Parallels and Differences in Earnings Management of the Visegrad Four and the Baltics

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Abstract

Earnings management is a legal and widely preferred phenomenon of business finance that financial managers use to maintain and improve the enterprise's competitiveness. Managers purposely manipulate business earnings to achieve the required status of the enterprise. The consequence of these activities is to provide a positive perspective for the owners, encourage the profitability for the creditor and the investors as well as demonstrate economic strengths to competitors. This article aims to identify parallels and differences in earnings management of enterprises in the Visegrad Four and the Baltics in terms of competitiveness for the nine-year period 2010-2018. The research uses a final sample of 4,543 observations from the EBITs of Slovak, Czech, Hungarian and Polish enterprises as well as 1,633 observations from the EBITs of Latvian, Lithuanian and Estonian enterprises. Time-series methods with all necessary assumptions have been run for the analyzed financial dataset. The results of the econometric modeling of unit roots show significant parallels in these groups of countries. The enterprises from the Visegrad group and the Baltics group use the apparatus of earnings management to be competitive. The obtained results confirm the systematic but legal manipulation from the side of management. A quantitative analysis of homogeneity tests using 1,000,000 Monte Carlo simulations indicates significant time differences of manipulation in these emerging countries. The year 2014 signaled a radical "accelerando" in earnings management for the V4, and the year 2016 is highlighted for the Baltics.

1. INTRODUCTION

Enterprises compete with each other only by the optimization of their own capital structures on the global market (Vagner, 2016). On the other hand, managers of enterprises doing business for more than a decade have a strong motivation to use aggressive behavior against their competitors

(Kljucnikov et al., 2016). Hudakova et al. (2018) support these conclusions by working with world surveys and studies which confirm that these strategies fundamentally contribute to improving the competitiveness of the enterprises. Management is facing challenges and requirements to the business model transformation (Malkawi & Khayrullina, 2021). Hoang & Joseph (2019) argue that earnings management represents a transformation towards a new accounting regime for many units. Financial managers generally prefer aggressiveness and legal earnings manipulation as indicators of sustainable manufacturing in Industry 4.0 (Susanto et al., 2019; Hayhoe et al., 2019). The use of risk management strategies to evaluate the routine activities of management assists enterprises in avoiding the pitfalls and management habits narrowly linked to a given rank of appropriate risk (Dvorsky et al., 2019). Kramarova & Valaskova (2020) highlight a conjunctive denominator: the use of information discrepancy within business finance to gain benefits. Meyers et al. (2019) emphasize the importance of earnings management strategies for enhancing decision-making using research results from big data. Thus, earnings management has become a very significant and especially trending issue for researchers nowadays. This practice can be considered routine in developed markets. However, in emerging countries it is still not very typical, although the economic factors are simpler to calculate from a methodological point of view (Belas et al., 2018). Our research uses a conventional earnings model to quantify the manipulation. We prefer original analysis focusing on the quantitative methods of time series, which is a new methodological approach using stationarity and homogeneity to indicate the manipulation of earnings. The main aim of our study is to identify earnings management strategies as well as parallels and differences in earnings management of enterprises in the Visegrad Four and the Baltics in terms of competitiveness for the nine-year period (2010-2018).

The article is divided as follows. The purpose of the research and the importance of earnings management in the context of competitiveness are depicted in the introduction. Subsequently, a literature review is provided focusing on analyses of various research studies that have represented the issue discussed. The third chapter shows our research objectives and hypotheses. Sophisticated quantitative methods using time series analysis have been chosen to fulfill the set goals. The apparatus of the Dixon test is used, followed by the Ljung-Box and McLeod-Li tests; Stationary Augmented Dickey-Fuller tests have also been conducted, supported by the Phillips–Perron test (No intercept, Intercept, Intercept and Trend considered), Homogeneity tests (von Neumann test and Standard Normal Homogeneity test), with their adequacy allowed by the Anderson–Darling test. Chapter Results describes the output of the examinations and the determinations regarding the hypotheses. This section identifies the parallels and differences in earnings management as a tool of competitiveness of enterprises within the V4 (Visegrad Four) and Baltic countries. In the Discussion part of the paper, current researches and investigations from developed countries are compared. Finally, brief conclusions are described, also presenting the limitations of our research and tracking possible tracks of future research.

2. THEORETICAL BACKGROUND

Earnings management has become a primary theme in accounting studies and a significant tool of researchers to determine instruments and mechanisms for making financial decisions regarding business finance and competitiveness (Sosnowski, 2018; Hoang, & Phung, 2019).

Recent studies on management earnings have focused on the several areas. Siekelova (2021) clarifies the historical development of the EM (earnings management) model and explains the development of profit models. Sosnowski & Wawryszuk-Misztal (2019a) show that some characteristics of management and supervisory board decisions improve the usefulness and credibility of earnings forecasts. Specifically, the more diversified the board in terms of age and the higher the management ownership results, the more accurate are the forecasts. Sosnowski & Wawryszuk-Misztal (2019b) add that certain characteristics of the management and supervisory board decisions can enhance the usefulness of forward-looking financial information from an IPO (initial public offering) prospectus, as some of characteristics of boards are important for the evaluation of the earnings forecast credibility at the time of IPO. The empirical results of Huynh (2020) show that the corporate governance mechanism is a significant moderation in the positive link between corporate social responsibility and earnings management. Gull et al. (2018) focus on the connection between female directors and earnings management, showing results that female directors are very effective in the monitoring of earnings activities. Harakeh et al. (2019) add that female directors have a mitigating mission in connecting earnings management and CEO (chief executive officer) incentive compensation. Ding et al. (2018) identify the effects of government affiliation on the performance and real earnings management of enterprises; this case study provides the conclusion that politically affiliated enterprises tend to have excellent accounting results and politically affiliated enterprises are more likely than non-affiliated firms to engage in earnings manipulation. In contrast, Novak Sedlackova et al. (2019) provide a longitudinal evaluation of the performance of airports in the context of public international commercial operation in Slovakia; their findings show that the majority of the analyzed group of enterprises have shown negative earnings. Dvorsky et al. (2020) add that most Slovak and Czech enterprises consider the usage of strategic management as a fundamental precept of corporate governance; strategic management leads the enterprises to opportunities to enhance the competitiveness of a business in terms of sustainability. He et al. (2021) find that the pay disparities among the top management team (TMT) have a negative impact on real earnings management, and this relationship further enhances the value of enterprises which support the internal governance view. Lel (2019) deals with the role of international donors in restraining the earnings manipulation of enterprises; this study finds that managers manipulate the earnings less when independent foreign institutional investors are among their shareholders. Kaldonski & Jewartowski (2020) show that benchmark-beating enterprises entering into real earnings manipulation are less willing to engage in aggressive tax planning. Kaldonski et al. (2020) add that institutional investors holding stable equity stakes play an important monitoring role in reducing real earnings management by managers, who are pressured by capital market forces to "meet or beat" earnings targets. The research of Kundelis & Legenzova (2019) reveals that Estonian, Latvian and Lithuanian tax differences among the multinational corporations of parent and subsidiary countries may influence the subsidiary's profitable activity. A change of one percentage point among Estonia, Latvia, Lithuania and the foreign countries causes a 2.3% increase in a profit-shifting manner. Cugova & Cug (2020) comprehensively map the motivation for using earnings management techniques and models in the conditions of the current globalized market. Dyreng et al. (2020) provide a study of accrual and real earnings management in which the interests of shareholders and managers conflict. Their findings show that shareholders prefer

avoiding violations by purposeful manipulation than violating a covenant without earnings management, with the former possibility ensuring shareholders a higher profit than the second. Khuong et al. (2020) have determined a positive link between real activities management and cash holdings detection, i.e. relevant diminutions in discretionary production costs and selling expenses enable managers to hide the real level of their financial situation of the enterprise. On the other hand, the negative correlation between accrual-based earnings manipulation and cash holdings shows that accruals support the moderation of the information asymmetry between the enterprise and other stakeholders. Valaskova & Fedorko (2021) monitor the manipulation with earnings in the transporting and storage sector (enterprises tend to manage earnings upwards) using the Beneish M-score.

3. RESEARCH OBJECTIVE, METHODOLOGY AND DATA

The paper aims to detect the use of earnings management in the competition and identify parallels and differences in earnings management of enterprises in the Visegrad Four and the Baltics for the nine-year period 2010-2018. The article focuses on cognate emerging markets. These countries are selected within the same investigation because earnings management has not been investigated and compared in these politically and economically close countries. Based on the historical development, countries of the V4 may be added to the Soviet-controlled Eastern bloc countries and countries of the Baltics to the formerly part of the Soviet Union. Joining the European Union in 2004 marks the next political parallel. The economic consistency of selected countries highlights the ranks of the Global Competitiveness Index (Table 1).

Tab. 1 – The Global Competitiveness Index. Source: Schwab (2019)

Country	Rank
Estonia	31
Czech Republic	32
Poland	37
Lithuania	39
Latvia	41
Slovakia	42
Hungary	47

The analysis allows formulating two hypotheses of parallels and differences in approaches to the competitiveness of enterprises from the Visegrad Four and the Baltics:

H0A: There is a significant occurrence of earnings management practices in the countries of Visegrad Four and the Baltics.

H1A: There is no significant occurrence of earnings management practices in the countries of Visegrad Four and the Baltics.

H0B: There is no significant time difference in earnings management practices in the countries of Visegrad Four and the Baltics.

H1B: There is a significant time difference in earnings management practices in the countries of Visegrad Four and the Baltics.

The following statistical methods were implemented to gain the target of the paper and to test set hypotheses. They are described with their advantages and disadvantages. The significance level alpha 0.05 was used for all statistical tests.

1. The Dixon test to detect and remove outlying values.

Different approaches and ways are recommended to identify the occurrence of outliers and subsequently to process initial samples. The resulting values are caused by the method of measurement and the meter itself (Kot & Rajiani, 2020). Ghosh & Vogt (2012) argue that the Dixon test delivers satisfying results in detecting inconsistent data. There may occur the masking phenomenon in our samples of financial data. It means that a couple of observations of EBIT are close together, but this cluster of observations is still inconsistent compared to the rest one (Berti-Équille et al., 2015). Thus, the Dixon statistics r22 was run because of this fact. The selected test is created to be applied in modeling where additional outlying cases are anticipated to minimize the impact of these values, which arise as a result of the masking (Garcia, 2012). The Dixon test is applied and set p-values are recognized using 1,000,000 replicates of Monte Carlo simulation. This test is not recommended for very large samples. After detecting outliers, it is possible to remove them or remove only extreme values, minorize or ignore them (Nagy, 2016; Ghosh & Vogt, 2012). It is preferred to exclude the outlying units because the values of these inconsistent data may affect changes in the conclusions of statistical tests and procedures.

2. The Ljung-Box test and McLeod-Li test to reject serial correlation.

In financial time series investigations, it is required to check the serial correlations. The rejection of serial correlation confirms the fact that the used EBIT of analyzed enterprises from the Visegrad Four and the Baltics are independently distributed. Wong & Ling (2005) highlight that the conservative nature of the origin Box–Pierce statistic for testing serial correlation was improved. That is why the improved portmanteau statistics represented by the Ljung-Box test and McLeod-Li test are used. However, the size and the power performance of these two tests are not robust to heavily tailed data (Chen, 2002).

3. The Augmented Dickey–Fuller test and Phillips-Perron tests to identify the unit root.

A time series is stationary if its statistical properties do not vary in the process of time. A stationary time series marks that the mean and variance are constant over time. There are two possible approaches to test stationarity: unit root or stationarity test (Durana et al. 2020). The best-known test for stationarity in econometrics is probably the Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test. It rejects the true hypothesis of stationarity too often, again leading to the preference for the hypothesis of non-stationarity (Hobijn et al., 1998). For this reason, unit root tests are preferred to test the significant occurrence of the use of earnings management practices in the countries of the Visegrad Four and the Baltics. An augmented version of origin Dickey-Fuller tests (equation 1 - 3) are run; the null hypothesis is that the series possesses a unit root and thus it is not stationary ($\gamma=0$).

$$\Delta y_t = \gamma y_{t-1} + \varepsilon_t \tag{1}$$

$$\Delta y_t = a_0 + \gamma y_{t\text{-}1} + \varepsilon_t \tag{2}$$

$$\Delta y_t = a_0 + \gamma y_{t\text{-}1} + a_2\, t + \varepsilon_t \tag{3}$$

The model applied for this augmented test:

$$\Delta y_t = a_0 + \gamma y_{t-1} + a_2 t + \sum_{i=2}^{p} \beta_i \Delta y_{t-i+1} + \varepsilon_t \tag{4}$$

where

Δy_t	first-order linear differential of equation,
γ	unit root,
a_0	intercept,
$a_2 t$	linear time trend,
p	lag order of the autoregressive process,
ε_t	white noise.

The results are supported by the Phillips-Perron test with the same null hypothesis and the equation is estimated based on equations 1 to 3 depending on including an intercept, intercept and a trend, or neither a constant nor a trend. Test statistics:

$$\tilde{t}_\gamma = t_\gamma \left(\frac{\gamma_0}{\hat{\sigma}_\varepsilon^2}\right)^{\frac{1}{2}} - \frac{T\,(\hat{\sigma}_\varepsilon^2 - \gamma_0)\big(se(\hat{\gamma})\big)}{2\hat{\sigma}_\varepsilon s} \tag{5}$$

where $\hat{\gamma}$ is the estimator of γ, t_γ is the t- fraction of $(t_\gamma = (\hat{\gamma}/se(\hat{\gamma})))$, $se(\hat{\gamma})$ is the standard error of the regression, γ_0 is a consistent estimator of the variance error in the Dickey-Fuller regression, and it is obtained as $(T\text{-}k)\, s^2/T$ where k is the number of regressors and T is the number of observations, $\hat{\sigma}_\varepsilon$ is an estimator of the residue spectrum. The weakness is highlighted by Hacker & Hatemi-J (2014): it is difficult to choose from the three equations for unit root testing. All three possibilities of the Phillips-Perron test are computed because of the mentioned fact.

4. The Anderson–Darling test to prove the normality.

The normality is a crucial assumption for using the chosen Standard Normal Homogeneity test (Kang & Yusof, 2012). More than 40 tests exist to prove the normality (Dufour, 1998). The outlying values were removed in the preprocessing part of the research, but it is necessary to focus on the tails of the distribution by financial data. It can be realized by empirical distribution function tests (EDF), and Arshad et al. (2003) argue that the most powerful one is the Anderson–Darling test based on their empirical testing of the goodness of fit. But the performance of the Anderson–Darling test is increasing with the sample sizes (Razali et al., 2011). The Anderson–Darling test was run for all samples to confirm normality.

5.The von Neumann test and Standard Normal Homogeneity test to identify the heterogeneity.

The heterogeneity in the analyzed time series of financial data means that there is a significant difference in time development. The time period is divided by the year(s) of the break into two or more homogenous periods with an individual central line. Time series behavior is not

homogenous because of the significant impact that caused key changes in the mean. The von Neumann test was run to identify the unequal year-to-year intensity of the use of the earnings management practices in countries of the Visegrad Four and the Baltics. The test sets the information about the existence of the heterogeneity, but it does not show the date (Agha et al., 2017). The Standard Normal Homogeneity test is computed to indicate a significant time difference of the use of the earnings management practices in the countries of the Visegrad Four and the Baltics. The null hypothesis of homogeneity of time series $\Delta = 0$ is tested against the alternative hypothesis of homogeneity of time series $\Delta \neq 0$. The p-value is estimated using a Monte Carlo simulation (Kanovsky, 2018). One million replicates were used in this case. Kang & Yusof (2012) notice that the Standard Normal Homogeneity is sensitive in detecting the breaks near the beginning and the end of the series.

The analyzed set of financial data are observations of EBIT (earnings before interest and taxes), and they are outputs of the Amadeus database provided by Moody's s analytics company Bureau van Dijk. The represented period covers the years from 2010 to 2018. The enterprises are chosen from two groups of countries: Visegrad Four (Slovakia, the Czech Republic, Hungary and Poland) and Baltics (Latvia, Lithuania and Estonia). The variable earnings before interest and taxes are chosen to miss out on unequal tax and interest approaches. The selected units have to meet the criteria from Table 2. These levels of purposive sampling are set because of the robustness and reliability of the research results and to analyze the enterprises with the same attributes (Singh & Masuku, 2014). The proper way to achieve representativeness is to form the populations by a relevant variable, which may lead to lesser weights for outliers but must be based on reliable information (Ghosh & Vogt, 2012).

Tab. 2 – Criteria for purposive sampling. Source: own research

Variable	Minimal value
Total assets	3,000,000 €
Total sales	2,000,000 €
Net income	100,000 €

The raw dataset of EBIT of Slovak, Czech, Polish, Hungarian, Latvian, Lithuanian and Estonian enterprises was checked to the occurrence of the outliers during the analyzed nine-year period. The Dixon test rejects the null hypothesis of the occurrence of no outliers in financial data in every sample every year (Table 3). Using 1,000,000 replicates of Monte Carlo simulation and significance level alpha, 69 outlying observations were identified in Slovak sample, 12 in Czech sample, 20 in Hungarian sample, 29 in Polish sample, 25 in Latvian sample, 22 in Lithuanian sample, and finally 40 outlying observations in Estonian sample (Table 4).

Tab. 3 – Dixon Test. Source: own research

Year	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
2010	< 0.0001	< 0.0001	< 0.0001	0.030	< 0.0001	< 0.0001	< 0.0001
2011	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0003	< 0.0001
2012	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.022	0.074

2013	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.003	< 0.0001
2014	< 0.0001	< 0.0001	0.001	< 0.0001	< 0.0001	< 0.0001	0.039
2015	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.046	< 0.0001
2016	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.037	< 0.0001
2017	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.016	< 0.0001
2018	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Tab. 4 – Creation of the samples. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
Initial	1,158	734	786	1,995	508	523	689
Outliers	69	12	20	29	25	22	40
Final	1,089	722	766	1,966	483	501	649

4. RESULTS AND DISCUSSION

Based on the observations of 1,089 Slovak enterprises, 722 Czech enterprises, 766 Hungarian enterprises, 1,966 Polish enterprises, 483 Latvian enterprises, 501 Lithuanian enterprises, and 649 Estonian enterprises, the annual average of EBIT is individually computed for the analyzed period (Figure 1).
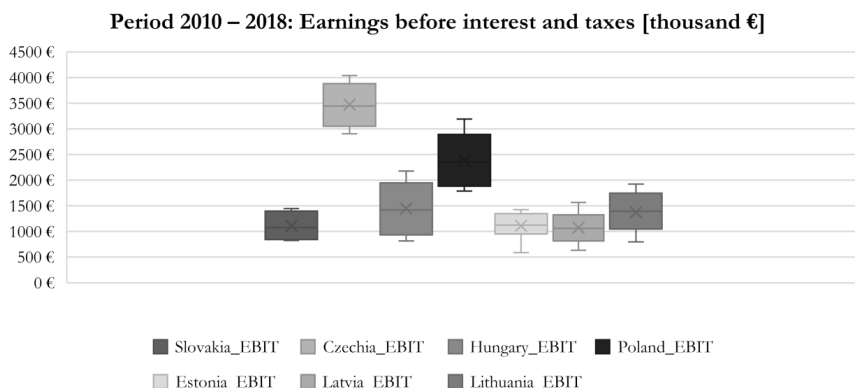

Fig. 1 – Earnings before interest and taxes: period 2010 – 2018. Source: own research

It is necessary to test the independence of analyzed financial time series not to reject the null hypothesis of no serial correlations. It is required to test this assumption before running stationarity tests used to test the first hypothesis of the article. The Ljung & Box test and McLeod-Li test were computed. P-values (Table 5) are greater than the significance level alpha 0.05, which means no occurrence of serial correlation in the data of enterprises from Visegrad Four and the Baltics.

Tab. 5 – Ljung-Box and McLeod-Li Test. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
Ljung-Box test							
p-value	0.082	0.285	0.351	0.347	0.458	0.091	0.112
McLeod-Li test							
p-value	0.106	0.257	0.540	0.551	0.058	0.088	0.489

The first hypothesis of the paper was firstly tested by the stationary augmented Dickey-Fuller test. Then these results were supported by the findings of the Phillips–Perron test. All three ways were run: the possibility with no intercept, with an intercept, and with an intercept and the linear trend.

As the p-value is greater than the significance level alpha, one cannot reject the null hypothesis. This situation means that the development of EBIT in the analyzed countries is not stationary (statistical properties vary in the analyzed period). The managers used earnings management practices to become competitive, as shown in a significant unit root. If the p-value is lower than the significance level alpha, the activities of managers do not show the marks of purposive manipulation. Based on the p-values of the stationary augmented Dickey-Fuller test and the Phillips-Perron test, the hypothesis of the existence of unit root cannot be rejected for all seven countries (Table 6 and Table 7). Table 7 contains all three possible alternatives: without intercept (No INT), with an intercept (INT), and with an intercept and linear time trend (INT + T). A remarkable parallel was confirmed among the enterprises from the Visegrad Four and the Baltics showing that there is significant legal manipulation of earnings to increase competitiveness.

Tab. 6 – Augmented Dickey–Fuller Test. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
Stationary	0.494	0.350	0.258	0.172	0.740	0.288	0.094

Tab. 7 – Phillips–Perron Test. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
No INT	0.494	0.350	0.258	0.172	0.740	0.288	0.094
INT	0.506	0.650	0.742	0.828	0.260	0.712	0.906
INT + T trend	0.985	0.999	0.998	0.998	0.999	0.999	0.985

It is necessary to test the normality of analyzed financial time series in order to avoid rejecting the null hypothesis of the following of the normal distribution. It is required to test this assumption before the running the homogeneity tests used to evaluate the second hypothesis of the article. The Anderson–Darling test was computed. P-values (Table 8) are greater than the significance level alpha, which means that the data of enterprises from the Visegrad Four and the Baltics follow the normal distribution.

Tab. 8 – Anderson–Darling Test. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
p-value	0.092	0.165	0.649	0.316	0.976	0.796	0.796

The second hypothesis of the paper was firstly tested by the von Neumann test, following which the results were enriched by the findings of the Standard Normal Homogeneity test.

As the p-value of the von Neumann test is lower than the significance level alpha 0.05, the null hypothesis can be rejected, and the alternative hypothesis of the heterogeneity of time series is thus accepted. This situation means that the development of EBIT in analyzed countries is not homogenous. Thus a significant date was found in which managers were found to use earnings management practices significantly more intensively. If the p-value is lower than the significance level alpha, the activities of managers are the same, with no change in the frequency of manipulation. If a different intensity of the manipulation was shown, the time series of development of EBIT was divided into two periods. The Standard Normal Homogeneity test was supported by the von Neumann test and the significant date of changing the manipulation intensity was set. Based on the p-values of the von Neumann test and the Standard Normal Homogeneity test using 1,000,000 Monte Carlo simulations, the hypothesis of homogeneity for all seven countries can be rejected (Table 9 and Table 10). In addition, the Standard Normal Homogeneity test detected 2014 as the significant year for the Visegrad Group and the year 2016 for the countries of the Baltics. A great difference was confirmed among enterprises from the Visegrad Four and the Baltics that there is a significant time difference in the use of the earnings management practices as a tool for being competitive.

Tab. 9 – von Neumann Test. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
p-value	0.008	0.001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Tab. 10 – Standard Normal Homogeneity Test. Source: own research

Country	Slovakia	Czechia	Hungary	Poland	Latvia	Lithuania	Estonia
p-value	0.008	0.008	0.008	0.008	0.008	0.008	0.008
Year	2014	2014	2014	2014	2016	2016	2016

Our results are discussed in our studies, which cover the significant incentive of earnings management from the analyzed countries of the Visegrad Four and the Baltics. Kramarova & Valaskova (2015) argue that the competitiveness and connected improving interdependence of the domestic market can affect the behavior of any economic unit, especially in terms of financial performance. This study analyzes transfer pricing and the effort to minimize tax manipulation in Slovak conditions under the legislative point of view. Kramarova et al. (2019) then deepen their investigation of transfer pricing as a possible means of managing earnings. They set the legislation definitions of the limits of legality/illegality of the pricing of transactions between related parties, i.e. the de facto degree of the legality of managerial decisions within earnings management. Khan et al. (2020) identify the opinions of Slovak and Czech businesses

regarding this risk, with the researchers' results showing discrepancies of opinion among these analyzed countries. The research of Kliestik et al. (2020b) detects the ways of identification and quantification of a slope and level as well as reasons for the earnings manipulation of enterprises in emerging countries during the 3-year period. This study creates a usable apparatus for the identification and quantification of manipulation. The Kothari model is used to reveal manipulation with earnings, with the mean value showing that 58% of analyzed enterprises tend to manage earnings to increase them. Given by the absolute values of discretionary accruals, downward manipulation showed to be significantly higher than upward manipulation. Kliestik et al. (2020a) extend their previous research to assess if earnings management is a common practice of enterprises within the V4 countries using selected earnings management detection models. The extensive calculations were not run based on the Kothari model, but the modified Jones model to detect earnings manipulation in these countries. This study highlights the increase in the manipulation of earnings in 2016. Their research also revealed that there are significant differences among the countries. Polish enterprises are the biggest manipulators of earnings, whereas the Slovak ones manipulate the least, at a level very close to that of Czech Republic and Hungary. The research of Piosik & Genge (2020) is based on the data from companies listed on the Warsaw Stock Exchange in Poland, with regression models used. The researchers deliver empirical proof that the connection between the slope of total upward real earnings management and shareholder concentration is U-shaped. Ayu et al. (2020) investigate the effect of environmental cost disclosure and social cost disclosure on financial performance mediated by earnings management. The set of data were tested using smart Partial Least Squares, with the findings confirming that environmental and social costs disclosure significantly affects financial performance. Garsva et al. (2012) use regression analysis to test income smoothing and regulatory capital management, with the investigation determining that loan loss provisions are used for both income smoothing and regulatory capital management. Pajuste et al. (2020) explore how the text complexity and content of management discussion and analysis related to earnings management in Estonian, Latvian, Lithuanian samples. The study uses 5 years of data from the mentioned countries, with their results showing a positive dependence among earnings manipulation and reporting complexity.

5. CONCLUSION

Our research has aimed to detect the use of earnings management in terms of competitiveness and to identify parallels and differences in earnings management of enterprises in the Visegrad Four and the Baltics. The outcomes of quantitative modeling have detected significant parallels in the analyzed countries regardless of the region. The development of earnings before interest and taxes of the Slovak, Czech, Polish, Hungarian, Latvian, Lithuanian and Estonian enterprises were not stationary during the nine-year period 2010-2018, which indicates the significant occurrence of earnings management. The time series analysis identifies not a homogenous development, but shows a two-year difference depending on the region. The radical acceleration of earning manipulation is marked in the year 2014 for the Visegrad group and for the Baltics group the year 2016 is the crucial one. The consequences of these results may be used not only in scientific fields but also in practice, i.e. for investors to determine more highly competitive

countries based on using unconventional indicators. These conclusions may also be helpful for the analysis regarding merge or fusion among these countries. An enterprise will be more precise by choosing partners for cooperation in terms of earnings manipulation. For governments, this study shows that they should increase their attention regarding whether the manipulation is always legal and they can use the presented methodological apparatus as a new paradigm detecting earnings management instead of or supplementing the conventional methods.

One weakness of the research is the short, nine-year period of the average EBIT analyzed as well as the unequal sample sizes of the enterprises from the individual countries. Limitations are also represented by the fact the whole sectors were analyzed together, not as separate groups that could have revealed the sectors with a higher or lower level of earnings manipulation. Future investigations can be focused on specific sectors, the extension of the studies for all European Union, dividing the countries according to membership in the European Monetary Union as well as setting a comprehensive methodology based on unit roots, stationarity and homogeneity to detect the occurrence of earnings manipulation and the identify the date and behavior incentives of significant acceleration for this activity. This research was conducted before COVID 19 pandemic. Future research may be undertaken from the year 2019 to disclose the impact of the crisis on the earnings management of the enterprises in regions of the Visegrad Four and the Baltics.

Acknowledgments

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