the necessary sources of liquidity and the necessary working capital.
- ✓ Reasonable management of the cost.
- ✓ Discipline regarding the expenses of the capital equipment.
- ✓ And lastly on a level of state interference, the creation of a new architecture of the financial system as well as the compensation system of the health care providers.

These measures are of vital importance to the management of risks, the avoidance of traps and the full exploitation of the opportunities that arise in times of financial and economic turbulence. Another important reason that calls for these measures is the improvement of the working conditions and the creation of relationships of trust and satisfaction between enterprises and human resources.



At the level of credibility of the samples of estimating the forecast of business failure and especially of those that use data from the annual financial statements, some doubts emerged by this paper. These doubts come from the fact that financial statements might be a product of misrepresentation of financial data and in general of “creative accounting”. Therefore, it is suggested that there should be an application of the relevant models of forecast through internal information by the examined financial entities.

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