

DETECTING THE MANIPULATION OF EARNINGS IN THE COMPANY: TRIANGULATION OF METHODS

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Earnings management

„Earnings management is an accounting technique for financial reporting that shows a mostly positive view of corporate finances and the financial situation.“

Durana, P., Valaskova, K., Chlebikova, D., Krastev, V., & Atanasova, I. (2020). Heads and Tails of Earnings Management: Quantitative Analysis in Emerging Countries. *Risks*, 8(2), 57.
<https://doi.org/10.3390/risks8020057>

Main aspects of this study

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- **main idea:**
 - application of three different methods strengthen the obtained results
 - if the methods agree in the result, it is more likely that earnings management really occurs in the company
- **scientific gap:**
 - only a few first studies on this issue are published in Slovakia
 - the model for Slovak companies was created in the study Svabova, L., Kramarova, K., Chutka, J., & Strakova, L. (2020). Detecting earnings manipulation and fraudulent financial reporting in Slovakia. *Oeconomia Copernicana*, 11(3), 485–508. <https://doi.org/10.24136/oc.2020.020>
- **aim:**
 - to extend the knowledge of methods suitable for the detection of earnings management in the Slovak environment

Methods

Triangulation of methods:

- Beneish model (M-score)
- discriminant model for Slovak companies ($M - score_{svk}$)
- logistic model for propensity score for Slovak companies ($P - score_{svk}$)

Variables used in the study

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Variable name	Index
<i>DSRI</i>	Days Sales in Receivables Index
<i>GMI</i>	Gross Margin Index
<i>AQI</i>	Asset Quality Index
<i>SGI</i>	Sales Growth Index
<i>DEPI</i>	Depreciation Index
<i>SGAI</i>	Sales, General, and Administrative Expenses Index
<i>LVGI</i>	Leverage Index
<i>TATA</i>	Total Accruals to Total Assets

- Beneish model – original approach with use of the variables
- discriminant model and propensity score model for Slovak companies – variables from two consecutive years - the year preceding the fraudulent conduct in the company and the year in which the tax fraud was detected

Beneish model

- probit regression
- created using the sample of 2,406 companies: 74 fraudulent and 2,332 non-fraudulent companies

$$M - score = -4.840 + 0.920 \cdot DSRI + 0.528 \cdot GMI + 0.404 \cdot AQI + 0.892 \cdot SGI + 0,115 \cdot DEPI - 0.172 \cdot SGAI - 0.327 \cdot LVGI + 4.697 \cdot TATA$$

- dividing point: -2.22
 - if $M - score > 2.22$ - the company probably applied opportunistic earnings management
 - if $M - score < 2.22$ - the company is not suspicious of the fraudulent accounting processes

Discriminant model $M - score_{svk}$

- discriminant analysis model
- created using the sample of 22 Slovak companies: 22 fraudulent and 22 non-fraudulent companies

$$\begin{aligned} & M - score_{svk} \\ &= 0.29 \cdot AQI_b + 0.060 \cdot AQI_{tf} - 0.437 \cdot DEPI_b + 0.180 \cdot DEPI_{tf} + 0.100 \cdot DSRI_b + 0.667 \\ &\cdot DSRI_{tf} + 0.943 \cdot GMI_b + 1.511 \cdot GMI_{tf} - 1.561 \cdot LVGI_b - 1.523 \cdot LVGI_{tf} + 0.427 \cdot SGAI_b \\ &+ 0.681 \cdot SGAI_{tf} - 0.051 \cdot SGI_b + 1.920 \cdot SGI_{tf} + 0.497 \cdot TATA_b + 1.031 \cdot TATA_{tf} - 3.699 \end{aligned}$$

- dividing point: 0
 - if $M - score_{svk} > 0$ - the company probably applied opportunistic earnings management
 - if $M - score_{svk} < 0$ - the company is not suspicious of the fraudulent accounting processes

Propensity score model $P - score_{svk}$

- logistic regression model
- created using the sample of 22 Slovak companies: 22 fraudulent and 22 non-fraudulent companies

$$P - score_{svk} = \frac{1}{(1 + \exp\{z\})}$$

where

$$\begin{aligned} z = & 49.582AQI_b - 0.162AQI_{tf} - 4.381DEPI_b + 74.063DEPI_{tf} - 0.595DSRI_b - 51.387DSRI_{tf} + 0.883GMI_b \\ & - 878.919GMI_{tf} + 172.012LVGI_b + 123.410LVGI_{tf} - 24.118SGAI_b - 30.941SGAI_{tf} + 29.541SGI_b \\ & - 200.461SGI_{tf} - 2.998TATA_b - 104.104TATA_{tf} \end{aligned}$$

- quantification of the propensity score to the manipulation of profits
- dividing point: 0.5

Results

- sample of 1,900 Slovak companies
- data from 2016 – 2018
- triangulation of methods – identification of fraudulent company by one, two and all three models

	Beneish model <i>M – score</i>	discriminant model <i>M – score_{svk}</i>	propensity score model <i>P – score_{svk}</i>
potential fraudulent company	743 (39.1%)	1,049 (55.2%)	927 (48.79%)
non-fraudulent company	1,157 (60.9%)	851 (44.8%)	973 (51.2%)
match of fraud identification	621 (32.7%)		-
	-	729 (38.4%)	
	685 (36.1%)	-	
	528 (27.8%)		

Results

- Beneish model match with the $M - score_{svk}$ model in 32.7% enterprises
- Beneish model match with the $P - score_{svk}$ model in 36.1% enterprises
- Slovak $M - score_{svk}$ and $P - score_{svk}$ models match in 38.4% enterprises
- all three models identically identified earnings management in 27.8% enterprises

Thank you for your
attention

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- Invitation to submit your papers to



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