

Earnings Management in Baltic Listed Companies: A Study of the Consumer Good Industry

Diana Bachtijeva, Vilte Cibutavičiūtė, Rasa Subačienė

Faculty of Economics and Business Administration, Vilnius University, Vilnius, Lithuania

Email: diana.bachtijeva@evaf.vu.lt

How to cite this paper: Bachtijeva, D., Cibutavičiūtė, V., & Subačienė, R. (2024). Earnings Management in Baltic Listed Companies: A Study of the Consumer Good Industry. *Theoretical Economics Letters*, 14, 1782-1801.

<https://doi.org/10.4236/tel.2024.145089>

Received: May 19, 2024

Accepted: October 25, 2024

Published: October 28, 2024

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Abstract

Earnings management is often used as a corporate strategy to influence stakeholder decisions. In listed companies, earnings management can be used to map a stable income stream, reducing earnings volatility. Such actions can help to manage investors' perceived level of risk, increase confidence and raise capital. This study examines the practice of listed companies applying earnings management in the consumer goods industry in the Baltic region. The study examines the accounting practices of three Baltic countries—Estonia, Latvia, and Lithuania, for the 2020-2022 period to assess the extent and specificities of earnings management's application. It should be noted that studies of accounting practices in the Baltic countries are very rare in the academic literature, mainly due to the limited availability of data and information in this region. The study reveals that the application of earnings management in listed companies operating in the consumer goods industry varies among the Baltic countries. Although Estonia, Latvia, and Lithuania share a common regional focus, statistically significant differences are found in their application of earnings management. Interestingly, no cases of earnings management are found in Estonia, while Lithuanian companies have the highest level of manipulating accounting data.

Keywords

Accrual-Based Earnings Management, Real Earnings Management, Baltic States, Stock Exchange

1. Introduction

Although existing legislation provides a comprehensive accounting framework,

different internal and external environments make it impossible to establish uniform accounting policies and rules. Therefore, flexibility in accounting standards has been used as an opportunity to manipulate accounting results and the decisions made by information users. One of the most prominent definitions of earnings management is provided by Schipper (1989), as purposeful intervention in the financial reporting process to obtain some personal benefit. In the broadest sense, earnings management involves making investment and financial decisions at the most opportune time to affect reported earnings. The problem of accounting manipulation has attracted strong research interest during the positive period of accounting theories (Healy, 1985; Watts & Zimmerman, 1986; Degeorge et al., 1999; Dechow & Skinner, 2000; Gunny, 2010) and remains relevant today (Ali & Kamardin, 2018; Gupta & Kumar, 2020; Poradova, 2021; Durana et al., 2022; Luo, 2022; Zhang & Guan, 2023). Gu (2020) notes that although the literature on earnings management has declined somewhat recently, it remains relatively large and relevant in accounting research journals.

Earnings management can be carried out in a wide range of areas, depending on the company's size, organizational structure, industry, and operational characteristics. The scientific literature presents different areas of earnings management: by changing accounting methods, techniques, and rules, a company's assets, equity, liabilities, cash flows, revenues, expenses, profits, and taxes are affected (Gupta & Kumar, 2020; Poradova, 2021; Strakova, 2021). Different authors have identified a wide but non-exhaustive list of techniques, including manipulations of depreciation rates, revaluation of fixed assets, inventory valuation techniques, cost allocation, changes in the value of capital, provisions, and contingent liabilities, liability valuation techniques, and tax timing (Gunny, 2010; El Diri, 2016; Poradova, 2021).

Earnings management is divided into accrual-based and real earnings management. Accrual-based earnings management directly affects the income and expense levels and therefore the accounting result. Accrual-based earnings management follows generally accepted accounting principles and involves choices of accounting methods that disguise true economic performance (Dechow & Skinner, 2000). The high-profile scandals at Enron, WorldCom, Global Crossing, Tyco, etc. have led to an increased focus on identifying earnings management in audits. Various mathematical models proposed by science to identify earnings management have facilitated detecting manipulation in audits (Enomoto et al., 2015). Therefore, this has encouraged companies to seek other forms of manipulation and apply real earnings management, which involves actions that deviate from normal corporate practices (Cohen & Zarovín, 2010). Ali & Kamardin (2018) summarize that performance-based manipulation can be categorized into operational decisions (increasing output, optimizing costs, changing the selling price), investment decisions (selling profitable fixed assets, short-sighted investments in research), and financing decisions (allocating surplus cash to finance the repurchase of treasury shares to affect the share price). Habib et al. (2022) highlight that companies

prefer to use real earnings management because it is more difficult to detect in an audit, with Choi et al. (2018), Zhang & Guan (2023) noting that auditors find it difficult to distinguish real earnings management from optimal corporate governance practices. The shift to international financial reporting standards has also encouraged companies to move away from accrual-based earnings management and towards real earnings management techniques, as confirmed by studies carried out in Europe and beyond (Ho et al., 2015; Ferentinou & Anagnostopoulou, 2016; Ipino & Parbonetti, 2017; Gu, 2020). Luo (2022) found that the reclassification of financial assets led to the substitution of Accrual Earnings Management for Real Earnings Management, suggesting that legal restatements may also affect the application of earnings management.

Stakeholder decision-making based on information in financial statements encourages managers to manipulate financial information, which Degeorge et al. (1999) refer to as the “information game”. When investors base their decisions on reported information about a firm’s performance and managers see this interest, they manipulate earnings accordingly. Watts & Zimmerman (1990) highlight that the contracts between the firm and its stakeholders create incentives to manage earnings. For this reason, research identifying the risks of applying earnings management in publicly traded companies holds particular interest. Given that investors are a particularly sensitive group, it is important to assess the application of earnings management in listed companies.

Research problem. A number of studies in the scientific literature have aimed to assess the characteristics and trends of manipulation (Kukreja et al., 2020; Durana et al., 2022; Marais et al., 2023). However, studies on identifying earnings management in Baltic listed companies are rare. It is worth noting that the term Baltic states includes Estonia, Latvia and Lithuania, and for clarity this paper refers to these three countries when using the term. Among the few existing studies, Grigorjeva & Lace (2008) assess the use of earnings management on the Vilnius, Riga, and Tallinn stock exchanges, Pajuste et al. (2020) explore the relationship between the complexity of Baltic corporate reporting and the use of earnings management, and Katutyte (2021) studies Nasdaq Vilnius listed companies to identify the use of earnings management in Lithuanian companies.

The lack of research on identifying earnings management in this region is also due to the difficult availability of financial information in the Baltic countries. In this type of research, financial information is difficult to obtain in the absence of databases, with the need to collect data manually. Dimitropoulos (2020) examines the financial statements of companies in 24 European Union countries to identify the use of earnings management and its relationship with corporate social responsibility. However, after applying criterion sampling, in which one of the criteria was the sufficiency of data—the Baltic states were excluded from the sample as the study was unable to obtain corporate financial information. Therefore, this study aims to assess trends in the application of earnings management in Baltic states listed companies in the consumer goods industry.

The topic of this study is significant and innovative, as the scientific literature on earnings management trends in Baltic companies is scarce. Despite previous studies, a systematic assessment of the application of earnings management in this geographical area remains limited. This paper focuses exclusively on the Baltic context, which has been under-represented so far due to limited access to financial data. The study contributes to the broader academic discourse and provides new insights into the dynamics of the application of earnings management in small but strategically important markets.

2. Prerequisites for the Application of Earnings Management

The desire to influence the decisions of the parties involved is an important motivation for using earnings management. Related parties make decisions concerning investments, credits, business partnerships, collaborations, strategies, and other issues based on financial statements. A company is considered successful if it invests in technology development and human capital, which requires financial stability and the continuous management of one's own and borrowed funds.

Managers might be motivated to apply earnings management for a variety of reasons. [Watts & Zimmerman \(1986\)](#) explain and predict the motives for using manipulative accounting based on three hypotheses following the opportunistic view of positive accounting theory. According to the bonus plan hypothesis, when managers' bonuses are directly linked to firm performance, they tend to shift accounting profits from future periods to the present ([Watts & Zimmerman, 1986](#)). Moreover, it has been observed that when the CEO also owns shares in the company or part of their remuneration is paid in shares, then they also have an interest in earnings management ([El Diri, 2016](#); [Strakova, 2021](#)). The debt-equity hypothesis states that the higher the leverage, the greater the incentive that managers have to increase the firm's earnings ([Watts & Zimmerman, 1986](#)). Investors and creditors tend to trust a company with a good debt-equity ratio, and a company might use various earnings management techniques to raise debt or obtain a loan on more favorable terms ([Iatridis & Kadorinis, 2009](#); [Poradova, 2021](#)). When properly managed, leverage can build creditor confidence in a firm and increase the availability of new financing. Therefore, the use of earnings management in a company secures financing and guarantees a better risk score, which is reflected in a lower interest rate. Finally, the political cost hypothesis states that the larger the company's size and visibility, the more incentivized it is to use profit-reducing accounting methods and carry forward its accounting profits ([Watts & Zimmerman, 1986](#)).

In addition to these hypotheses, findings in the literature also suggest that managers of listed companies have an interest in applying earnings management, aiming to maintain stability by mitigating average annual earnings volatility ([Degeorge et al., 1999](#)). According to [Walker \(2013\)](#), firms seek to mitigate earnings volatility to manage investors' risk perceptions. This is the case because investors tend to pay more for stocks with stable and predictable earnings streams rather

than those with large and unexpected fluctuations (Nia et al., 2015; Ghazali et al., 2015).

Nia et al. (2015) note that one of the indicators of a company's success is the fulfillment of financial analysts' forecasts. Therefore, companies can "inject" optimism (Iatridis & Kadorinis, 2009) to meet or exceed the forecasts of financial analysts and the expectations of information consumers, thus attracting the attention of investors and increasing the value of their shares (El Diri, 2016; Strakova, 2021). El Diri (2016) notes that fulfilling financial analysts' forecasts is more important for companies than achieving past performance because financial analysts' forecasts are often the basis for information consumers' decision-making. Therefore, companies use earnings management to maintain a stable financial position, a good image, and a positive reputation with financial analysts.

It has been observed that companies tend to adopt profit-enhancing accounting methods before initial public offerings (Rahman et al., 2013; Walker, 2013; El Diri, 2016; Poradova, 2021). According to Cheung & Krinsky (1994), very little is known about a company before an initial public offering, which is misleading for investors. When there is not much reliable information available in the market to make decisions, investors have to rely on data provided in financial statements (Poradova, 2021). Therefore, companies can use earnings management to increase the demand for, and the initial price of, unissued shares, thereby guaranteeing to raise more capital.

3. Hypothesis Development

A literature review shows that listed companies have a number of preconditions for applying earnings management in accounting. In addition, a strong focus on corporate financial information creates incentives to apply earnings management (Watts & Zimmerman, 1986; Sari & Rokhmania, 2020; Githaiga et al., 2022). The increasing incidence of fraudulent reporting has raised investors' concerns and distrust of capital markets (Kukreja et al., 2020). On the other hand, companies listed on stock exchanges are required to keep accounts in accordance with international financial reporting standards (IFRS). The use of IFRS reduces the diversity of information provided, better reflects the economic situation of the company, and provides greater transparency in financial markets and corporate financial statements (Beke, 2010). In addition, publicly traded companies often commit to socially responsible and ethical practices. Such companies are subject to mandatory audits of their financial statements, during which earnings management can be identified in the audit (Enomoto et al., 2015; Habib et al., 2022). Thus, the literature does not provide a consensus on how companies should behave in terms of whether they should apply earnings management.

Earnings management identification studies should select countries with similar levels of development, culture, and economic situations or study a specific region. Durana et al. (2022) chose the Visegrad Four countries—the Czech Republic, Hungary, Poland, and Slovakia, to study the application of earnings management. In

addition, the authors recommend an extension to the Baltic countries, which have similarities in their regional, political, economic, demographic, and cultural contexts. They have experienced a similar period of independence and many economic difficulties, such as inflation, economic downturns, and increased mortality. With the approval of EU membership in 2004, Baltic companies were allowed to list on a stock exchange and maintain their accounts in accordance with adopted IFRS. Thus, it could be assumed that the overlapping period of development of the Baltic states as individual countries and the overall region as well as sharing the same accounting requirements for listed companies might lead to similarities in the results of the application of earnings management.

However, when analyzing the identification of earnings management's attributes in corporate accounting, differences between countries become apparent, as evidenced by [Kliestik et al. \(2021\)](#) in relation to the Visegrad Four. Indeed, their study results showed that despite the similarities across the region, the attributes of corporate governance differ between these countries. It is clear that changes in the macroeconomic environment affect the financial stability of these countries in different ways, and therefore, there are multiple motivations for earnings management depending on the specific circumstances and challenges. The results of the study suggest that the application of earnings management by listed companies in the Baltic region will have different outcomes.

However, it should be noted that even if a suitable region is chosen, the data may not be fully comparable. [El Dirir \(2016\)](#) observes that a company might resort to manipulation itself to survive in a sector where earnings management is common. [Durana et al. \(2021\)](#) highlight that the focus should not be placed on the entire market but rather on a specific sector. Consequently, the application and intensity of earnings management might be determined by the industry in which the firm operates. It is therefore important to explore a specific sector rather than the whole of the Baltic states to obtain more objective data.

In the last five years, the external environment, the Covid-19 pandemic, the geopolitical situation, etc. have had a significant impact on economic fluctuations. Therefore, in order to ensure the objectivity and reliability of the findings, it is appropriate to select the industry least affected by regular fluctuations in the volume and intensity of economic activity. In an economic context, consumption is directly related to the disposable income of the population that remains after taxes and can be freely used or saved. Economic theory suggests that goods purchased can be divided into luxury goods and necessities, albeit with different elasticities of demand. For example, the consumer goods industry covers a wide range of products, including foodstuffs, hygiene products, household chemicals, cosmetics, and clothing, which are essential and often bought to meet regular needs. [Jakutis \(2005\)](#) argues that the consumer cannot do without basic necessities and therefore their demand is price inelastic. This means that even if the price of consumer goods rises, their demand does not decrease. Consequently, shoppers are more likely to forego luxury goods and instead always focus on meeting their basic

needs. It should be noted that economic cycles and fluctuations have very little impact on this industry and that demand for consumer goods remains strong even in times of economic downturn. The industry's resilience to external factors was also observed during the Covid-19 pandemic. Šneiderienė et al. (2020) observe that during this period, most households decided to postpone large purchases that were planned earlier and opt instead for larger quantities of essential food and household goods.

In order to test the assumption that the application of earnings management by listed companies will produce different results across the Baltic region, it is appropriate to compare the consumer goods industry among the different Baltic countries. Since the three countries involved in the study are Estonia, Latvia, and Lithuania, three hypotheses are proposed:

H1. The application of corporate governance in the consumer goods industry differs between Lithuanian and Latvian listed companies.

H2. The application of corporate governance in the consumer goods industry differs between Lithuanian and Estonian listed companies.

H3. The application of corporate governance in the consumer goods industry differs between Latvian and Estonian listed companies.

4. Study Design

Identification of the period under study. Since it is necessary to have comparable data in the financial statements, it is appropriate to select a period of several years to identify and assess earnings management. Given that the results of previous studies (Grigorjeva & Lace, 2008; Pajuste et al., 2020; Katutytytė, 2021) might already be outdated and that up-to-date information helps to ensure the relevance of the study's results and reflect the current situation on the market, the relevant period for the study is considered as 2020-2023. It is known that Latvian companies are obliged to submit their financial statements for 2023 by May 2024, while Lithuania and Estonia have until June of the same year. Given that not all companies had published a set of financial statements at the time of the data collection, 2023 is not included in the data sample. In addition, the previous financial year is also included in the calculations, so information from the financial statements for the 2019-2022 period will be used for the calculations. Thus, the period covered by this study is 2020-2022.

Company selection. Criterion sampling is used to select the sample to identify and assess earnings management. The Nasdaq Baltic Stock Exchange brings together companies from fifteen different sectors, including banking, financial services, healthcare, telecommunications, construction, real estate services, and retail. Therefore, the first selection criterion is the industry (consumer goods sector) and the second is the adequacy of data. This means that the selected companies must be active in the consumer goods sector and must have published financial statements for the entire 2019-2022 period of analysis. The data published by the companies must also be sufficient for the calculations (see **Table 1**).

Table 1. The process of selecting companies.

	Not eligible		In the sample	
	Companies	Firm-years	Companies	Firm-years
<i>Nasdaq Baltic</i> market			73	219
Criteria				
Consumer goods sector	63	189	10	30
Sufficient data		2	10	28

Source: Prepared by the authors.

During the period under analysis, 73 companies traded on the Nasdaq Baltic Stock Exchange, representing 219 companies per year. The application of the criterion-based screening exercise shows that accounting information for one of the ten companies selected by industry is only available from 2021. Nevertheless, the company was not excluded from the sample as it is possible to carry out a one-year analysis based on its data. Accordingly, the sample for the profit management identification study was reduced by two firm-years, and the trend in the application of corporate governance was investigated by selecting 28 firm-years instead of 30.

Selecting an earnings management identification model. Different mathematical models have been used in the literature to identify the attributes of earnings management, including the Healy model, Dechow modified Jones model, Dechow and Dichev model, Roychowdhury model, etc. These models are designed to identify different types of earnings management (see **Table 2**), and their application in practice often requires considerable statistical, mathematical, and econometric knowledge. Therefore, a comprehensive study on the identification of earnings management would require the application of several models.

Table 2. Set of models for identifying earnings management.

Model name	Type of earnings management	Model description
Healy model	Accrual-based earnings management	Differences between actual and expected discretionary accruals are identified.
Dechow's modified Jones (1991) model	Accrual-based earnings management	Differences between actual and expected discretionary accruals are determined, taking into account receivables and changes in income.
Beneish M-score model	Accrual-based and real earnings management	The values of the abnormal variables are assessed and the estimated M-score is interpreted.
Dechow and Dichev model	Accrual-based earnings management	In the context of firm-specific analysis, aggregation-based manipulations are identified based on data dynamics.
Roychowdhury model	Real earnings management	Identifies differences between actual and expected discretionary expenditure, production costs, and cash flows.

Source: Prepared by the authors following Healy (1985), Dechow et al. (1995), Beneish (1999), Dechow & Dichev (2002), Roychowdhury (2006), and Sun & Rath (2010).

The list of earnings management identification models in **Table 2** is not exhaustive. In order to identify potential manipulation of financial performance in the companies under study, this paper has chosen to use the universal Beneish M-score model, which is widespread and frequently used due to its relative ease of application. In addition, the chosen model is universal as the primary tool for detecting manipulations in a company's financial statements. According to **Beneish (1999)**, financial analysts, market regulators, researchers, and others are interested in the distortions present in publicly published financial statements, as well as their level of reliability. The model can therefore serve as an early warning system for investors, analysts, and creditors in identifying companies that might manipulate their financial statements. Indeed, the Beneish model is one of the most commonly used quantitative models in forensic accounting investigations, helping to fully analyze the financial statements filed by listed companies and the changes in ratios over different periods (**Sylwestrzak, 2022**).

The Beneish model calculates an M-score and eight variables to identify potential distortions in the financial statements. The days' sales receivables index (DSRI) measures whether changes in accounts receivable are consistent with changes in sales (**Beneish, 1999**). The average value of the DSRI for a firm that has not engaged in manipulation is 1.031, while a value above 1.465 indicates evidence of manipulation (**Nyakarimi, 2022**).

A gross margin index (GMI) score of 1.014 or lower indicates that gross profit for the current accounting period is not being manipulated, while a score of 1.193 or higher indicates a high probability that the firm's gross profit is being generated by accounting manipulation (**Beneish, 1999**).

The asset quality index (AQI) in a given year is the ratio of fixed assets other than property, plant and equipment (PP&E) to total assets, comparing the ratio of a company's asset quality in the current year to its asset quality in the previous year. An AQI higher than 1.254 indicates a tendency to capitalize intangible assets or costs, i.e., to defer costs. An increase in this index indicates that the capitalization of costs is undertaken to avoid passing them on as expenses, thus reducing profits (**Beneish, 1999**).

A sales change index (SGI) value lower than 1.134 does not identify manipulation, while a value higher than 1.607 indicates probable manipulation of sales revenue (**Beneish, 1999; Repousis, 2016; Adu-Gyamfi, 2020; Nyakarimi, 2022; Adoboe-Mensah et al., 2023**). It is important to note that an increase in sales by itself may be associated with a company's successful performance, although a sudden change in the index may signal manipulation.

According to **Beneish (1999)**, a depreciation index (DEPI) value lower than 1.077 means that the company's assets are deliberately depreciated at a slower rate or have been revalued. The downward trend further supports the argument that the company could have chosen a new depreciation method or a useful life favorable to earnings.

The selling, general and administrative expenses index (SGAI) can help to

identify a disproportionate increase in sales for the current year compared to the previous period, with Beneish (1999) observing that a value above 1.041 indicates a negative outlook for the future.

A leverage index (LVGI) value higher than 1.037 means increasing leverage (Beneish, 1999; Repousis, 2016; Adoboe-Mensah et al., 2023), hence reflecting a threat to future investor returns. It also indicates that the company has financed its operations with debt rather than equity, thereby increasing the risk for equity investors.

A mean total accruals to total assets (TATA) score of 0.018 or lower is indicative of non-financial manipulation, while a mean score of 0.031 or above indicates that financial data might have been deliberately changed (Beneish, 1999; Repousis, 2016; Adoboe-Mensah et al., 2023).

Beneish's M-score indices of the variables are calculated based on the following formulas (Beneish, 1999):

$$DSRI = \frac{\text{Receivables}_t / \text{Sales}_t}{\text{Receivables}_{t-1} / \text{Sales}_{t-1}} \quad (1)$$

$$GMI = \frac{(\text{Sales}_{t-1} - \text{Cost of goods sold}_{t-1}) / \text{Sales}_{t-1}}{(\text{Sales}_t - \text{Cost of goods sold}_t) / \text{Sales}_t} \quad (2)$$

$$AQI = \frac{1 - (\text{Current assets}_t + \text{PP\&E}_t) / \text{Total assets}_t}{1 - (\text{Current assets}_{t-1} + \text{PP\&E}_{t-1}) / \text{Total assets}_{t-1}} \quad (3)$$

$$SGI = \frac{\text{Sales}_t}{\text{Sales}_{t-1}} \quad (4)$$

$$DEPI = \frac{\text{Depreciation}_{t-1} (\text{Depreciation}_{t-1} + \text{PP\&E}_{t-1})}{\text{Depreciation}_t (\text{Depreciation}_t + \text{PP\&E}_t)} \quad (5)$$

$$SGAI = \frac{\text{Sales, general, and administrative expense}_t / \text{Sales}_t}{\text{Sales, general, and administrative expense}_{t-1} / \text{Sales}_{t-1}} \quad (6)$$

$$LVGI = \frac{(\text{LTD}_t + \text{Current liabilities}_t) / \text{Total assets}_t}{(\text{LTD}_{t-1} + \text{Current liabilities}_{t-1}) / \text{Total assets}_{t-1}} \quad (7)$$

$$TATA = \frac{(\Delta \text{Current Assets}_t - \Delta \text{Cash}_t - \Delta \text{Current liabilities}_t - \Delta \text{Current maturities of LTD}_t - \Delta \text{Income tax payable}_t - \text{Depreciation and amortization}_t)}{\text{Total assets}} \quad (8)$$

where:

t = index of the years included in the reference period;

$t - 1$ = index of the years included in the period before the reference period;

Δ = change.

The Beneish M-score model assumes that manipulation is possible when the firm's forecasts of the future are poor or unfavorable to the organization. Furthermore, it takes into account variables based on cash flows and accruals and considers those areas of corporate performance and accounting estimates where the practice

of managing contractually based incentive pay is well established. Irrespective of whether the final M-score of the model identifies the use of manipulative accounting in the firm, the different values of each component indicate the extent to which manipulation is taking place and where the source of the distortions in the financial statements might lie. Finally, after all eight variables of the M-score model have been evaluated separately, the M-score is computed according to the following formula (Beneish, 1999):

$$\begin{aligned} \text{M-score} = & -4.84 + 0.92 \cdot \text{DSRI} + 0.528 \cdot \text{GMI} + 0.404 \cdot \text{AQI} + 0.892 \cdot \text{SGI} \\ & + 0.115 \cdot \text{DEPI} - 0.172 \cdot \text{SGAI} + 4.679 \cdot \text{TATA} - 0.327 \cdot \text{LVGI} \end{aligned} \quad (9)$$

After calculating the M-score, a value lower than -2.22 indicates that the firm does not manipulate accounting information and a value higher than -1.78 indicates that the firm manipulates accounting information, with any value between these two figures hinting at possible manipulation (Beneish, 1999).

The companies' financial statements were obtained from the Nasdaq Baltic website¹. The financial ratios required for the calculations were collected manually and organized in worksheets. After calculating the indices and M-scores, descriptive statistical methods were used to analyze the information. Analysis of variance (ANOVA (Randolph & Myers, 2013)) was used to confirm the hypotheses. This paper focuses on the variance between scales, i.e., between the M-scores of different Baltic countries.

Means of the different Baltic M-scores are compared to assess statistically significant differences. If the resulting statistic $|f|$ is greater than or equal to the F-score with df_a , df_b degrees of freedom and the level of significance of the study, the means of the scales are not equal, meaning that the results of identifying and measuring earnings management vary across countries (Randolph & Myers, 2013). Other mathematical statistical methods are selected during the course of the study, taking into account the intermediate results.

5. Results

For the purpose of identifying and measuring earnings management, the financial statements of the companies for the 2019-2022 period were collected and the values of the Beneish model indices and the M-scores were calculated by applying Formulas 1 - 9. The descriptive statistics of the calculated results are presented in **Table 3**.

Table 3 shows that the overall average M-score is -2.420 . This value falls within the M-score's interpretative range, suggesting that companies do not manipulate accounting data. An analysis of the mean values of the results shows that they are not significantly different from the average. The mean of the LVGI component is 1.108, while the median value is 1.096, which is above the critical value and signals a risk of earnings management. Observing the scatter of the measured data around the mean shows that the results of the M-score are not evenly distributed. Ranging

¹Nasdaq Baltic website link: <https://www.nasdaqbaltic.com>.

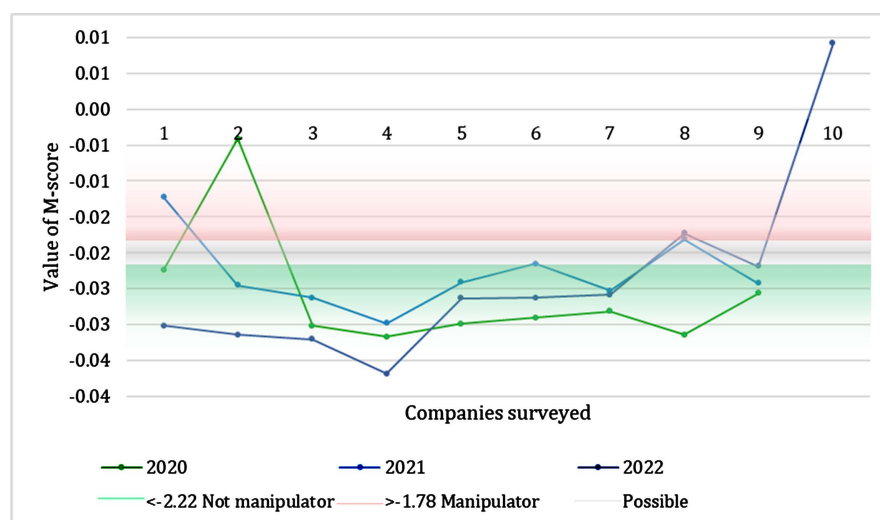
between 0.018 and 0.258, the variance of the whole sample indicates that the variables in the model signal identifying signs of earnings management in the firms under study differently.

Table 3. Data characteristics for assessing the application of manipulative accounting.

	DSRI	GMI	AQI	SGI	DEPI	SGAI	TATA	LVGI	M-score
Average	0.999	0.917	1.031	1.173	1.044	1.013	-0.006	1.108	-2.420
Media	0.983	1.022	0.962	1.122	1.005	1.010	-0.021	1.096	-2.605
Variance	0.092	0.258	0.118	0.143	0.218	0.057	0.018	0.085	0.865
St. deviation	0.303	0.508	0.343	0.378	0.467	0.239	0.134	0.292	0.930
Min. value	0.503	-0.826	0.733	0.718	0.358	0.481	-0.307	0.668	-3.687
Max. value	2.149	1.447	2.675	2.851	3.224	1.718	0.421	2.211	0.917

Source: Compiled by the authors based on calculations.

In order to assess the trends in the prevalence of earnings management in listed companies operating in the consumer goods industry in the Baltic states and analyze the results in more detail, the entire 2020-2022 study period is further analyzed. In order to assess the performance of the M-score for the companies under investigation, the M-score results for the whole sample are grouped by year and presented graphically (see **Figure 1**).

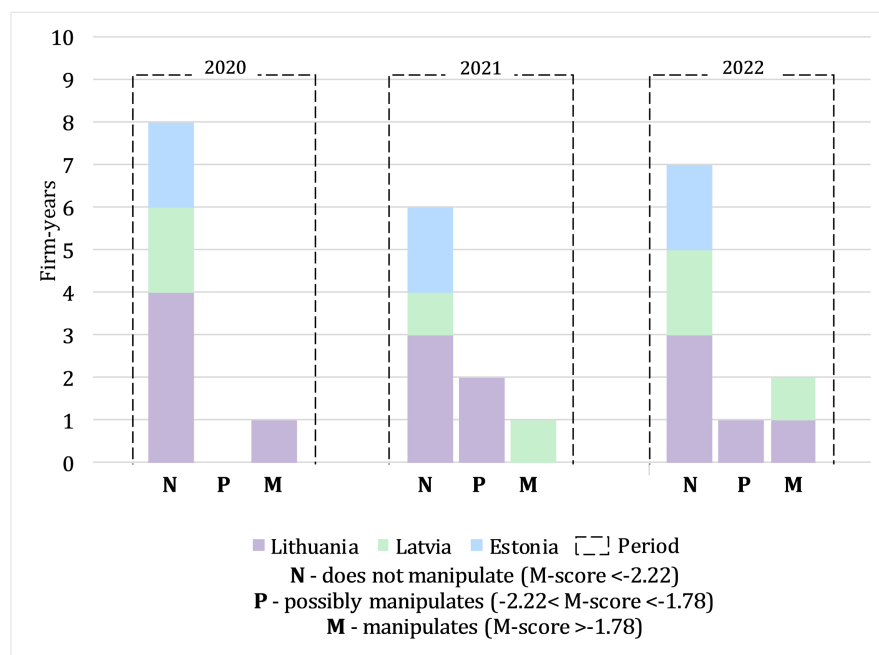


Source: Compiled by the authors based on calculations.

Figure 1. Results of the M-score for the measurement of earnings management in the companies in the 2020-2022 period.

Figure 1 shows the annual results of the 28 companies grouped by year. The figure shows the critical thresholds of the M-score (red, gray, and green), which will take the company to the next part of the M-score interpretation scale if they

are reached or exceeded. For the sake of clarity, it is stressed that the values obtained are only assessed within the limits of the chosen model, without drawing unwarranted conclusions about the accounting policies of the companies under study. The results obtained show the distribution of the M-score identifying accounting manipulation in the sample over the whole period of analysis. Thus, it can be seen that there is no significant use of accounting manipulation in the distribution of manipulation cases across the Baltic countries when the data is grouped by time and country (see **Figure 2**).



Source: Compiled by the authors on the basis of calculations.

Figure 2. Identification of signs of manipulation in the countries during the period analyzed.

Figure 2 shows that only one country—Estonia, was not characterized by earnings management during the period under study. Based on the scale of interpretations of the research model, it could be argued that the aforementioned companies are more likely to use earnings management. The results of the study show that even in 75% of the years studied, there was no risk of the application of earnings management. Of the 25% of cases in which manipulation was detected, 18% were attributed to Lithuania and the rest to Latvia. Nevertheless, the case of Estonia is worth noting as its M-score did not exceed -2.22 during the period under investigation. Finally, the trends in the application of earnings management do not show any increase or decrease in any year.

In order to compare the means of the estimated M-score between different Baltic countries, the ANOVA method was used, testing the statistical hypothesis H_0 that the variances of the M-score are equal. H_0 is accepted if the calculated $|f|$ statistic is less than the critical value, thus implying a similar trend in the application of

earnings management in countries; otherwise, if the estimated $|f|$ statistic is above the critical value, hypothesis H0 is rejected. The results of the ANOVA are presented in **Table 4**.

Table 4. Results of M-score analysis of variance for the Baltic countries.

	Lithuania	Latvia	Lithuania	Estonia	Latvia	Estonia
Mean	-2.493	-1.927	-2.493	-2.813	-1.927	-2.813
Variance	0.625	1.906	0.625	0.090	1.906	0.090
Observations	15.000	7.000	15.000	6.000	7.000	6.000
Df	14.000	6.000	14.000	5.000	6.000	5.000
F	0.330*		6.910*		21.070**	
P (F < = f) one-tail	0.040		0.020		0.000	
F Critical one-tail	0.350		4.640		4.950	

*p < 0.05, **p < 0.01; Source: Compiled by the authors based on calculations.

Table 4 compares the dispersion of M-score results between Lithuania and Latvia, Lithuania and Estonia, and Latvia and Estonia over the 2020-2022 period. The critical F-values are chosen from the distribution table. The results obtained in **Table 4** show a different trend in the application of earnings management. First, the similarities or differences in the prevalence of this phenomenon between Lithuania and Latvia are assessed. The statistic $|f|$ calculated from the ANOVA is 0.33. At a significance level of 0.05, the $|f|$ value is less than the critical value of $0.33 < 0.35$, highlighting that there are no statistically significant differences between the M-score values of Lithuania and Latvia. Hence, there is a similar situation between the countries in the application of earnings management, and thus H0 cannot be rejected. In view of the above, it is concluded that H1 is rejected.

The differences between the application of earnings management in Lithuanian and Estonian listed companies show that the estimated statistic $|f|$ is equal to 6.91. This value at the significance level of 0.05 is higher than the critical value of $6.91 > 4.64$, and therefore H0 is rejected. This means that the application of earnings management differs between these countries and thus H2 is accepted.

Regarding the similarities or differences in the application of earnings management between Latvia and Estonia, the statistic $|f|$ calculated here is 21.07. A critical value of f_{α} is selected from the F distribution table with a chosen significance level of 0.01. It can be seen that the calculated statistic $|f|$ is higher than the critical value ($21.07 > 4.95$), showing that the countries differ in their application of earnings management. Accordingly, the results of the ANOVA indicate that H3 is accepted.

Comparing the peculiarities of the application of earnings management in Lithuania and Latvia, it can be seen that the spread of M-score results is the same. Accordingly, listed companies in the consumer goods industry in Lithuania and Latvia have the same level of manipulation of the information presented in the

financial statements, and thus it can be argued that there is a similar tendency of profit manipulation. However, when comparing the results of these countries with Estonia, differences in the dispersion of the results become apparent. The results of the ANOVA show that the application of earnings management differs between Lithuanian-Estonian and Latvian-Estonian listed companies operating in the consumer goods industry.

It should also be noted that the risk of applying earnings management is also signaled by the values of the individual components of the Beneish model exceeding the critical thresholds. In order to assess the areas of risk, company-years with an M-score above the threshold of -2.22 were selected (see [Table 5](#)).

Table 5. Areas of corporate performance and accounting estimates indicative of the risk of applying earnings management.

M-score	DSRI	GMI	AQI	SGI	DEPI	SGAI	TATA	LVGI
<i>Cases of possible manipulations ($-2.22 < M\text{-score} < -1.78$)</i>								
-2.189	0.946	1.221	0.733	1.312	0.940	0.891	0.034	1.354
-2.151	1.030	1.297	0.966	1.231	1.187	0.595	-0.020	1.138
-1.814	1.017	0.772	0.841	1.469	1.037	0.856	0.092	0.879
-1.730	1.388	0.134	0.824	1.321	0.996	1.000	0.107	0.847
<i>Cases of manipulation ($M\text{-score} > -1.78$)</i>								
-1.230	1.069	1.020	0.970	1.145	0.358	0.928	0.237	0.969
-0.412	2.149	1.000	1.099	1.008	0.928	1.027	0.186	0.668
0.917	0.919	-0.826	2.675	2.851	0.805	0.481	0.421	0.784

Source: Compiled by the authors based on calculations.

Table 5 shows that the index values in bold are above the critical limits set by the author of the Beneish model. Hence, these values have influenced the calculation of the overall M-score and are indicative of earnings management. It can be argued that it is in this area, where the index exceeds the critical value, that the company might be manipulating information. From a general perspective, the DSRI, GMI, and SGI signal real earnings management, while the DEPI and AQI indicate accrual-based earnings management. It should be noted that the SGAI did not exceed the critical threshold in any of the companies analyzed. However, the most noticeable indicator is the TATA: in almost all cases, it reflects deliberate interference in the preparation of the company's financial statements. The stocks-to-assets ratio measures the level of active liabilities and exceeds the critical value (0.031) in six out of seven companies. This indicates that the companies under study are showing signs of earnings management. The sharp increase in TATA compared to the previous period might also indicate that the firm is carrying forward too many liabilities. It can be argued that in assessing the application of earnings management using the Beneish M-score model, it is important not only

to calculate and interpret the M-score but also assess its individual components.

6. Discussion and Limitations

In order to assess the trends in the use of earnings management in listed companies operating in the consumer goods sector in the Baltic states, a comparative analysis of the results in Estonia, Latvia, and Lithuania was carried out. In summary, the results show that the application of earnings management varies from one Baltic country to another. Although these countries are united by their geographical location, period of development, and political, legal, and cultural environments, the assessment of the characteristics of manipulative accounting in the companies under study reveals statistically significant differences among the three countries. This finding is in line with the results of [Kliestik et al. \(2021\)](#) assessing the attributes of earnings management in the Visegrad Four countries, where differences were also found. Nevertheless, no differences were found between Lithuania and Latvia in terms of the application of earnings management. Furthermore, it should be noted that no cases of earnings management were found in Estonian companies operating in the consumer goods sector.

The results of this study confirm the findings of previous studies. [Grigorjeva & Lace \(2008\)](#) also found the prevalence of earnings management attributes in the Baltic market. In a study of the Nasdaq Vilnius Stock Exchange, [Katutyte \(2021\)](#) found that 71% of the firms studied were characterized by accrual or real earnings management. While the results of this study reveal the application of earnings management in only 25% of cases across the Baltics states, the data collection covered the entire Baltic stock exchange rather than Lithuanian companies alone. This result is also influenced by the fact that not a single case was identified in Estonia.

The Beneish model was chosen for identifying earnings management and was found to be easily adaptable. It should be noted that the variables used in the model are as informative as the estimated M-score as the different elements of the model signal a possible deviation from the M-score value. The most significant variable is the TATA, which has an unusual value in almost all cases where the M-score exceeded the critical threshold.

The model used in the study does not allow confirming or denying the manipulation of accounting data, as the results obtained in the study are only indicative of the presence of earnings management in a company. Regardless of the model's sophistication, none of the variables can provide a definitive answer concerning whether or not a company manipulates accounting information. It should also be mentioned that one of the shortcomings of the study is that the sample size of companies is too small and varies among the Baltic countries. Accordingly, future research in this sector should be extended to more European countries.

7. Conclusion

This paper has investigated the identification and assessment of the attributes of

earnings management in listed companies operating in the consumer goods industry in the Baltic states for the 2020-2022 period. The study suggests that the application of earnings management is widespread in the listed companies in the consumer goods industry in the Baltic countries, especially in Lithuania and Latvia. The results of our study show that 25% of the cases studied are indicative of potential manipulation, with the majority (as many as 18%) being Lithuanian companies (Nasdaq Vilnius Stock Exchange), whereas no such indications were found in Estonia. As the sector chosen for the study is economically volatile, it can be argued that the risk of applying earnings management is more country-specific.

A separate analysis of the components of the Beneish M-score models shows that different accounting estimates can signal the risk of applying earnings management. The most common distortion of the financial statements is indicated by an overstatement of the accruals-to-assets ratio. This indicates the need to analyze the individual model components to precisely identify types and trends in the application of earnings management in the companies under study. This suggests that identifying the attributes of earnings management can be seen as a complex phenomenon that is not dependent on the geographical context but rather on other factors such as the firm's strategy, management decisions, and managers' actions.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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