

# Detection of Financial Statement Fraud Using Beneish Model

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***Abstract:*** *One of the greatest challenges faced by auditors is to detect anomalies in financial statement reporting. Once the anomalies are detected they have to be further investigated by forensic accountants. However, the practice of forensic accounting has not yet become a reality in Bosnia and Herzegovina. So the main purpose of the study is to analyze to which degree BH companies are exposed to the financial statement fraud and with respect to that the need for forensic accountants. The financial statement data will be collected from BH companies and it will be analyzed using Beneish model. The Beneish model is the mathematical model that identifies the manipulation of earnings through financial ratios. These analytical techniques should reveal the unconventional variations in financial statement reporting, indicating that there is possibility of fraudulent transactions.*

***Key words:*** *Beneish model, fraudulent reporting, forensic accounting*

## **Introduction**

One of the greatest challenges in 21<sup>st</sup> century faced by companies, institutions and organizations is financial statement fraud, which is increasing in number and size, what significantly affected the people's trust in credibility of financial statements and corporate reports. As stated in the Report to the Nation on Occupational Fraud and Abuse (2016), published by ACFE, compared to the other types of occupational fraud (corruption and asset misappropriation), financial statement fraud is the least frequent (9.6%), however, it is the largest in terms of size of median loss (\$975 000).

The financial statement fraud become a global concern, affecting not only large, multinational companies and organizations, but also small and medium sized enterprises. However, the well-known corporate scandal cases such as Enron, WorldCom, Tyco and few others are the most known examples of not only financial statement fraud, but also other types of occupational fraud. After these corporate scandal cases the issue of auditor's failure to detect fraud signs or

symptoms was brought to the attention and the role of forensic accountant become irreplaceable in fraud investigation. In order to be a forensic accountant one has to possess a broad spectrum of knowledge and skills in different fields such as accounting, auditing, law, psychology, criminology, etc. Also, the forensic accountant needs to possess outstanding moral and ethical principles and values.

Technology advancements significantly improved the detection process of frauds and embezzlements, so today auditors have access to many tools, programs and software that save time, produces more relevant findings and point out the critical areas that should be further investigated by forensic accountants. Some of the common tools used in the audit of financial statements are: Benford's Law, Beneish Model, ratio analysis, data mining. This study will focus on the Beneish Model financial statement fraud detection tool as one cost-effective and efficient tool that should be utilized by auditors.

Beneish (Beneish M-Score) Model extracts the necessary data from the balance sheet, income statement and statement of cash flow, and uses eight variables (days sales in receivables, gross margin index, asset quality index, sales growth index, depreciation index, sales, general and administrative expenses index, total accruals to total assets index, and leverage index) as indicators of companies prone to manipulate financial statements. Companies with the higher Beneish score are more probable to manipulate financial statements.

### **Fraud Triangle**

The first step in fraud investigation is to understand the motives behind the fraud commitment. The forensic accountant has to investigate why fraudster commits the fraud, under which circumstances and what is used as fraud justification or rationalization. These three elements are perfectly depicted in so-called fraud triangle which was developed by Donald Cressey in 1973, what is shown in the figure below.

**Figure 1: Fraud Triangle**



Source: Singleton T.W. & Singleton A.J. (2010). Fraud Auditing and Forensic Accounting. Wiley.

The fraud triangle was created after Donald Cressay had interviewed 200 people accused for embezzlement. Cressay had discovered that each fraud had three elements in common: pressure (motivation or need), knowledge or opportunity and rationalization (Singleton and Singleton, 2010).

Pressure, incentive or motivation is related to the something that is happening or has happened in the fraudster's personal life what forces him or her to commit the fraud, for example: financial difficulties, bad habits such as gambling, or incentive such as bonus payments based on the performance (Singleton and Singleton, 2010).

Opportunity is related to the knowledge and experience with respect to the fraudster working environment. Fraudster will utilize the weaknesses of internal control, familiarity with the environment and trust given to him to commit the fraud (Singleton and Singleton, 2010).

Rationalization is related to the way in which fraudster justifies his or her fraudulent actions. It is interesting that, according to the ACFE Report to the Nation from 2008, 93% of fraudsters did not have criminal record, and it is not rare situation that fraudsters are religious people (Singleton and Singleton, 2010).

### **Types of financial statement fraud**

According to the ACFE Report to the Nations on Occupational Fraud and Abuse (2016) the financial statement fraud occurs in 9.6% of cases, with the median loss of \$ 975,000. The intention of fraudster is to misstate the financial statement entries or disclosures to trick the users of financial statements.

The financial statement fraud is classified into two groups: financial and non-financial. Within financial group there is further classification on asset/revenue overstatement and asset/revenue understatement. Since the focus of this research paper is on the financial aspect of the financial statement fraud the following common types of fraud will be further explored: timing differences, fictitious revenues, concealed liabilities and expenses, improper disclosures and improper asset valuations.

Association of Certified Fraud Examiners (2017) describes the types of the financial statement fraud in the following way:

Timing differences refers to the incorrect treatment of sales where the revenues and expenses are shifted from one period to the another, affecting the earnings in a desired way. For example, the inventory is recorded as a sale, knowing very well that part of it will be returned back or two-year service contract is treated as the revenue of the current year what leaves the consequences on the future period earnings.

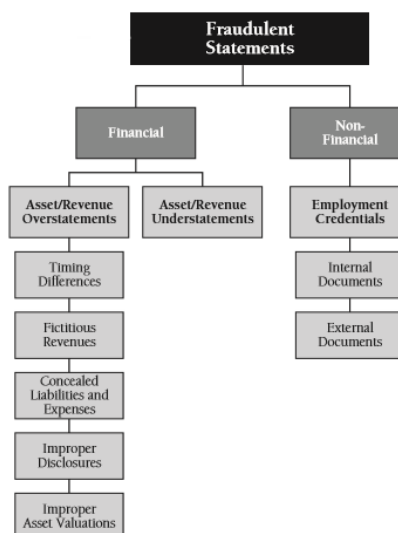
Fictitious revenues are related to the sales that are never realized, which not rarely include fake customers, what leaves the impact on the revenues, profits and assets. The common sign of fictitious revenues are obscure accounts receivable that are overdue for a long period of time. The companies in a financial problems are prone to record fictitious revenues.

Concealed liabilities and expenses refer to the incorrect treatment of liabilities what usually happens at the end of the accounting period where liabilities are moved to the first month of the consequent period or when the company is large enough, liabilities are moved to the subsidiary companies, which are either not being audited or they are audited, but by a different audit company.

Improper disclosures refer to the obligation of the management to disclose all relevant information in the financial statements. Improper disclosures related to the financial statement fraud usually include the following: omission of liabilities, subsequent event, related-party transactions and management fraud.

Improper asset valuation refers to the incorrect statement of asset amounts (accounts receivable, inventory, business combinations, long-lived or fixed assets), capitalization of expenses, or deflating the contra-asset amounts (allowance for doubtful accounts, accumulated depreciation). Through improper statement of the assets, contra-assets and expenses the financial indicators will show a better than a true equity and profit values.

**Figure 2: Part of Fraud Tree**



Source: ACFE (2017)

## Schilit's seven shenanigans

Schilit and Perler (2010) in their book *Financial Shenanigans*, have identified seven financial “sins” related to the earnings manipulation, which are:

- recording revenue too soon
- recording bogus or fictitious revenues
- boosting income with one-time gains
- shifting current expenses to later period
- failing to disclose all liabilities
- shifting current income to later period
- shifting future expenses to current period.

According to the research done by Isakovic-Kaplan and Delalic (2013), the comparison is made regarding the frequency of seven financial shenanigans in the world and in the Bosnia and Herzegovina, what is summarized in the table below:

**Table 1: Comparison of seven financial shenanigans between the world and Bosnia and Hezegovina**

WORLD	BOSNIA AND HERZEGOVINA
Recording revenues too soon	Recording revenues too soon
Recording bogus revenue	Recording bogus revenues
Boosting income with one-time gains	Shifting future expenses into the current period
Shifting current expenses to a later or earlier period	Shifting current expenses to a later or earlier period
Failing to disclose all liabilities	Shifting current income to a later period
Shifting current income to a later period	Recording bogus expenses
Shifting future expenses into the current period	Failing to disclose actual revenues

Source: Adjusted from Isakovic-Kaplan and Delalic (2013). Creative accounting in companies in B&H

By looking at the table above, the first two fraudulent practices are common to the B&H and the world. However, the four out of five remaining financial shenanigans show that companies in B&H are prone to demonstrate lower net income through increase in expenses or by moving future expenses to the current period. The possible reason behind this kind of situation is the fact that BH companies usually do not have established reward system based on the performance, so there is no incentive to increase revenues. So the top management of BH companies is usually motivated to commit the fraud against the government through showing lower net income what implies lower income taxes to be paid to the government.

## Red Flags of Financial Statement Fraud

Almost every fraud has warning signals detected in its financial statements, which are commonly called red flags. According to the ACFE (2017) the red flags that are usually detected in financial statements are anomalies in profitability, cash flow, assets, liabilities, equity accounts, anomalies in relationships between financial statement items. Warshavsky (2012) argues that accruals are very often used as the basic component in the earnings manipulation. The purpose and size of accruals should serve as one of the important instruments that should assist the forensic accountant in detection of financial statement fraud, or earnings manipulation.

## Methodology

### *Beneish M-Score Model*

Beneish M-score is the mathematical model developed by Messod Beneish which uses eight variables derived from the company's financial statements (balance sheet, income statement and statement of cash flow) with the aim of detecting the companies prone to manipulate its financial reports (Beneish, 1999).

The variables that are included in the Beneish model are financial ratios computed from the financial statements for two consecutive years. The formulas for variable computations are shown in the table below:

DSRI – days sales in receivables index – increase in receivables that is not proportionate to the sales may be sign of revenue inflation (Beneish, 1999).

GMI – gross margin index – if the GMI index is greater than 1, it means that gross margin have declined and Lev and Thiagarajan (1993) argue that it is negative sign regarding company's performance. So there should be a positive relation between increase in GMI and probability of manipulated earnings (Beneish, 1999).

AQI – asset quality index – if AQI is greater than 1, it is the indication of company's potential involvement in cost defferal. So, as in the case of GMI index, there is positive relation between increase in AQI and manipulated earnings (Beneish, 1999).

SGI – sales growth index – growth does not necessiraly indicate manipulation, but when large companies are exposed to pressure, there is greated probability that their earnings will be manipulated. The positive relation is expected between SGI and manipulated earnings (Beneish, 1999).

DEPI – depreciation index – if DEPI index is greater than 1, it means that the rate at which assets depreciate have slowed down, indicating that the company has examined its estimates of assets useful life. The positive relation between DEPI index and earnings manipulation is expected (Beneish, 1999).

SGAI – sales general and administrative expenses index – the increase in SGAI is positively related to the manipulation of earnings (Beneish, 1999).

LVGI – leverage index – if LVGI is greater than 1, than it represents an indication of increase in leverage. This variable is included in the model with the aim of analyzing debt agreements incentives for manipulation of earnings (Beneish, 1999).

TATA – total accruals to total assets – the variable is used in the model with the aim of analyzing the extent to which cash corresponds to the reported earnings. It is expected that greater positive accruals are related to the increased likelihood of earnings manipulation (Beneish, 1999).

#### *Study hypothesis*

H1 – The companies in Bosnia and Herzegovina are prone to manipulate financial statements.

Table 2: Variables used in Beneish Model

Variables	Formulas
DSRI	$\left[ \frac{\text{Receivables}_t}{\text{Sales}_t} \right] / \left[ \frac{\text{Receivables}_{t-1}}{\text{Sales}_{t-1}} \right]$
GMI	$\text{Gross margin}_{t-1} / \text{Gross margin}_t$ $\text{Gross margin} = (\text{Sales} - \text{Cost of goods sold}) / \text{Sales}$
AQI	$\left[ 1 - \frac{\text{PPE}_t + \text{CA}_t}{\text{Total Assets}_t} \right] / \left[ 1 - \frac{\text{PPE}_{t-1} + \text{CA}_{t-1}}{\text{Total Assets}_{t-1}} \right]$ PPE: Plant, Property and Equipment/ CA: Current asset
SGI	$\left[ \frac{\text{Sales}_t}{\text{Sales}_{t-1}} \right]$
DEPI	$\left[ \frac{\text{Depreciation rate}_{t-1}}{\text{Depreciation rate}_t} \right]$ $\text{Dep' rate} = \text{Depreciation} / (\text{Depreciation} + \text{PPE})$
SGAI	$\left[ \frac{\text{SGA}_t}{\text{Sales}_t} \right] / \left[ \frac{\text{SGA}_{t-1}}{\text{Sales}_{t-1}} \right]$ SGA: Sales, general, and administrative expense
TATA	$\frac{\Delta \text{Current Asset} - \Delta \text{Cash} - (\Delta \text{Current Liabilities} - \Delta \text{Current maturities of LTD} - \Delta \text{Income Tax payable}) - \text{Depreciation \& Amortisation}_t}{\text{Total Assets}_t}$
LVGI	$\left[ \frac{\text{Leverage}_t}{\text{Leverage}_{t-1}} \right]$ Leverage = Debts / Assets
Source: Anh and Lihn (2016)	



The study examines 31 randomly selected company from the Tron Systems database for the period 2013-2014. The company's financial statement data is analyzed using Beneish M-Score model.

5 variables model:

$$M = -6.065 + .823 \text{ DSRI} + .906 \text{ GMI} + .593 \text{ AQI} + .717 \text{ SGI} + .107 \text{ DEPI}$$

8 variables model:

$$M = -4.84 + .920 \text{ DSRI} + .528 \text{ GMI} + .404 \text{ AQI} + .892 \text{ SGI} + .115 \text{ DEPI} - .172 \text{ SGAI} + 4.679 \text{ Accrual to TA} - .327 \text{ Leverage}$$

If the M-score is greater than -2.22, there is an indication that company is a potential manipulator of financial statements data. Otherwise, the M-score lower than -2.22 indicates that the company is not prone to manipulate its financial statements.

Out of 31 companies, 21 had the M-score lower then -2.22, indicating that there is no potential manipulation of financial statements data. Six companies had the M-score greater then -2.22, what points out that they have manipulated their financial statements. Four companies were classified as non-manipulators according to the 5-variable model, however, after adding three more variables to the model (accruals to total assets, sales general and administrative expenses, and leverage index), they were classified as manipulators.

**Table 3: Descriptive statistics of sample (n=31 company)**

Variable	Mean	Median	Stan.dev.	Min	Max
DSRI	0,98	0,95	0,57	0,16	3,05
GMI	0,87	0,99	1,11	-4,31	3,00
AQI	0,93	0,80	1,55	-0,14	8,61
SGI	1,47	1,03	1,71	0,32	7,69
DEPI	1,04	0,97	0,28	0,59	2,12
SGAI	1,20	0,90	1,28	0,17	7,50
TATA	0,04	0,02	0,10	-0,05	0,57
LVGI	1,28	1,05	0,89	0,60	4,32
5-variable model	-2,75	-3,11	1,81	-7,02	2,08
8-variable model	-2,10	-2,37	1,50	-4,11	1,96

The analysis showed that the common variables that were manipulated are gross margin, days sales in receivable, sales growth, and asset quality. When gross margin decreases from year to year, there is greater possibility that the company will manipulate the sales and cost of goods sold. The increase in day sales in receivable signals that the company's policy regarding accounts receivable has weakened, so when DSRI is greater than 1, there is greater likelihood that the receivables will be manipulated, leading to the conclusion that revenues will be inflated. Also, the increase in asset quality index could be related to the cost deferral or capitalization of expenses.

The findings indicate, that consistent with the Schilit's seven shenanigans, Bosnian companies prone to commit financial statement fraud, are manipulating usually with the sales revenue and expense capitalization in order to improve the financial statements performance.

Furthermore, the R square for the GMI, AQI and SGI was 45.8%, 21.0% and 26.8%, respectively, with the level of significance lower than 0.05, what leads to the conclusion that there is a significant relationship between GMI, AQI, SGI and financial statement fraud.

## **Conclusion**

The purpose of the study was to analyze the current situation in Bosnia and Herzegovina related to the degree to which companies are exposed to the financial statement fraud. For that purpose, the financial statements data was obtained from the Tron Systems for 31 company. The obtained data was analyzed using Beneish M-score model, which is eight variables model that was developed by professor Messod Beneish in 1999.

Findings revealed that 16% of the analyzed companies are prone to manipulate their financial statements data, where sales revenues and capitalization of expenses were two main areas where manipulations were done. The regression analysis showed that gross margin index, asset quality index and sales growth index significantly influence the Beneish M-score.

This research is a first step in the more detailed investigation of financial statement fraud among BH companies, since the audit and forensic accounting profession is not yet fully developed in the country. Also, the Beneish M-score model could be utilized by the auditors in BiH as a time and cost efficient tool in the financial statement audit. In that way the attention would be drawn to the areas, accounts or items that should be further explored by forensic accountants, providing in that way space for development of forensic accounting profession.

## References

- Anh, N.H., & Lihn, N.H. (2016). Using the M-score model in detecting earnings management: evidence from non-financial Vietnamese listed companies. *Journal of Science: Economics and Business*, Vol. 32.
- Association of Certified Fraud Examiners (2016). Report to the Nations on Occupational Fraud and Abuse.
- Association of Certified Fraud Examiners (2008). Report to the Nations on Occupational Fraud and Abuse.
- Association of Certified Fraud Examiners (ACFE) (May 2017). Financial Transactions and Fraud Schemes. Retrieved from ACFE website:  
[http://www.acfe.com/uploadedFiles/ACFE\\_Website/Content/review/examreview/12-accounting-concepts.pdf](http://www.acfe.com/uploadedFiles/ACFE_Website/Content/review/examreview/12-accounting-concepts.pdf)
- Beneish, M. (1999). The detection of earnings manipulation. *Financial Analyst Journal*.
- Isaković-Kaplan, Š., & Delalić, A. (2014). Kreativno računovodstvo u privrednim društvima u BiH, Međunarodna naučno stručna konferencija: Borba protiv prevara i korupcije 2014, Forenzika i prevencija Beograd.
- Schilit, M.H., & Perler, J. (2010). *Financial Shenanigans: How to detect accounting gimmicks & fraud in financial reports*. McGraw Hill.
- Singleton, T.W. & Singleton, A.J. (2010). *Fraud Auditing and Forensic Accounting*. Wiley.
- Warshavsky, M. (2012). Analyzing earnings quality as a financial forensic tool. *Financial Valuation and Litigation Expert*, issue 39.