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STUDY ON ESTIMATING THE RISK OF MANIPULATION OF FINANCIAL INFORMATION BY ECONOMIC ENTITIES

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Abstract

In this work, we proposed to analyze, starting from the existing accounting information in the financial statements, the way in which we can estimate the risk of manipulation of the financial information, by which companies. The research involved the study of specialized literature with the aim of identifying the opinions of specialists regarding the existence of this risk and the method of its identification. Starting from different models that use both financial information and non-financial information on the basis of which a score function is calculated, we carried out a case study in which, using the Beneish model, we assessed the risk of manipulation of accounting information in three listed companies on the stock market (which for reasons of confidentiality I marked with A, B and C, using the results published in the financial statements for the years 2022 and 2023. Based on the 8 indices of the Beneish model: the receivables turnover rate index at the figure of business, the gross commercial margin index, the asset liquidity rate index, the turnover growth index, the degree of depreciation of assets, the share of administration and marketing expenses in the turnover, accruals related to the exploitation activity and the financial leverage we calculated M-score, which allowed us to assess the degree of manipulation of the accounting information in the published financial statements. We thus found that by referring to the reference indices and the reference score proposed by Beneish (-1.78), a score updated compared to 1999, the year in which the value of the score function was determined for the first time, we found that for none of the analyzed entities we can states with certainty that they manipulated the reported information. However, in the case of companies B and C there are such indications, which requires additional analysis when the control bodies follow the reporting method.

Key words: *financial statements, risk, manipulation, Beneish model, accounting reporting*

INTRODUCTION

At the global level, there have been numerous financial scandals that brought into discussion the need to identify some solutions through which the risk of manipulation of the reported accounting information can be determined. These risks can be identified through financial auditing, but other solutions are also being sought that can be used equally by shareholders, associates, management, but especially creditors and investors, but also control factors, with the aim of detecting some management elements of earnings or financial fraud [4], given that the tools, methods and procedures for embellishing financial statements or applying financial fraud schemes have become more and more diverse and complicated [11, 17, 20].

The need to identify the risk of fraud or manipulation of the results reported by companies, stems from the threat they represent for the proper functioning of the economy [13, 20, 21], the recent economic crises being a conclusive example. Even if the use of accounting information manipulation tools does not automatically mean bankruptcy, they can contribute to the decrease of credibility or to the increase of costs for the following periods, costs that increase as a result of the decrease of trust of third parties [25].

Detecting the tools for manipulating the reported accounting information is sometimes

difficult, this is due to the fact that the current business environment is a volatile one (globalization contributes to the rapid change of market conditions, the way of development and use of technology, etc.), which makes it difficult for managers when it comes to making objective and reliable decisions [18].

Regarding the method of risk determination, we find that traditionally, the indicators used started from the information presented in the balance sheet and the profit and loss account [12, 16, 32], but it was found that the traditional indicators that reflect performance economic indicators must be replaced by other alternative indicators, such as financial indicators of the creation of added economic value or financial ratios [22]. These indicators adjust the accounting result with various other elements that are influenced by the depreciation policy applied by the economic entity, by its financing or investment policy [3]. They are mainly used by credit institutions to determine the performance of the loans granted, with the aim of limiting the decision-making power of the credit entity, which can thus be conditioned by credit rating indicators regarding the financing structure, profitability, etc. [9, 31].

In the specialized literature, there are other models for predicting the behavior of handling financial reporting, these being based on the analysis of some financial ratios used in the calculation of a score function.

Thus, Beneish proposed in 1999 a model consisting of a set of indices for detecting accounting manipulations, indices that through a discriminant analysis allow the determination of a score function, which is then compared with the values included in the classification and evaluation intervals of the risk of fraud or manipulation of accounting information [5, 6, 14].

In turn, Dechow et al. used a similar approach, identifying a score function (F) which is however much more complex. The method is a statistical one and proposes 3 models in which both financial rates and non-financial elements are integrated and which are similar to those that estimate the possibility of bankruptcy of economic entities. Based on the result of the score function, the probability of leveling earnings or using creative accounting tools can be determined. As far as the non-financial elements are concerned, they are as important in handling as the accounting information, especially when they relate to the capital markets.

Model 1, makes strict reference to the financial statements, using different rates and indicators (variation of working capital, change in the turnover indices of receivables, stocks and accounting gains, percentage change in cash receipts) [10, 23]. Model 2 takes into account the abnormal variation in the number of employees, but also the operational leasing contracts. Model 3 uses adjusted stock returns as market-based variables [15, 19].

For his part, Montier developed a model that is based on 6 criteria that can provide information regarding the manipulation of financial statements and reported results.

These criteria measure: the difference between net income and cash flow, increasing sales (DSO and DSI), increasing other current assets to revenues, decreasing the value of depreciation, increasing total assets [7, 24].

Pustylnick created two linear functions, P-score and R-score, starting from Altman's model, in which he changed some variants. Thus the P-score model reflects the value of a company starting from the way it is perceived on the market, and the R-score is a model that modifies the P-score function and is related to the real liquidity of a company [26, 27, 28].

The models proposed by various economists have the advantage that they have been tested, that the proportion in which the results obtained were relevant was significant, which confirms the efficiency of their use for different fields of activity, for companies classified by size criteria and operating in different categories of savings.

At the level of Romania, there are Romanian economists who have adjusted the Beneish score or the Dechow score to the conditions of the national economy. Thus in 2013, Robu et al. tested the Beneish method for companies from different fields of activity, finding that the risk of tax fraud can be estimated through the detection indices of accounting manipulation [29]. Also, Burca and Lile created another model for determining the risk of manipulation starting from the Dechow model, which they

adjusted to the conditions of the Romanian market economy [8].

MATERIALS AND METHODS

The Beneish model uses the financial information reported by companies in order to determine some variables that are the basis for calculating an M-score function, depending on which the probability of distortion or manipulation of accounting reports is determined. Thus, the probability of manipulation is correlated with 8 indicators:

1. Days' Sales in Receivables signifies the relationship between the effectiveness of collecting accounts receivable and the overall sales revenue generated, comparing one financial year to another. Beneish theorized that a significant rise in net receivables suggests a boost in sales, potentially due to a shift in trade credit policy. In turn, this increases the likelihood that those revenues have been overstated
2. The Gross Margin Index is calculated as a ratio between the gross margin rate from the previous year of the manipulation report and the gross margin rate recorded from the current financial year, the one in which the report is made. The decrease in the gross commercial margin indicates its negative effect on operational continuity, there is the possibility of distorting the financial reporting, with the aim of obtaining sufficient earnings to remunerate the investors who financed various investments
3. Asset Quality Index is the indicator that assesses the degree of depreciation not only for fixed assets, but also for current assets that can significantly influence financial performance. The metric is calculated by comparing the aggregated proportions of the asset composition over two successive financial years.
4. The Sales Growth Index serves as a measure that signals potential concerns about a company's operations, advising prudence when evaluating its business activities. This index is derived from the ratio
between the turnover recorded in two consecutive reporting years.
5. Depreciation Index is an indicator that, if it has a significant variation, may indicate a manipulation of the accounting information, resulting from the value of the economic benefits that the company obtains from their use. This metric is determined by comparing the proportions of depreciation costs for fixed assets across two successive financial years.
6. The SGA Index, which analyzes general administrative and sales expenses, tracks their variation from one period to another. A high rate of their growth compared to the value of sales indicates a transfer of resources in the form of services to third parties, which, however, takes place under disadvantageous conditions. This index is calculated as a ratio between general administrative expenses and turnover
7. Leverage Index is an indicator whose change indicates the risk of manipulation resulting from the high pressure on cash flows. The index is calculated as the ratio between total liabilities and liabilities.
8. Accruals to Assets Index is an indicator that reflects the variation between a company's deferred income and its total assets, indicating a way of manipulating earnings. It is calculated as a ratio between uncollected receivables and the level of total assets.

These variables are the basis for determining a score function whose values can indicate the existence or non-existence of the manipulation of accounting information, especially those related to the company's profit. Values lower than the recommended threshold indicate the absence of accounting manipulation, and a higher value the application of accounting manipulation.

The score function has the following form:

$$M = \beta 0 + \beta 1X1 + \beta 2X2 + ... + \beta iXi + ... + \beta nXn \text{ [2]} \quad (1)$$

where:

M is the score of the function

Xi – the independent variables

βi – coefficients of the model, where (i = 1,...,n).

From the application of this function, Beneish has stability M-score which can be calculated

either starting from 8 variables, resulting in the following equation:

$$M\text{-}Score = -4.84 + 0.92 \times DSRI + 0.528 \times GMI + 0.404 \times AQI + 0.892 \times SGI + 0.115 \times DEPI - 0.172 \times SGAI + 4.679 \times TATA - 0.327 \times LVGI \quad (2)$$

The score can be calculated based on only 5 variables, like this:

$$M\text{-}Score = -6.065 + 0.823\ DSR + 0.906\ GM + 0.593\ AQ + 0.717\ SG + 0.107\ D$$

in which:
DSRI – receivables turnover ratio index
GMI – gross commercial margin index
AQI – asset liquidity ratio index
SGI – turnover growth index
DEPI – degree of depreciation of assets
SGAI – share of administrative and marketing expenses in turnover
TATA – accruals related to the exploitation activity
LVGI – financial leverage
In relation to the values obtained, it can be established whether or not a company presents a risk of manipulation of accounting information. The reference value is -1.78 in the case of the score calculated in relation to the 8 factors. Initially, the score was fixed at -2.22, and then at -1.98. In 2012, the last reference value was established.

RESULTS AND DISCUSSIONS

Based on the information provided by the foundation for calculating the M-Score, derived from financial statements and managerial accounting, was established. This analysis encompassed three taxpayer companies listed on the stock exchange. It revealed that none raised definitive concerns regarding result manipulation based on their M-Score figures, which fell below the threshold of -1.78 (Figure 1).

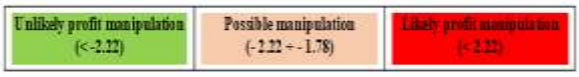

Fig. 1. Beneish M-Score
Source: own processing after [1].

However, two of the companies, company B and C, are in the range of possible manipulation, as a result of the scores of -2.08 (company B) and -2.07 (company C).
In the following, we analyzed the values of the 8 factors, for each of the 3 companies, so that we can identify the risks that contributed to the emergence of suspicions of manipulation of the published accounting information.

Table 1. Beneish score indices (variant with 8 factors)

Factors	Symbol	Society A	Society B	Society C
Sales Index	DSRI	0.804	0.427	1.632
Gross Margin Index	GMI	1.774	1.135	1.049
Asset Quality Index	AQI	0.508	2.617	0.987
Sales Growth Index	SGI	0.845	0.845	0.967
Depreciation Index	DEPI	0.832	1.070	1.504
Sales and General Administration Expenses Index	SGAI	1.108	0.840	0.711
Total Accrual	TATA	0.038	0.033	-0.060
Leverage Index	LVGI	0.978	0.839	0.962
M-Score		**-2.44**	**-2.18**	**-2.07**

Source: own processing.

The value recommended by Beneish for DSRI is 1.031. We state that companies A and B registered values below this limit, while company C has a higher value. A lower degree of collection of receivables may be due to the management policy of the receivables-debt ratio, without necessarily indicating a situation of manipulation of the reported results from a financial point of view.
The recommended value for GMI is 1.014. For the current study, all three companies recorded values above the benchmark, indicating that they have either elevated their sales levels or enhanced the proportion of their commercial markup.

The recommended value for AQI is 1.039. In the case of the analyzed companies, we note that a supra-unit value was registered by company B, the other two companies having sub-unit values, which may be due to the revaluation of fixed assets and the creation of revaluation reserves.

Beneish's recommended value for SGI is 1.134. We find that the values are sub-unit for the companies in the case study, with deviations of 0.167, respectively 0.289, indicating a decrease in turnover, which implies a reduction in the activity carried out. In the conditions of an increase in inflation, this may raise suspicions related to the manipulation of processed accounting information.

The value recommended by Beneish for DEPI is 1.077. The values obtained by two of the economic entities in the case study are below this threshold, which indicates a reduction in the weight of the depreciation of fixed assets, with an impact on the results obtained. The increased value in the case of the third company indicates an increase in depreciation expenses. These increases are influenced by the depreciation method applied, which in turn has an impact on the financial results and the profit tax owed by the entity.

The threshold proposed by Beneish for SGAI is 1.041. In the case of entity A, the value obtained is higher than this threshold, and this may be due to the granting of performance bonuses. The sub-unit values may raise suspicions related to the way of recognition and reporting of these categories of expenses.

From the analysis of the TATA factor, it appears that there are no indications regarding the use of accounting policies susceptible to the manipulation of information in financial reporting. The tax is calculated based on the total commitments of the economic entity and its total assets. An increase in commitments indicates the existence of manipulation. Beneish draws attention to the accumulations that could be used by economic entities in favor of earnings manipulation, having a favorable impact on reported profits [6].

The negative value in the case of company C indicates the inadequate recognition of some revenues, which have the effect of an increase in receivables but not accompanied by an increase in receipts.

Regarding the LVGI, the sub-unit value indicates that the analyzed companies have a low ratio between debts and assets, being able to pay off these debts, but also being able to increase their own capital through capital instruments.

We find that even When employing the model that incorporates five variables, the outcomes suggest similar findings: potential concerns for companies B and C, while indicating an absence of risk for company A.

Table 2. Beneish score indices (variant with 5 factors)

Factors	Symbol	Society A	Society B	Society C
Sales Index	DSRI	0.804	0.427	1.632
Gross Margin Index	GMI	1.774	1.135	1.049
Asset Quality Index	AQI	0.508	2.617	0.987
Sales Growth Index	SGI	0.845	0.845	0.967
Depreciation Index	DEPI	0.832	1.070	1.504
M-Score		**-2.80**	**-2.41**	**-2.33**

Source: own processing.

From the analysis of the factors that participate in the calculation of the M-Score for the entities that were the subject of the case study, it can be found that the low risk of manipulation of the reported accounting information is correlated with the existing increase in turnover which can also support the increase in some administrative expenses, marketing, etc. (Company A, Figure 2).

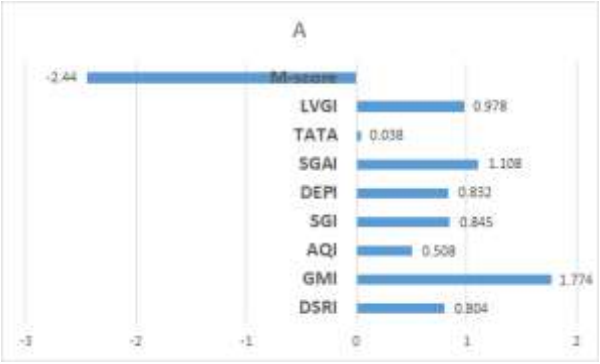

Fig. 2. M-score factors (company A)
Source: own processing.

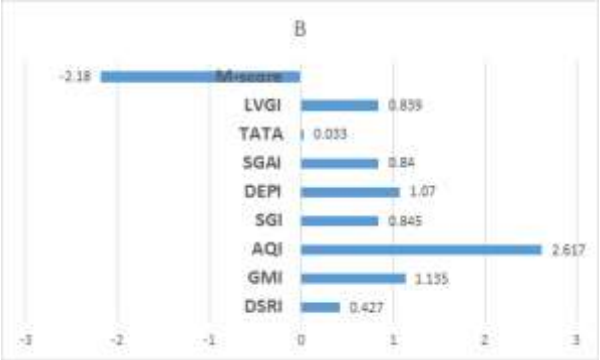

Fig. 3. M-score factors (company B)
Source: own processing.

On the other hand, we find that only an increase in the value of immobilized assets that is not due to the realization of investments, cannot support the development objectives of a company in the long term (Company B, Figure 3).

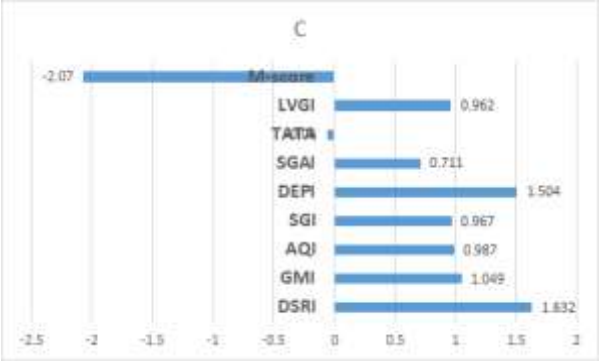

Fig. 4. M-score factors (company C)
Source: own processing.

A DEPI or DSRI supra-unit index cannot support the company's economic growth, especially when the asset growth is due to receivables whose payment term is overdue (Company C. Figure 4).

CONCLUSIONS

The use of information regarding the degree of manipulation of accounting information is useful both for risk management specialists within a company, which could lead to the economy of resources, but also for investors, creditors, control factors.

The mathematical model proposed by Beneish aims to identify the entities that manipulate the accounting information with the aim of distorting the reported earnings. In substantiating the model, the economist started from the premise that the risk of manipulation of accounting information increases when there is either an unusual increase in receivables and sales, or a decrease in gross operating margin.

The current study has shown us the fact that although we cannot state with certainty that none of the analyzed companies applied techniques to manipulate the accounting information reported through the financial statements, there are still indications that raise questions about these practices.

The use of these verification techniques, although it is not usual in the activity of an economic entity, could constitute a way of information not only for the control factors or for the creditworthiness analyzes carried out on the occasion of financing, but also for the managers of the economic entities who could thus be much more informed and more prudent in making decisions.

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