

ECONOMICS

Sociology

Kliestik, T., Blazek, R., & Belas, J. (2022). CEO monitoring and accounting record manipulation: Evidence from Slovak agriculture companies. *Economics and Sociology*, 15(4), 204-218. doi:10.14254/2071-789X.2022/15-4/10

CEO MONITORING AND ACCOUNTING RECORD MANIPULATION: EVIDENCE FROM SLOVAK AGRICULTURE COMPANIES

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ABSTRACT. Many authors focus on detecting accounting record manipulation using various models and investigating the reasons of accounting falsification and alteration. In general, the tax base is changed because its optimization benefits the business. Various research studies show that the CEO is the one who commences the process of updating accounting data. As a result, we'd like to show the gender of persons that initiate manipulation the most frequently. By recognizing inventive accounting, Beneish's methodology is utilized to identify organizations that have cheated. As a result, organizations are categorized as having a female, male, or mixed management team. Based on the Beneish model, statistical approaches (such as contingency tables and establishing the link between variables), and correspondence analysis, we established that gender influences how a company's accounting is managed: if a woman is a director, the company is regarded non-manipulative. In contrast, if a male keeps control of the corporation, the company has a strong incentive to falsify its financial reports.

Received: January, 2022

1st Revision: September, 2022

Accepted: December, 2022

DOI: 10.14254/2071-
789X.2022/15-4/10

JEL Classification: C61,
M00, M40

Keywords: creative accounting, gender equality, correspondence analysis

Introduction

Accounting has been a challenge for many generations. Early phases of double-entry bookkeeping aided in the improvement of the business policies of enterprises dedicated to transoceanic journeys and the conquering or colonization of new nations and territories. Accounting was then used in everyday employment as a tool for business balances, which

considerably extended its use. Simple entries were replaced by entries that aided in understanding the concerns of specific creditors and debtors. Merchants and firms could describe exactly where their money was placed; they understood how to navigate numerous records; and they also knew how to disburse their funds in such a manner that they could reckon with unexpected charges or sicknesses that frequently afflicted shipping organizations.

Because men were the only ones in charge of the company's bookkeeping from the start, only men handled it. Because gender equality was not yet a problem that was particularly addressed, funds were managed by only one gender. According to certain authors, men have distinguished themselves since time immemorial by attempting to help one another, even if it meant counterfeiting or defrauding another merchant with whom they had numerous irregularities. According to the authors, Balaciu et al. (2009), this is why they began to conceal various accounting records, debts were shifted from one merchant to another with the intention of damaging one and assisting another.

Companies were expanding, and it was important to keep manufacturing and all administrative activities running. As a result, women began to gain access to certain occupations. These were once unimportant positions. Gender equality, on the other hand, became a possible theme later on, implying that women would rise to higher positions and become CEOs (A CEO is the highest position at any organization and is in charge of the overall running of the entire company. They are responsible for making big decisions for the company and are also the company's representative in the media and the public eye). Women, with their proclivity for emotional behaviour and ability to focus on the fulfilment of desires through sensitivity, became formidable competitors to men, who achieve their goals primarily through logic. According to scientists Stoet and Geary (2018), while women's engagement in science and research is still low, governments that encourage women in scientific and technology jobs benefit greatly since women attain a greater understanding and fulfilment of consumer demands than males. According to the authors Krook and True (2012), including a discursive approach to gender equality is a starting point for improving our society's functioning. The writers Bolzendahl and Myers (2004) addressed this topic, specifically feminism and gender equality. Many authors draw on their research, as indicated by their paper, "Feminist attitudes and support for gender equality: Opinion change in women and men," with 1974–1998 being the period most referenced in the scientific database Web of Science.

Gender equality is an infrequently mentioned topic, but it is critical. Its consequences are also obvious in business, as the writers focus on gender from the perspective of accounting record manipulation in corporations. Based on this fact, we decided that the purpose of the article would be to find out if the firm CEO's gender affects how they manipulate. We attempted to validate this truth in Slovakia's sector A—agriculture, forestry, and fisheries. Using Beneish score computations, we first identified organizations that engaged in manipulation and then determined who is in charge of the company, whether it is a woman, a man, or mixed management. Following that, we concentrated on correspondence analysis, in which we contrasted the Beneish model's output with the company's management. We discovered intriguing findings by transforming three-dimensional space into two-dimensional space. In the Discussion section, the obtained results were compared to the scientific outputs of other authors of scientific papers. The general findings of the study were presented in the Conclusion section, along with limitations and future research directions.

1. Literature review

Gender equality has had an impact on innovative accounting and earnings management. Pavlovic et al. (2018) from Serbia discovered the intriguing results after doing research on

Serbian agricultural enterprises listed on the Belgrade Stock Exchange. They came to the conclusion that the number of women on corporate boards has only a minor, linear accounting relationship with the use of passive accounting. According to studies by Gull et al. (2018), gender diversity is attributable to the tendency for women to use manipulation, whether they are financial managers or general managers. In their 2019 study, Saona et al. looked at non-financial public companies in Finland, France, Denmark, Germany, Norway, Italy, the UK, Portugal, and Sweden. This study was carried out between 2006 and 2016. The study concluded that when gender diversity is balanced across the board, manipulative techniques are relaxed and European legal values are strengthened. which have been popular in recent decades.

The authors Saeed et al. (2022) discovered in their study that when women held high positions, the quality of domestic marketplaces improved. This shift has benefited international firms operating in emerging markets. On the other hand, the world's religion prevents women from working or participating in the development of a business. Thus, religion is one weapon that has a significant impact on gender equality. Utoft (2020), who examined gender equality from a historical perspective, also focused on this fact. Based on his research, he found that the program for implementing gender equality is used more often in organizations where women are in higher positions and can stand up for their right to promote gender equality at work. Based on this, we can say that women are trying to get into management positions, which can have a big effect on corporate fraud because women are more emotional and more likely to side with the law than with money. However, the reduction of gender inequality in managerial positions is a touchy domain, which attracts special attention in current approaches to the employer value proposition offered (Bite & Konczos-Szombathelyi, 2020; Samoliuk et al., 2022) and related efforts of corporate social responsibility increase (Kryshtanovych et al., 2022; Oliinyk, 2017). Despite the appropriate managerial policies development, women are still underrepresented in companies' management, even in the most developed countries (Cortellese, 2022). Wynn (2020), Badea et al. (2020), Pimpa (2019), Hamada (2018), Mitkova and Kottulova (2016), Szydlo (2015), Szydlo (2014), Kargbo et al. (2011), Grosser and Moon (2012) are among the other authors who cover gender equality and its impact on company management in their papers (2008).

Gender equality and manipulation are topics that are rarely discussed in science. As a result, we have decided to investigate this matter. To detect manipulation, we decided to employ the Beneish model. Based on M-scores, this approach is used to uncover creative accounting. Manipulation exists in many communities, as proven by Adamikova and Corejova (2021), Safta et al. (2020), Sabau et al. (2020), and Taherinia et al. (2018). This model operates on the same principles as the Altman model, which assesses company bankruptcies. As a result, it is relatively easy and has a high level of support in professional practice, as it may be used by rookie scientists. The model has a simple concept, with 8 parameters displayed, each with its own modification indicator, making this model a powerful tool for study. Individual parameter results can be compared to the manipulation indicator. This lets researchers, auditors, and financial analysts better focus on areas that are problematic based on the parameter result, making it easier to find a problem or occurrence of a suspicious result, which should have a negative effect on the overall valuation of the company.

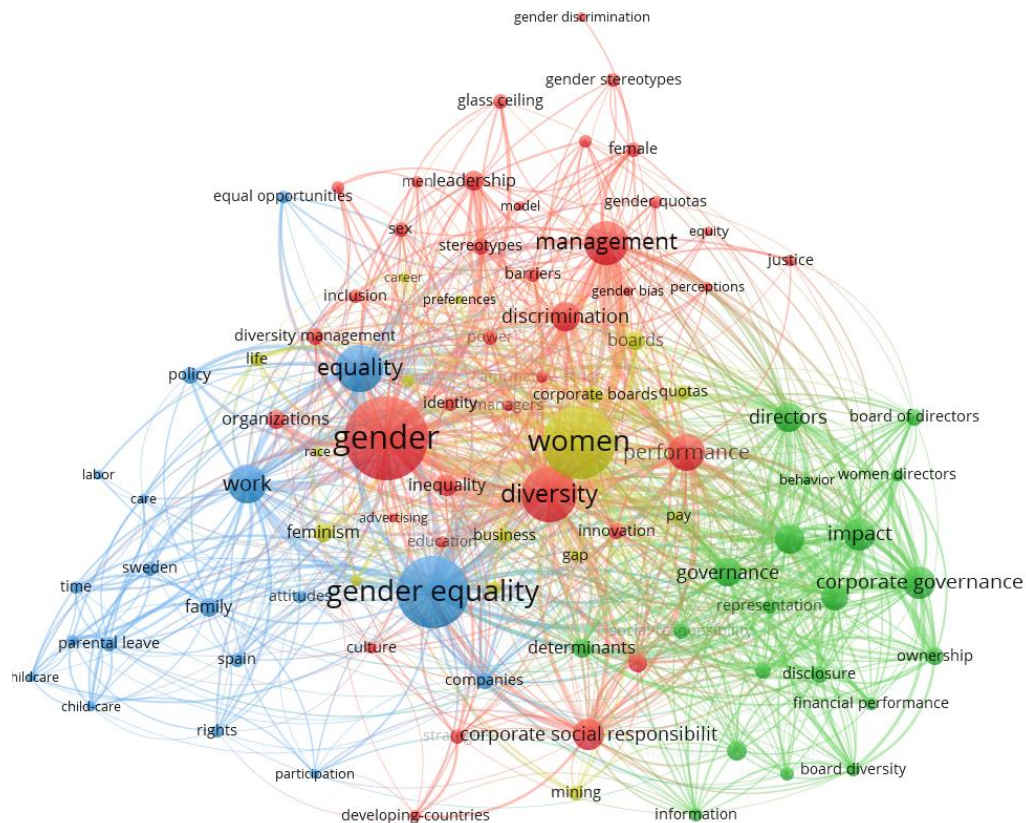


Figure 1. Bibliographic analysis of gender equality in companies

Source: *own research*

We opted to use the application VosViewer, which may offer a graphical depiction to help the reader understand the concept. Many authors use the application as a visual aid to help them understand the topic. Del Ponte et al. (2022), Lareyre et al. (2022), Viswanathan and Telukdarie (2022), Sinha et al. (2021), Xu et al. (2021), Hlawiczka et al. (2021), Mirmazloumi et al. (2021), Marin-Palacios et al (2021). According to the bibliographic study, gender equality is mostly about four groups of keywords: gender equality (blue colour cluster), gender (red colour cluster), women (yellow colour cluster), and corporate governance (green colour cluster).

2. Methodological approach

This part of the research paper is all about the methods used to make the study. The methodology of the study is divided into the following steps:

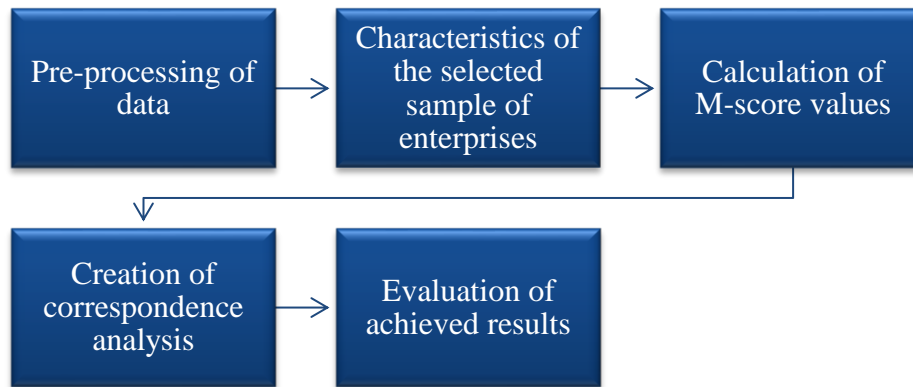


Figure 2. The methodological steps of the study
Source: *own processing*

We employed a model to identify accounting manipulation in the company, statistical analysis, and correspondence analysis to create our study. The Beneish M-score was generated using an 8-parameter Beneish model and Microsoft Excel.

Sector A—Agriculture, forestry, and fishing—was studied, and it represents 1,571 firms in the Slovak Republic. These companies were subjected to the threshold criteria that corporations were required to meet. The following were the criteria:

- Minimum asset value 3,000,000 €
- Minimum sales value 2,000,000 €
- Minimum profit value 100,000 €

Only 46 out of 1,571 companies matched the required criteria, which served as the foundation for this study.

The following table shows the number of companies classified as handling, non-handling, or potentially handling:

Table 1. Number of enterprises belonging to the relevant category

	Number of enterprises
Handling company	25
Potential handling company	15
Non-handling company	6

Source: *own compilation*

For research purposes, we examined enterprises in industry A—Agriculture, forestry, and fishing. We concentrated on 46 businesses. Based on the M-score results, we may conclude that 25 organizations, or nearly 54%, engaged in manipulation when their resulting M-score exceeded the manipulation limit. Furthermore, nearly 33% of organizations, or 15, are classified as potentially handling because their M-score fluctuated between the values of handling and non-handling. The remaining 13%, or six organizations, have slipped below the manipulation threshold and are classified as not manipulating their accounting records. For a better illustration, we created the graph below.

■ Handling company ■ Potential handling company ■ Non-handling company

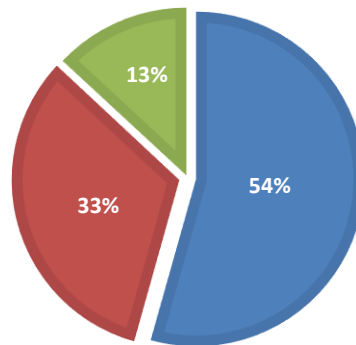


Figure 3. Classification of enterprises according to the resulting M-score
Source: *own compilation*

Following that, we discovered what gender the firm leads, or which gender is suitable for the post of company manager, using the Slovak Republic's Commercial Register. In determining these facts, we arrived at the following conclusion, which is shown in the table below:

Table 2. Number of individual categories of company CEOs

	Gender of the CEO		
	Woman	Man	Mixed line
Count	12	22	12

Source: *own research*

Based on the information we got from the Commercial Register of the Slovak Republic, most of the directors and managing directors of the companies we are looking into are men. Men run as many as 48 percent of all enterprises. The remaining 52% was split evenly between women and mixed management, with both alternatives accounting for 26%. We have produced another graphic depiction for a better overview.

■ Woman ■ Man ■ Mixed line

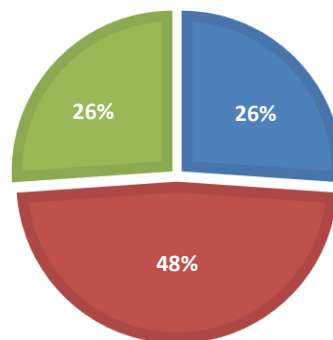


Figure 4. Gender representation in the position of CEO or executive of the company
Source: *own compilation*

To achieve our goal, we will also apply correspondence analysis, which will allow us to graphically change our outputs into a more legible and understandable format. D'Ambra et al. (2022), Jadwal et al. (2022), Turmaine et al. (2022), Hsu et al. (2022), and Champahom et al. (2022) employed this analysis to compare and research numerous facts that occurred in the world. We were interested in the results of our study, so we decided to use correspondence analysis to make a graph of them.

One of the most well-known is the chi-square test, which is used to assess quantitative or qualitative data, i.e., to determine the existence or non-existence of independence between two variables. The fact that two variables are independent implies that they have no link and that one does not effect on the other. As a result, this test was utilized and implemented using contingency tables. The following hypotheses' dependence was determined using the chi-square test:

H₀: There is no statistical link between gender and accounting record falsification.

H₁: Gender and accounting record manipulation have a statistical relationship.

Correspondence analysis is a technique for examining the relationships between variables in a contingency table. Correspondence analysis, like the method of principle components, solves a similar problem by using a smaller number of latent components to explain how the original continuous variables depend on each other. We use correspondence analysis to track the links between two categorical variables' individual categories. The analysis yields the so-called correspondence map, which represents the axes of the reduced coordinate system and graphically displays the individual categories of both variables. Correspondence analysis is similar to other ordination approaches in that it reduces dimensionality based on its own analysis, i.e., discovering the association matrix's eigenvectors. Even in the case of correspondence analysis, we strive to obtain ordination axes in decreasing order of importance, so that the key information contained in the table can be summed in a subspace with the fewest dimensions possible.

We needed the IBM SPSS Statistics tool, which is used for advanced statistical analysis, to conduct correspondence analysis. We needed qualitative variables to establish whether there was a relationship between them in order to conduct a correspondence analysis. We performed the Pearson Chi-Square test at a significance level of 5% to determine whether there is a relationship between the variables. We must develop hypotheses as we investigate dependency.

The correspondence analysis results were processed using Euclidean distance. Euclidean distance, calculated as (Eq. 1):

$$d_{ij} = \sum_{k=1}^K (x_{ik} - x_{jk})^2 \quad (1)$$

where x_{ik} is the value of the k -th variable of the i -th object and x_{jk} is the value of the k -th variable of the j -th object.

3. Conducting research and results

Based on IBM SPSS Statistics, we discovered that the Pearson's chi-square test value is 0.00, which is less than our chosen level of significance of 0.05, implying that we reject the null hypothesis and accept the alternative hypothesis H₁, and thus we can conclude that there is statistical dependence between gender and manipulation.

The results are also shown in the table below:

Table 3. Pearson's Chi-Square test

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.127 ^a	4	0.042
Likelihood Ratio	2.891	4	0.082
Linear-by-Linear Association	0.681	1	0.042
N of Valid Cases	46		

a. 3 cells (13.52%) have expected count less than 5. The minimum expected count is 7.55.

Source: *own research*

We utilized the Contingency coefficient to determine the strength of the dependency between the individual variables, which yielded 0.821, indicating that the dependence between the given variables is quite strong. The outcome is also shown in the table below.

Table 4. Contingency Coefficient between gender and manipulation variables

Symmetric Measures			
		Value	Approximate Significance
Nominal by Nominal	Cramer's V	0.792	0.009
	Contingency Coefficient	0.821	0.000
N of Valid Cases		46	

Source: *own research*

Because all the prerequisites are met, we may proceed with the correspondence analysis. The Euclidean Distance Measure will be used, which will distribute the individual ratios uniformly among all objects for which the correspondence analysis will be conducted. The mass value for Euclidean distance measurement is the same for all items, as shown in Table 5. The final column, "Contribution of Dimension to Inertia of Point, Total," indicates that all of the values we were able to record have been converted from three-dimensional to two-dimensional space. The number is 1, indicating that 100% of all findings have been changed and that no measured value has been lost.

Table 5. Transformation of the gender variable into two-dimensional space

Gender_of_the_company _director	Mass	Score in Dimension			Inertia	Contribution				
		1	2			Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		Total
						1	2	1	2	
Man	,333	-,597	-,022	,021		,665	,001	,999	,001	1,000
Woman	,333	,277	,453	,013		,143	,524	,339	,661	1,000
Mixed line	,333	,321	-,431	,014		,192	,475	,432	,568	1,000
Active Total	1,000			,049		1,000	1,000			

a. Symmetrical normalization

Source: *own research*

The same procedure, namely the Euclidean Distance Measure, is applied to the variable gender, which has three variable variants. Table 6 depicts the transformation of three-dimensional space into two-dimensional space, and as we can see from the table, all variables were converted into two-dimensional space at 100%, implying that all values were transformed and no variables were lost (column Total).

Table 6. Transformation of manipulation variable into two-dimensional space

Final_classification_according_to_M_score	Mass	Score in Dimension		Inertia	Contribution				
		1	2		Of Point to Inertia of Dimension		Of Dimension to Inertia of Point		Total
					1	2	1	2	
Non-manipulative company	,333	,268	,456	,013	,134	,533	,321	,679	1,000
Possible manipulator	,333	,329	-,426	,014	,202	,465	,449	,551	1,000
Handling company	,333	-,597	-,030	,021	,664	,002	,998	,002	1,000
Active Total	1,000			,049	1,000	1,000			

a. Symmetrical normalization

Source: *own research*

Based on the 100% transformation, we can deduce that the correspondence analysis results will be accurately evaluated, i.e., the results will not be skewed, because we do not lack any data that would be eliminated or omitted during the transformation.

Figure 5 depicts the Dimension Score for each of the gender factors that have been converted into two-dimensional space. Each variable has two values, which are the coordinate values on the X and Y axes.

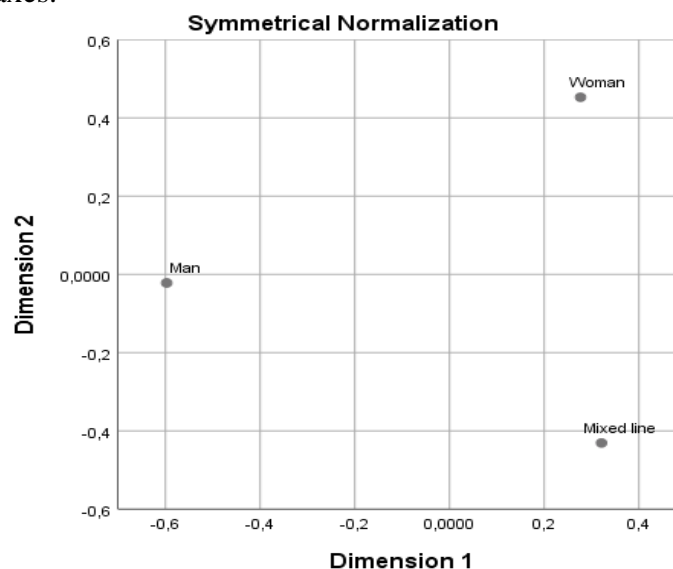


Figure 5. Transformation of 3 dimensions into 2-dimensional space from the category of gender in leadership

Source: *own research*

Figure 6 depicts the transformation of the manipulation category's resulting qualitative variables, i.e., whether the company manipulated, did not manipulate, or is in the group of possible manipulators. Again, we can establish which coordinates the individual variables are located on based on the resulting score in dimension because we know their X- and Y-axis locations.

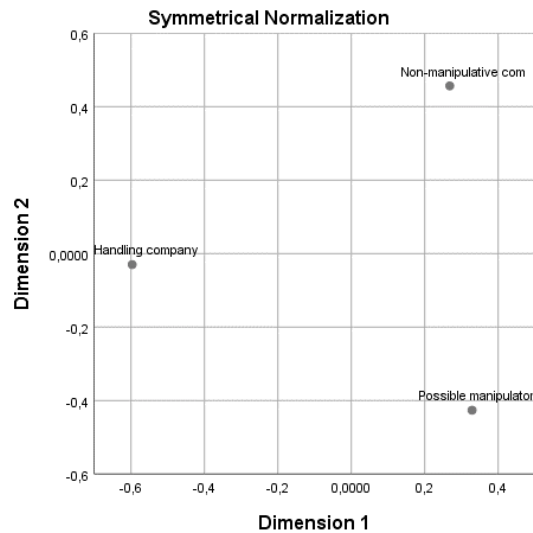


Figure 6. Transformation of 3 dimensions into 2-dimensional space from the category of handling companies
Source: *own research*

In this study, we wanted to see if gender influences a company's eventual involvement in financial statement falsification. To have a deeper understanding of the subject, we focused on scientists who work on it. These authors have helped us learn more about creative accounting, manipulation, and the equality of men and women. They have also put more emphasis on correspondence analysis.

We conclude that gender influences how creative accounting is employed in a company based on a contingency table, hypothesis, and Pearson's Chi-squared test. Since the statistical requirement for the correspondence analysis was met, we could do the correspondence analysis, in which we turned three-dimensional spaces (three variables for gender and three variables for the classification of the M-score) into two-dimensional spaces. We constructed two maps that overlapped in IBM SPSS Statistics, and the outcome is displayed in Figure 7. In this diagram, we can observe which variables are most closely related to one another.

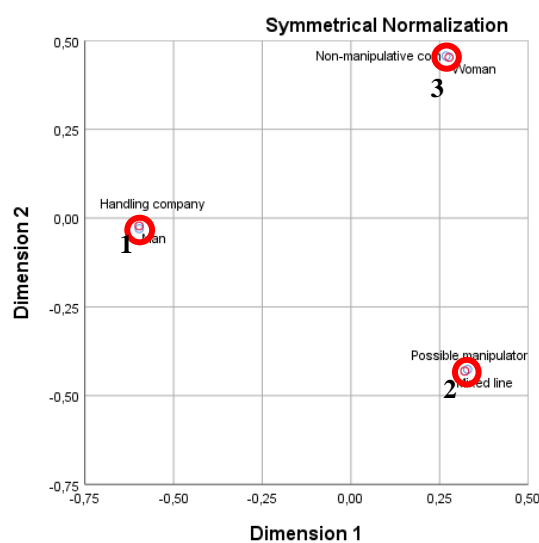


Figure 7. Graphic representation of the influence of gender on manipulation in the company
Source: *own research*

The results show that organizations with a male role, like a CEO, use a lot of manipulation. This is shown by cluster 1, which shows that these two factors almost always overlap. In the instance of Cluster 2, we contend that mixed CEO is extremely likely to find itself in a situation in which its manipulative use is ineffective and cannot always be accurately identified. In this scenario, we would recommend a more thorough investigation or more detailed accounting control. Cluster 3 depicts the polar opposite, as in the case of men. According to the correspondence analysis, we have concluded that if there is a woman in the position of director or manager of the company, the use of creative accounting and thus manipulation will not occur in the company, as there are overlapping variables that represent gender and the successful classification of the company.

4. Discussion

The research focused on whether gender effects a company's eventual involvement in financial statement fraud. The study was carried out on Slovak Republic territory, specifically in sector A, which comprises agriculture, forestry, and fisheries. Companies that wanted to take part in the study had to meet certain criteria. These requirements were met by 46 businesses, which were then evaluated using the SPSS program. However, the research findings transcend analysis and the acceptance or rejection of hypotheses. This study also focused on the scientists who work on the problem in order to correctly carry out the analysis and, in particular, to ensure the uniformity of the stages. These authors gave a more complete look at creative accounting and manipulation, but they mostly added important information that could be used in this study. This information concentrated on the issue of gender equality as well as aiding in a better focus on correspondence analysis, which provides graphical results that are easy to read and can aid readers—whether scientists or laypeople—in understanding the findings and general direction of research done on a variety of industries or businesses.

The provided study was based on the research of the authors, Anh and Khuong (2022), who investigated the relationship between gender diversity and state ownership of revenue management. Then, Goel and Kappor (2021) use sectoral classification to look at the relationship between earnings management and the characteristics of independence and gender diversity in the Indian business sector. The authors Zalata et al. (2022) say that having a woman on the board of a company lowers the quality of earnings because it makes it easier to keep an eye on things. In their study on the relationship between gender diversity in positions of executives, supervisory boards, and management, authors Li et al. (2021) studied the impact of gender diversity on the company's real profits during bullish and bearish periods. Nekhili et al. (2022) investigated the unethical actions of revenue management partners in a French context. Ghaleb et al. (2021) talked about accountability and the link between managing actual earnings, reporting on social enterprises, and having a mix of men and women on boards. Ongsakul et al. (2020) focused on shareholders and their earnings management. The study largely looked at whether there is a diversity of female directors when discussing how representative shareholders are (representing the presentation of returns).

Harris et al. (2019) suggest in their study that women in lower-paying jobs have less influence on earnings management. However, as gender equality progresses and more women and men assume positions of leadership, there will be a growing disparity in how each gender uses creativity. Clients participate in real earnings management actions as a result of the participation of women in corporate governance, according to Kung et al. (2019). No matter how we define gender equality, Damak (2018) says that there is no evidence that the number of women on a board affects how they handle revenue management. Ammer and Ahmad-Zaluki (2017) agree that having women on a board makes it less likely that people will try to

manipulate it. However, they stress that having women in leadership positions can lead to more mistakes.

Both the authors' research and the descriptions of what they did in the articles show that they have different ideas about gender equality. This could be attributable to the time lag between the various studies as well as the gradual increase in the number of women in leadership roles, which, according to the majority of the authors, discourages the use of creative account management and profit management.

Conclusion

The purpose of this exploration was to investigate the research question: Does the gender of the firm's director or manager effect whether the company avoids or pursues manipulation? We had to come up with specific goals that we needed to reach in order to analyse the subject of the study. First, we've determined which industry will be the focus of our investigation. We chose sector A—Agriculture, forestry, and fishing—since it is close to us and we have already recognized the use of creative accounting. This industry is also involved in a lot of problems that come up when non-repayable loans, or Euro funds, are used. To determine the gender involved in the manipulation, we needed to locate the directors or managers of the firms under investigation in the Commercial Register. Following that, the Beneish model was utilized, which has a success rate of up to 76% in identifying corporations that alter financial accounts, according to Mantone's research (2013). The resulting M-score classified organizations into three categories: those that alter their financial statements, those that do not, and those that are at the intersection of probable manipulation. For each category, we retrieved three variables. We studied whether there was a relationship between the given qualitative characteristics, and this was shown to be true. This result was required in order to do a correspondence analysis. Following that, this analysis demonstrated that gender has an impact on whether the company uses manipulative tools to optimize accounting, as evidenced by the resulting map of correspondence analysis, which divided the variables into three clusters, each of which contained the two most closely related variables.

The research also encountered the limits we anticipated. The first constraint is the number of businesses examined. Future research may focus on explore a larger number of companies in a future study. It can be additionally boost this number by focusing on enterprises that operate not only in the Slovak Republic but also in the Visegrad Four countries, avoiding additional constraints such as focusing on only one nation. These findings would contribute significantly more to answering the study topic we addressed in this article, and thus, whether the gender of the firm's leadership has an impact on whether the corporation decides to manipulate it or not.

Acknowledgement

The paper is an output of the project NFP313011BWN6: "The implementation framework and business model of the Internet of Things, Industry 4.0, and smart transport."

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