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Application of the Beneish M-Score Model in Detecting Financial Statement Fraud in Transportation and Logistics Sector Companies Listed on the Indonesia Stock Exchange in 2019-2023

Latifah Anjarini[1], Hanifah Puspita Sari[2], Ahmad Saifi Athoillah[3]*

[1,2,3] *Diploma Program IV of Financial, Department of Accounting, State Polytechnic of Malang, Malang, Soekarno Hatta Street No. 9 Jatimulyo Lowokwaru Malang City, Malang, 65141, INDONESIA*

*Corresponding Author: saifiathoillah@polinema.ac.id
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Abstract

The high rate of fraud in Indonesia, especially in financial reports, is a serious concern because it causes large losses. This study aims to analyse the percentage level of transportation and logistics sector companies listed on the Indonesia Stock Exchange during the 2019-2023 period which are classified into three categories, namely manipulators, grey companies and non-manipulators. This study uses a quantitative descriptive method with purposive sampling technique resulting in 20 companies as samples. The data used is secondary data obtained from annual financial reports and analyzed using eight Beneish M-Score ratios. The results showed fluctuations in the manipulator category with the highest percentage in 2020 at 35%. The grey company category was found at 5% in 2019 and 2021, and 10% in 2022, but not found in 2020 and 2023. Meanwhile, the non-manipulator category dominates with the highest proportion of 95% in 2023. The level of integrity of financial statements in the transport and logistics sector has not been consistent. Investors and creditors should be more aware of the potential manipulation of financial statements in order to avoid the risk of loss. Companies are expected to increase transparency and compliance with financial reporting standards to maintain stakeholder trust.

1. Introduction

In this age of modern economic change, financial statements are fundamental for organisations to convey financial position and business performance to interested parties. The stability of financial conditions and improved performance reflected in the financial statements will attract investors to invest in the company. Companies often carry out various efforts to achieve this goal, such as careful planning, creating the right strategy, and building cooperative connections. The demand from stakeholders for financial statements encourages corporate entities to continuously improve their performance over time. However, not all efforts made produce results that match expectations. Failures that occur, as well as concerns about the inability to maintain the company's existence, encourage companies to manipulate the data presented in the financial statements.

Fraud is an act that is carried out consciously with the intention of engineering, deceiving, or sharing misleading information with other individuals in order to obtain certain benefits, which are carried out in ways that are contrary to the provisions of applicable laws or regulations. According to Arifin (2020) fraud is an illegal act committed by individuals or groups in a conscious or planned manner in the hope of gaining benefits and

harming other parties. Fraud is believed to be the most pressing problem and the main challenge in the organisational environment. Association of Certified Fraud Examiners Indonesia (2020) interprets fraud as a series of activities that are deliberately manipulated by someone to achieve personal benefits by exploiting others using false reasons. Association of Certified Fraud Examiners Indonesia (2020) classifies the phenomenon of fraud into 3 conceptual categories called the fraud tree, namely the practice of ethical deviations in the form of corruption (corruption), unapproved asset taking (asset misappropriation), and manipulation of accounting information (fraudulent statements).

The level of fraud in Indonesia, especially corruption cases, is high. This phenomenon is in accordance with the findings obtained through empirical research conducted by an organisation called Transparency International Indonesia (TII). Indonesia is classified as a country that routinely becomes the object of intensive supervision of the dynamics of corruption that occur in it (Transparency International Indonesia 2024). Based on the results of the survey Corruption Perceptions Index (2024), in 2023 Indonesia recorded a score of 34 out of 100 and placed the country at number 115 out of a total of 180 countries that were the object of the survey. The index score is consistent with the CPI score in 2022 (Transparency International Indonesia, 2024). This reflects that the state's response to corrupt practices has stagnated with a minimal rate of development and has even worsened due to the lack of substantive support from stakeholders. This condition causes Indonesia to become a public concern because the level of fraud that occurs every year has not decreased.

Fraud in financial statements is an act of presenting inappropriate information or deliberate omission of certain accumulations or statements in financial statements with the aim of misleading report users. Financial reports have an important function as an essential primary reference for interested parties in the process of determining decisions related to the company. According to Hidayat (2018), financial statements are a form of data presentation that reflects the company's financial condition, where the data serves as a tool to assess the company's financial performance. The transport and logistics sector contributes significantly to the economy, so the reliability of financial reports in this sector is important. Based on data obtained from the Central Bureau of Statistics (BPS) in 2022 and 2023, the transport sector shows the highest growth compared to other sectors, reaching around 15%. This growth plays an important role in driving an increase in Indonesia's overall economic growth.

The survey results of Association of Certified Fraud Examiners Indonesia (2020) revealed that the incidence of fraud that often occurs in the territory of Indonesia is corruption at 64.4%, the second occurred at 28.9% is the case of misuse of assets, and at 6.7% mentioned the case of engineering practices on financial statements. The findings of this survey show results that are in line with the results of a study conducted by the Association of Certified Fraud Examiners (2022). which found that financial statement fraud is a phenomenon that rarely occurs but results in the highest average loss. Although the percentage of financial statement fraud is the lowest, globally this type of fraud is recorded as the most significant loss based on the value of the loss generated. Based on the findings of Association of Certified Fraud Examiners (2022), also revealed that the transport and logistics sector is in the third tier of the top 5 industries with high average losses.

Financial statement fraud is an important issue in the business world, especially in the fast-growing transport and logistics sector. However, with rapid growth, the industry is also prone to corruption and financial statement manipulation. Therefore, the implementation of effective fraud detection methods is becoming increasingly urgent to ensure the financial integrity of companies. The Beneish model is one of the widely recognised tools among academics and practitioners to detect potential fraud in reports (Arianto et al., 2023). This method was invented by Messod Beneish, a professor in accounting, who observed that there is a relationship between improper financial statements and fraudulent behaviour. The Beneish model applies a quantitative analytical approach through financial data by calculating ratios. The model applies eight financial variables as analytical parameters to identify potential fraudulent practices. The Beneish M-Score model uses eight raiso indicators including, Day Sales.in Receivable Index (DSRI), Asset Quality Index (AQI), Gross Margin Index (GMI), Sales Growth Index (SGI), Selling General and Administrative Expense Index (SGIA), Depreciation Index (DEPI), Total Accural to Total Asset (TATA), and Leverage Index (LVGI). These indicators can be used in corporate entities that publish audited financial statements because the data implemented must have a high level of reliability. Each ratio describes a particular aspect of a company's financial statements. The application of Beneish M-Score allows it to assist in the process of determining strategic choices, both by the company's internal management and by external parties. Research Annisa and Ghozali (2020) shows that the Beneish M-score model is considered effective in analysing signs of engineering in financial statements. This is evidenced in the results of his research showing that seven of the eight Beneish ratios are able to identify financial fraud.

In line with research by Sarumpaet (2021) shows that the five beneish ratios implemented in the study are able to identify corporate entities that perform financial manipulation. On the other hand, research by Widowati and Oktoriza (2021) proves that the five most significant beneish ratios according to Christy and Stephanus (2018), namely DSRI, AQI, GMI, SGI, and TATA are able to identify entities classified as manipulators or manipulators. However, these two studies did not calculate the eight beneish ratios as a whole, but only calculated several beneish ratios in an effort to reveal financial statement irregularities and engineering. Thus, this research

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gap arises because there are not many researchers who calculate the eight beneish ratios as a whole to detect irregularities or financial statement engineering, especially in the transportation and logistics sector entities listed on the Indonesia Stock Exchange (IDX). The purpose of this study is to fill the gap by calculating the eight beneish ratios to identify financial statement engineering of transport and logistics corporate entities listed on the Indonesia Stock Exchange (IDX).

The selection of the 2019-2023 period as the focus of the study is based on the relevance and urgency of the latest data to provide an accurate picture of the current situation. Based on the 2023 Corruption Perception Index (CPI) report, Indonesia's score stagnated at 34/100. This condition emphasises that the issue of fraud is still a significant challenge that needs to be addressed. In addition, the findings of the Association of Certified Fraud Examiners Global reveal that financial report engineering with a low percentage of cases that occur has a large financial loss impact. Based on the explanation that has been conveyed, the author conducts a study to detect acts of engineering in the entity's financial statements by utilising the Beneish M-Score method as a research tool. The object of focus in this study is corporate entities operating in the transport and logistics sector listed on the Indonesia Stock Exchange (IDX). This selection is based on the findings of a global survey conducted by Association of Certified Fraud Examiners (2022), which shows that business entities in the transportation sector rank third as the type of business that suffers the greatest financial losses due to fraud.

2. Literature Review

2.1 Signaling Theory

Signalling theory was proposed by Michael Spence through his scientific study entitled Job Market Signaling in 1973. In this theory, it is explained that the party in control of the information (sender) can share signals that reflect the state of the corporate entity to other parties, such as investors, so that the information can be utilised by the recipient (Purba, 2023, p. 34) . There are various types of signals, both in the form of information that is directly visible and in the form of data that requires deeper analysis to determine whether this data is a positive signal or a negative signal. According to Purba (2023, p. 34) signal theory can be understood as a strategic action taken by the management of a corporate entity with the aim of conveying instructions to investors regarding management's perception of the potential development of the entity in the future. According to Subroto & Endaryanti (2024, p. 37) signal theory serves as one of the strategies implemented by managers to optimise the value of the company. Through this theory, companies can provide instructions or information to investors regarding the condition of the company, which has significant implications for the decision-making process (Purba, 2023, p. 35) . Signalling Theory plays a role in conveying positive signals to investors through financial reports. Healthy management performance will be reflected in financial reports, resulting in favourable signals.

Signalling theory emphasises the significance of information published by companies in the context of investment decision making by external parties. This theory argues that companies that have high quality, whether intentionally or not, will send signals to the market (Purba, 2023, p. 36-37) . The main components in signal theory consist of signal givers and signal receivers. The essence of signal theory lies in the role of signalers, which refer to internal individuals (such as executives or managers) who have access to information about individual products, or organisational entities that are not accessible to external parties (Purba, 2023, p. 38) . These internal individuals obtain a variety of information, both positive and negative, which can provide benefits to external parties. The signal receiver is an entity located in the next phase in the chronology of signal delivery (Subroto and Endaryanti, 2024, p. 38) . In signalling theory, the receiver is identified as an external entity that has a knowledge gap about the organisation in question but has a desire to learn more about the organisation, according to the signalling theoretical framework. The possibility of manipulation or distortion of information can give an unequal advantage to the signaller at the expense of the receiver's interests as the signaller and receiver often have opposing interests at the same time. In practice, signalling should have a strategic impact; this generally involves choosing a signaller in favour of various alternatives. For example, the receiver may make decisions regarding hiring, purchasing, or investment. (Subroto, and Endaryanti, 2024, p. 38).

2.2 Fraud

Fraud is unlawful behaviour carried out by a single individual or collective in a conscious or structured manner that results in the single individual or group gaining an advantage, and causing losses to other individuals or groups. According to *Black's Law Dictionary* (1979) in Suhardi (2022, p. 1) fraud is a variety of efforts designed by individual ingenuity used to gain advantage over other individuals through the presentation of false information and manipulation of facts. Razaee and Riley (2010) in Rahmatika (2020, p. 14) state that fraud is behaviour that is contrary to the law, structured fraud that contains elements of deliberate dishonesty. *The Association of Certified Fraud Examiners* (ACFE) classifies *fraud* in several categories, called the "*Fraud Tree*", which is a grouping system related to phenomena caused by fraud (Arifin, 2020, p. 3-4).

2.2.1 Asset Misappropriation

Asset misappropriation includes the misuse or illegal appropriation of resources or property belonging to the entity or other parties. According to Lubis (2023, p. 34) asset misuse is a type of *fraud* committed by taking company property illegally and its nature can be counted (*tangible*) so that this type of *fraud* is very easy to detect.

2.2.2 Corruption

Corruption is an act of abuse of power, authority, or position entrusted for the benefit of certain individuals or groups with efforts that violate the law and ethics, which often harms other parties or the public interest. Lubis (2023, p. 32-33) states that corruption is not carried out by a single individual but cooperates with other parties to launch its actions, so corruption can be said to be the most difficult *fraud* to detect. This cooperation includes *conflicts* of *interest*, *bribery*, and *economic extortion*.

2.2.3 Financial Statement Fraud

Lubis (2023, p. 37) explains that financial statement engineering is an action taken by top management or corporate executives to hide the reality of financial conditions through financial manipulation or engineering in the preparation of financial statements. The strategy is applied so that the financial performance of the corporate entity is viewed positively in front of the stakeholders of the financial statements, a practice conventionally known as *window dressing*.

2.3 Financial Statement Fraud

Financial fraud related to reporting is an action deliberately carried out by management to cover up the reality of financial conditions through manipulation of financial statements (Suryandari and Endiana, 2019). According to the *Black Law Dictionary* in Lubis (2023) *fraudulent financial fraud* is a misrepresentation that occurs due to negligence or without a valid calculation basis. Fraud in financial reporting is when a company deliberately deceives its stakeholders, especially investors and creditors, by presenting information that does not match reality (Ferina et al., 2023). According to the *Association of Certified Fraud Examiners* (2013) in Arianto et al., (2023) financial statement *fraud* is *fraud* involving management by copying financial statement information in a way that harms users of financial statements.

According to Wells (2011) in Suryandari, and Endiana (2019, p. 44-45), *financial. statement fraud* can manifest in various ways such as:

- The fabrication, alteration or manipulation of *financial records*, legitimate records or economic events.
- Deliberate omission of economic events, accounts, or other material data as a basis for preparing financial statements.
- Deliberate application of accounting rules, policies, and protocols beyond established conformity, applied in the mechanisms of quantification, identification, reporting, and exposure of economic events and commercial transactions.
- The conscious omission of data that should be disclosed and presented in relation to the essential rules and accounting policies applied in the process of preparing financial statements.

2.4 Measurement of Financial Statement Fraud

Fraud in financial reporting is not detected by the naked eye. Therefore, to identify *fraud,* detection procedures for financial reports are needed. There are two analytical models applied in the prediction of financial statement fraud, namely *Beneish M-Score* and *F-Score* (Lubis 2023, p. 42). This study focuses on the effectiveness of the *Beneish M-Score* Model in detecting financial statement fraud by calculating the *M-Score* value of each corporate entity's financial statements. *Beneish M-Score* is a method designed to identify indications of potential fraud in corporate financial statements. The concept was originally formulated by Messod Daniel Beneish in 1999 as an early detection tool for earnings manipulation through the analysis of selected financial ratios. This model applies 8 variable calculation ratios as indicators to identify potential entities indicated to engineer *revenue* in financial statements. The ratios that are components of the *Beneish M-Score* to identify indications of report engineering (Lubis 2023, p. 44-45).

2.4.1 Day's Sales in Receivable Index (DSRI)

This ratio represents the comparative between receivables and total *revenue* earned by the entity in the current period (t) compared to the previous period (t-1). This ratio serves to evaluate the proportionality between *receivables* and *revenue* in two consecutive periods. The growth in sales results reflected in receivables may result

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from the transformation in credit sales regulations implemented by the company as a strategy to deal with ongoing competition. However, disproportionate growth in receivables can also be caused by the phenomenon of inflation. The value of the *Day's Sales in Receivable Index* (DSRI) is determined through analysis. The following is the DSRI ratio formula:

$$DSRI = \frac{\frac{\textbf{Net receivables}_t}{\textbf{Net sales}_t}}{\frac{\textbf{Net receivables}_{t-1}}{\textbf{Net sales}_{t-1}}}$$

The calculation results of the formula will be compared to the *index* value on the predetermined parameters as in Table 1.

Table 1 *Index parameter DSRI*

Category	*Parameter Index*
Manipulator	≥ 1,465
Grey Company	1.031 < *index* < 1.465
Non-manipulators	≤ 1,031

Source: Beneish, 1999

2.4.2 Gross Margin Index (GMI)

Gross Margin Index (GMI) is a ratio that compares the gross margin in the previous year (t-1) with the profit margin in the current year (t). This ratio acts as an instrument to measure the level of profitability of the company, which can reflect the potential development of the entity in the future. Lev and Thiagarajan (1993) in Lubis (2023, p. 44) reveal that if GMI exceeds 1 (GMI> 1), this signals an adverse negative signal on the entity's future development expectations. If the entity has unfavourable prospects, then the entity tends to be more vulnerable to earnings manipulation practices. The GMI ratio can be calculated using the following formula:

$$GMI = \frac{\frac{(Sales_{t-1} - (COGS_{t-1}))}{sales_{t-1}}}{\frac{(Sales_t - COGS_t)}{Sales_t}}$$

The calculation results of the above formula will be compared with the *index* values on the parameters that have been determined as in Table 2.

Table 2 *GMI parameter index*

Category	*Parameter Index*
Manipulator	≥ 1,193
Grey Company	1.014 < *index* < 1.193
Non-manipulators	≤ 1,014

Source: Beneish, 1999

2.4.3 Asset Quality Index (AQI)

Lubis (2023, p. 44) defines AQI as a ratio that compares the entity's non-current assets other than fixed assets with the entity's total assets in a particular year (t) and the previous year (t -1). If AQI has a value exceeding one (AQI> 1), then the entity is detected to postpone expense recognition (Zulzilawati, 2021). Deferral of expenses can result in an increase in the value of profit, which is one indication of fraudulent practices in financial statements. The AQI ratio can be calculated using the following formula:

$$AQI = \frac{\frac{1 - (Current\ assets_t - Net\ fixed\ assets)}{Total\ assets_t}}{\frac{1 - (Current\ assets_{t-1} - Net\ fixed\ assets_{t-1})}{Total\ assets_{t-1}}}$$

The calculation results of the above formula will be compared with the *index* values on the parameters that have been determined as in Table 3.

Table 3 *AQI parameter index*

Category	*Parameter Index*
Manipulator	≥ 1,254
Grey Company	1.039 < *index* < 1.254
Non-manipulators	≤ 1,039

Source: Beneish, 1999

2.4.4 Sales Growth Index (SGI)

Lubis (2023, p. 45) states that this ratio serves to compare non-current assets owned by the entity and measure the entity's sales growth rate. If the calculation of the *Sales Growth Index* (SGI) exceeds one (SGI> 1), it indicates that there is growth in the entity's sales compared to the previous year. Corporate entities that experience *revenue* growth tend to commit fraud in financial statements, with the aim of maintaining this achievement. This is due to the assumption that entities with relatively constant sales levels are easier to obtain additional capital compared to entities that experience fluctuations in their sales levels. The SGI ratio is calculated through the comparison of sales in the current period (t) with sales in the previous period (t-1). The SGI ratio formula is as follows:

$$\boldsymbol{SGI = \frac{Sales_t}{Sales_{t-1}}}$$

The calculation results of the above formula will be compared with the *index* value on the parameters that have been determined as in Table 4.

Table 4 *SGI parameter index*

Category	*Parameter Index*
Manipulator	≥ 1,607
Grey Company	1.134 < *index* < 1.607
Non-manipulators	≤ 1,134

Source: Beneish, 1999

2.4.5 Depreciation Index (DEPI)

Lubis (2023, p. 44) reveals that this ratio represents the ratio between depreciation expense to fixed assets before depreciation in the current year (t) and the previous year (t-1). Harahap (2017) in research Zulzilawati (2021) suggests that this ratio serves to assess the conformity between the depreciation recorded and the depreciation rate that should be, so that it is possible to identify the slowness of depreciation recognition or confirm that the recording of depreciation is in line with the depreciation method applied.

DEPI with a value exceeding one (DEPI> 1) indicates a slowdown in the depreciation of the company's assets (Zulzilawati, 2021). This slowdown can be caused by revisions to the useful life of assets or the application of new methods, which in turn has the potential to increase the company's *revenue*. The DEPI ratio is formulated as follows:

$$DEPI = \frac{\frac{Depreciation_{t-1}}{Depreciation_{t-1} + PPE_{t-1}}}{\frac{Depreciation\ \ t}{Depreciation_{\ t} + PPE_t}}$$

The calculation results from the above formula will be compared with the *index* value on the predetermined parameters as in Table 5.

Table 5 *DEPI parameter index*

Category	*Parameter Index*
Manipulator	≥ 1,077
Grey Company	1.001 < *index* < 1.077
Non-manipulators	≤ 1,001

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Source: Beneish, 1999

2.4.6 Sales General and Administrative Expenses Index (SGAI)

Apriani and Nuzula (2019) in research Zulzilawati (2021) said that the SGAI ratio with a value exceeding or equal to one (SGAI ≥ 1) indicates a degradation of optimisation in the management of selling, administrative and general costs. The phenomenon of degradation of this level of efficiency implicitly reflects the unfavourable prospects of corporate entities. If this condition is not immediately intervened, the entity has the potential to face the risk of losses in the future. *Sales General and Administrative Expenses Index* (SGAI) is calculated by comparing selling, general and administrative expenses with *revenue* for the current period (t) and the previous period (t-1). The SGI ratio formula is as follows:

$$SGAI = \frac{\frac{SGA\ expenses_t}{Sales_t}}{\frac{SGA\ expenses_{t-1}}{Sales_{t-1}}}$$

The calculation results of the above formula will be compared with the *index* value on the predetermined parameters as in Table 6.

Table 6 *SGAI parameter index*

Category	*Parameter Index*
Manipulator	≥ 1,041
Grey Company	1.041 < *index* < 1.054
Non-manipulators	≤ 1,054

Source: Beneish, 1999

2.4.7 Leverage Index (LVGI)

Lubis (2023, p. 45) states that this ratio aims to evaluate the proportion of the entity's debt obligations to total assets longitudinally from year to year. LVGI index with a value exceeding one (LVGI > 1) indicates an escalation of the entity's debt burden. This increase in liabilities indicates an increase in payment responsibilities that must be fulfilled by the entity. In conditions where the company's financial health is not optimal, this phenomenon can be an indication of potential manipulation in financial reporting. *Leverage Index* (LVGI) is obtained by comparing the company's total debt obligations in the current period (t) with total assets in the current period, against the same ratio in the previous period (t-1). The LVGI ratio formula is as follows:

$$LVGI = \frac{\frac{Current\ Liabilities_t\ +\ Long\ term\ Debt_t}{Total\ assets_t}}{\frac{Depreciation_{t-1}t}{Depreciation_t + PPE_t}}$$

The calculation results of the above formula will be compared with the *index* value on the parameters that have been determined as in Table 7.

Table 7 *LVGI parameter index*

Category	*Parameter Index*
Manipulator	≥ 1,111
Grey Company	1.037 < *index* < 1.111
Non-manipulators	≤ 1,037

Source: Beneish, 1999

2.4.8 Total Accruals to Total Asset (TATA)

Total Accruals to Total Asset (TATA) is a ratio that assesses the amounts of accruals of corporate entities with their total assets. *Total Accrual* is a ratio used to quantify *profits* that are not sourced from actual cash flow. The existence of an accrual value that exceeds cash receipts indicates the potential for manipulative practices through

an unreasonable increase in *revenue* value (Suheni and Arif, 2020). *Total Accruals to Total Asset* (TATA) is formulated as follows:

$$TATA = \frac{(Net\ income\ from\ continuing\ operations_t + Cash\ flow\ operations_t}{Total\ assets_t}$$

The calculation results of the above formula will be compared with the *index* value on the parameters that have been set as in Table 8.

Table 8 *LVGI parameter index*

Category	*Parameter Index*
Manipulator	≥ 0,031
Grey Company	0.018 < *index* < 0.031
Non-manipulators	≤ 0,018

Source: Beneish, 1999

Based on the 8 calculations that have been carried out, these results will be integrated into the *Beneish M-Score* Model equation, which is formulated as follows (Lubis, 2023, p. 46).

Beneish M-Score = -4.84 + 0.920 DSRI + 0.528 GMI + 0.404 AQI + 0.892 SGI + 0.115 DEPI - 0.172 SGAI - 0.327 LVGI + 4.697 TATA

To find companies that manipulate financial statements or not is done by criteria. If the *beneish m-score* value > -2.22 is classified as a corporate entity that is indicated to carry out financial statement engineering. Conversely, if the *beneish m-score* value < -2.22 is classified as a corporate entity that is not indicated to carry out engineering of financial statements.

3. Methodology

The object of study can include human entities, material entities, economic interactions, and temporal phenomena that occur within the scope of the study. (Priadana and Sunarsi, 2021). The objects in this study include transport and logistics sector companies that are officially listed on the Indonesia Stock Exchange (IDX) in the 2019-2023 period. This research method uses quantitative methods using a descriptive approach.

3.1 Data Sources and Data Required

3.1.1 Data Source

Empirical data is classified into two categories, namely primary data and secondary data. This research uses secondary data. Secondary data refers to information retrieved through mediation or documents that are already available (Priadana and Sunarsi, 2021, p. 44). This data comes from the financial statements of transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) which have gone through the audit process in 2019-2023. The data source for this study was obtained through the official portal of the Indonesia Stock Exchange (IDX) and the company's official portal.

3.1.2 Required Data

Data are essential facts, used, applied, and analysed in research (Abubakar, 2021, p. 57). The data needed in this study includes financial statements for the period 2019-2023, including statements of financial position, income statements, cash flow statements, as well as additional relevant information.

3.2 Data Collection Method

Data collection techniques are methods applied by researchers to obtain essential information needed to solve research problems (Abubakar 2021). The data collection techniques applied in this study are:

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3.2.1 Documentation

This method refers to the methodology of data acquisition through the analysis of written sources such as books, official reports, minutes of meetings, as well as daily journals, and other documents that contain relevant information needed by researchers in the data collection process (Abubakar, 2021, p. 114). The data used in this study comes from the company's financial statements.

3.2.2 Literature Study

The methodology of data collection through literature review is carried out through the review of various books, notes, and reports that have relevance to the problem being studied. Supporting data used in this study comes from journals relevant to the topic of study, collections of academic literature, and similar research results that support the researcher's study.

3.3 Population and Sample

3.3.1 Population

According to Sugiyono (2019) , population is the entire element that is used as a generalisation area. Population elements are the total subjects to be analysed (Sugiyono, 2019) . The population in this study are transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023.

3.3.2 Sample

According to Sugiyono (2019) the sample is a segment of the totality and characteristics of the population. The samples in this study were 20 transportation and logistics sector companies listed on the Indonesia Stock Exchange (IDX) for the 2019-2023 period which were in accordance with the sample qualification provisions in this study.

3.3.3 Sampling Technique

The sample in this study was obtained through a *nonprobability sampling* method through a *purposive sampling* approach. This method is applied through determining certain criteria for sampling (Abdullah et al., 2022, p. 85). The sample criteria applied by the author in this study are : (Kurnianingsih and Siregar 2020):

- Transport and logistics sector business entities listed on the Indonesia Stock Exchange (IDX) for the 2019- 2023 period.
- Transport and logistics sector business entities that publish audited financial reports for the 2019-2023 period.
- Transport and logistics sector corporate entities that use rupiah currency in financial statements.
- Transport and logistics sector corporate entities that have complete data information.

Table 9 *Sampling criteria*

Description	Total
Transport and logistics sector companies listed on the Indonesia Stock Exchange (IDX) for the period 2019-2023.	37
Transportation and logistics sector companies that publish audited financial reports for the period 2019-2023	(13)
Transport and logistics sector companies that use rupiah currency in financial statements.	(3)
Transport and logistics sector companies that have complete data information	(1)
Total Sample	20

Source: Data processed, 2025

3.4 Data Analysis Technique

In this study, the data collected was analysed using a quantitative approach through the calculation of the *M-Score* ratio, followed by descriptive analysis to interpret the results of the *M-Score* calculation and draw conclusions based on these findings. Below is presented the data analysis mechanism applied by

researchers:

- Calculating the *Beneish Ratio Index* value based on information found in the accounting documents of transport and logistics companies listed on the Indonesia Stock Exchange.
  Comparing the calculation results of the *ratio index* with the standard parameter index in the *Beneish Model.*

Table 10 *Beneish ratio parameter index M-score*

No	Ratio	*Parameter Index*		
		Non-manipulator	*Grey Company*	*Manipulator*
1	DSRI	≤ 1,031	1.031 < *index* < 1.465	≥ 1,465
2	GMI	≤ 1,014	1.014 < *index* < 1.193	≥ 1,193
3	AQI	≤ 1,039	1.039 < *index* < 1.254	≥ 1,254
4	SGI	≤ 1,134	1,134 < *index* < 1,607	≥ 1,607
5	DEPI	≤ 1,001	1,001 < *index* < 1,077	≥ 1,077
6	SGAI	≤ 1,054	1,041 < *index* < 1,054	≥ 1,041
7	LVGI	≤ 1,037	1.037 < *index* < 1.111	≥ 1,111
8	TATA	≤ 0,018	0.018 < *index* < 0.031	≥ 0,031

Source: Beneish, 1999

- Classify corporate entities into three groups, namely *manipulators*, *grey companies*, or *non-manipulators*. Grouping is based on the criteria: (Hadi et al., 2020)

  a. *Manipulator* category, if:
  - Corporate entities have ≥ 3 (three) kinds of ratio indices, where the index parameters give an indication of being a *manipulator;*
  - Corporate entities have 3 (three) kinds of ratio indexes that indicate their index parameters as *manipulators*, 2 (two) kinds of ratio indexes that indicate their index parameters as *grey companies*, and 3 (three) kinds of ratio indexes that indicate their index parameters as *non-manipulators;*
  - Corporate entities have 4 (four) kinds of ratio indices indicating their index parameters as *manipulators* and 4 (four) kinds of ratio indices indicating their index parameters as *non-manipulators* and;
  - Corporate entities have 4 (four) kinds of ratio *indexes* that indicate their index parameters as *manipulators* and 4 (four) kinds of *ratio indexes* that indicate their index parameters as *grey companies*.

  b. *Non-manipulator* category, if the corporate entity has ≥ 3 (three) kinds of ratio *indexes* that are indicated as *non-manipulators* by the *index parameter.*

  c. Category *grey company*, if:
  - Corporate entities have ≥ 3 (three) kinds of ratio indexes whose index parameters indicate that they are *grey companies* and ratio indexes that do not match the parameters that have been determined as *manipulator* categories and *non-manipulator* categories.
  - Corporate entities have 3 (three) kinds of ratio indices indicating their index parameters as *grey companies*, 2 (two) kinds of ratio indices indicating their index parameters as *manipulators*, and 3 (three) kinds of ratio indices indicating their index parameters as *non-manipulators,* and
  - Corporate entities have 4 (four) kinds of ratio indices that indicate their index parameters as *grey companies* and 4 (four) kinds of ratio indices that indicate their index parameters as *non-manipulators.*

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- Determine the percentage level of corporate entities classified as *manipulators, grey companies, and non- manipulators* (Zulzilawati,2021) with the following formula :

    a. Percentage of *manipulator* companies

$$= \frac{Number\ of\ companies\ manipulator}{Number\ of\ companies\ studied}\ x\ 100\%$$

    b. Percentage of non-manipulator companies

$$= \frac{Number\ of\ companies\ non\ -\ manipulator}{Number\ of\ companies\ studied}\ x\ 100\%$$

    c. Percentage of *grey companies*

$$= \frac{Number\ of\ companies\ grey\ company}{Number\ of\ companies\ studied}\ x\ 100\%$$

4. Analysis Results

Beneish M-Score consists of 8 financial ratio indicators formulated to identify indications of fraud in financial statements. Each ratio is calculated using numerical numbers from the financial statements of a corporate entity that is the object of research. The ratio index is then compared with the index parameters that have been determined for each ratio (Latifatussolikhah and Pertiwi 2020) . The following are the results of the calculation of the ratio index and its comparison with the index parameters for the period 2019 to 2023:

4.1 Days Sales in Receivables Index (DSRI)

According to Beneish (1999), companies are classified as *manipulators* or considered to manipulate if DSRI ≥ 1.465. Companies are classified as *non-manipulators* if DSRI ≤ 1.031 and as *grey companies* if the DSRI value is between 1.031 and 1.465 or 1.031 < index < 1.465. Based on the results of the calculation of the DSRI ratio using the numerical figures of the financial statements of the transport and logistics sector entities for five periods presented in detail in Appendix 1, it shows that in 2019 there were 3 corporate entities classified as *manipulators*, 14 entities classified as *non-manipulators*, and 3 entities included in the *grey company* category. In 2020, the total entities indicated as *manipulators* increased to 5 companies. There were 12 entities classified as *non-manipulators* and the number of *grey companies* remained stable at 3 entities. In 2021, there were 3 corporate entities categorised as *manipulators*, 7 entities as *non-manipulators*, and 10 entities included in the *grey company* category. Furthermore, in 2022, the total entities classified as *manipulators* remained 3 entities while *non-manipulators* increased to 8 companies, and 9 other entities were included in the *grey company*. In 2023, there was 1 entity classified as a *manipulator*, 6 entities classified as *grey companies*, and 13 other entities included in the *non- manipulator* category.

4.2 Gross Margin Index (GMI)

According to Beneish (1999) , companies are classified as *manipulators* or considered to manipulate if GMI ≥ 1.193. Companies are classified as *non-manipulators* if GMI ≤ 1.014 and as *grey companies* if the DSRI value is between 1.014 and 1.193 or 1.014 < index < 1.193. Based on the results of the calculation of the GMI ratio using the numerical figures of the financial statements of the transport and logistics sector entities for five periods presented in detail in Appendix 2, it shows that in 2019 there were 6 entities classified as *manipulators*, 10 entities classified as *non-manipulators*, and 4 entities classified as *grey companies*. In 2020, it was revealed that the number of entities classified as *manipulators* remained at 6, entities included in the *non-manipulator* category increased to 11 entities, and *grey companies* decreased to 3 entities. In 2021, there were 4 entities identified as *manipulators*, while 13 entities were classified as *non-manipulators*, and 3 other entities were classified as *grey companies*. In 2022, the number of entities included in the *manipulator* category remained at 4 entities, with 13 entities still classified as *non-*

manipulators, and 3 other entities classified as *grey companies*. Furthermore, in 2023 there was an increase in the number of *manipulator* entities to 5, while 12 *non-manipulator* entities, and 3 other entities were consistently classified as *grey companies*.

4.3 Asset Quality Index (AQI)

According to Beneish (1999) an entity is classified as a *manipulator* if the AQI value ≥ 1.254. Conversely, the company is considered a *non-manipulator* if the AQI value ≤ 1.039, and if the AQI value is between 1.039 and 1.254 or 1.039 < index < 1.254 the company is included in the *grey company* category. Based on the results of the calculation of the AQI ratio using the numerical figures of the financial statements of the transport and logistics sector entities for five periods presented in detail in Appendix 3, it was found that in 2019 there were 6 entities identified as *manipulators*, 9 entities belonged to the *non-manipulator* category, and 5 other entities were included as *grey companies*. Furthermore, in 2020 it was found that there were 5 entities identified as *manipulators*, 13 entities belonging to the *non-manipulator* category, and 2 other entities classified as *grey companies*. In 2021, 5 entities were identified as *manipulators*, 6 entities were classified as *non-manipulators*, and 9 other entities were classified as *grey companies*. Then, in 2022 the number of entities classified as *manipulators* increased to 6, 7 entities were classified as *non-manipulators* and 7 other entities were included in the *grey company*. Meanwhile, in 2023, there was a decrease in the number of *manipulator* entities to 3 entities, while 6 entities were classified as *grey companies* and 11 other entities were classified as *non-manipulators*.

4.4 Sales Growth Index (SGI)

According to Beneish (1999), an entity is classified as a *manipulator* if the SGI value ≥ 1.607. Meanwhile, if the SGI value ≤ 1.134, then the company is classified as a *non-manipulator*. Companies with SGI values between 1.134 and 1.607 or 1.134 < index < 1.607 are classified as *grey companies*. Based on the results of the calculation of the SGI ratio by utilising empirical data information sourced from the financial statements of transportation and logistics sector entities over a period of five consecutive years presented in detail in Appendix 4. It was revealed that in 2019, there were 5 entities identified as *manipulators*, there were 7 entities classified as *non- manipulators*, and 8 other corporate entities included as *grey companies*. Furthermore, in 2020, no entities were found in the *manipulator* category, but 18 entities were found to be classified as *non-manipulators*, while 2 other entities were classified as *grey companies*.n In 2021, there was 1 entity classified as a *manipulator*, while 14 entities were classified as *non-manipulators*, and 5 other entities were classified as *grey companies*. In 2022, there were 6 entities classified as *manipulators*, 7 entities as *non-manipulators*, and 7 other entities included in the *grey company* category. As for 2023, there are 3 entities classified as *manipulators*, 4 entities are included as *grey companies*, and 13 other entities are included in the *non-manipulator* category.

4.5 Depreciation Index (DEPI)

The DEPI ratio has an *index* parameter value that has been determined by Beneish (1999) . The DEPI value is classified as a *manipulator* if the value is ≥1.077. If the DEPI value is ≤1.001, the company is classified as a *non-manipulator*. Meanwhile, if the DEPI value is in the range between 1.001 and 1.077 or 1.001 < index < 1.077, then the company is classified as a *grey company*. Based on the results of the calculation of the *Depreciation Index* (DEPI) ratio sourced from the financial report data of the transportation and logistics sector entities for five consecutive years presented in detail in Appendix 5. It was revealed that in 2019 there were 7 entities classified as *manipulators*, 1 entity classified as *non-manipulators*, and 12 other entities included in the *grey company* category. Furthermore, in 2020, 10 entities were identified as *manipulators*, 8 entities were classified as *non-manipulators*, and 2 entities were classified as *grey companies*. In 2021, there were 9 entities classified as *manipulators*, 7 entities included in the *non-manipulator* category, and 4 other entities classified as *grey companies*. Then in 2022, 9 entities were included in the *manipulator* category, 7 entities were classified as *non-manipulators*, and 4 other entities were classified as *grey companies*. As for 2023, there are 6 entities identified as *manipulators*, 3 entities classified as *grey companies*, and 11 entities classified as *non-manipulators*.

4.6 Sales, General, and Administrative (SGAI)

The SGAI ratio has an index parameter value that has been determined by Beneish (1999) . A company is categorised as a *manipulator* if the SGAI value is ≥ 1.041. If the SGAI value ≤ 1.054, then the company is categorised as a *non-manipulator*. Meanwhile, if the SGAI value is between 1.041 and 1.054 or meets the provisions of 1.041 < index < 1.054, then the company is classified as a *grey company*. Based on the results of the calculation of the SGAI ratio obtained from the numerical data of the financial statements of the transport and logistics sector entities for five consecutive years presented in detail in Appendix 6. It was found that in 2019 there were 7 entities classified as *manipulators*, while 13 other entities were included in the *non-manipulator* category.

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Furthermore, in 2020, there were 15 entities included in the *manipulator* category, while 5 other entities were included in the *non-manipulator* category. In 2021, there were 6 entities identified as *manipulators*, while 14 other entities were classified as *non-manipulators*. Then, in 2022, 5 entities were identified as *manipulators*, while 14 entities were classified as *non-manipulators* and 1 entity was categorised as a *grey company*. Furthermore, in 2023, there were 5 entities included in the *manipulator* category, 1 entity was categorised as a *grey company*, and 14 other entities were included in the *non-manipulator* group.

4.7 Leverage Index (LVGI)

The LVGI ratio has index parameters that have been determined by Beneish (1999) , where a company is considered a *manipulator* if the LVGI value is ≥ 1.111. On the other hand, if the LVGI value is ≤ 1.037, then the company is categorised as a *non-manipulator*. If the LVGI value is in the range between 1.037 to 1.111 or 1.037 < index < 1.111, then the company is included in the *grey company* category. Based on the results of the calculation of the LVGI ratio sourced from the numerical data of the financial statements of the transportation and logistics sector entities for a period of five consecutive years presented in detail in Appendix 7. It was revealed that in 2019 there were 5 entities classified as *manipulators*, while 12 entities were classified as *non-manipulators*, and 1 entity was classified as a *grey company*. Furthermore, in 2020 there were 9 entities identified as *manipulators*, 8 entities included in the *non-manipulator* category, and 3 other entities classified as *grey companies*. In 2021, there were 3 entities included in the *manipulator* category, while 16 entities were classified as *non-manipulators*, and 1 other entity was included in the *grey company* category. Furthermore, in 2022, there were 5 entities classified as *manipulators,* while only 1 entity was included in the *non-manipulator* category, and as many as 14 entities were categorised as *grey companies*. Then, in 2023, there were 5 entities classified as *manipulators*, 2 entities classified as *grey companies*, and 13 other entities classified as *non-manipulators*.

4.8 Total Accrual to Total Asset Index (TATA)

The TATA ratio has index parameters that have been established by Beneish (1999) . An entity is classified as a *manipulator* if the TATA value is ≥0.031. If the TATA value is ≤0.018, the entity is classified as a *non-manipulator*. Meanwhile, if the TATA value is between 0.018 and 0.031 or 0.018 < index < 0.031, then the entity is included in the *grey company* category. Based on the results of the TATA ratio calculation using numerical data from the financial statements of transportation and logistics sector entities for five consecutive years presented in detail in Appendix 8. It was found that in 2019 there were 5 entities identified as *manipulators* and 15 other entities identified as *grey companies*. Then, in 2020, there was 1 entity identified as a *manipulator*, while 19 other entities fell into the *grey company* category. In 2021, there was 1 entity identified as a *manipulator*, 1 entity as a *non-manipulator*, and 18 other entities identified as *grey companies*. Furthermore, in 2022, the number of entities classified as *manipulators* increased to 2, while the entities identified as *non-manipulators* remained consistently 2, and 16 other entities were identified as *grey companies.* Then, in 2023, only 1 entity was identified as a *manipulator*, while 19 other entities were identified as *grey companies.*

5. Discussion

5.1 Company Classification

Based on the results of the analysis of financial ratios, companies are divided into three categories, namely *manipulators* for companies involved in manipulation, *non-manipulators* for companies that are not involved in manipulation, *grey companies* for companies that manipulate but with insignificant values. This category is determined based on predetermined rules (Latifatussolikhah and Pertiwi 2020) . The following are the results of the classification of companies from the period 2019 to 2023:

5.1.1 Company Classification in 2019

The classification of entities in 2019 is presented in detail in Appendix 9. In 2019, there were 3 entities identified as *manipulators*, 16 entities in the *non-manipulator* category, and 1 entity in the *grey company* category. The summary of the results of entity classification in 2019 can be seen in Table 11.

Table 11 *Summary of company classification results in 2019*

No	Class	Company Code
1.	*Manipulator*	SDMU, TNCA, PURA
2.	*Non-Manipulator*	ACTION, BIRD, CMPP, IMJS, LRNA, MIRA, SAFE, TAXI, TMAS, WEHA, HELI, TRUK, BPTR, SAPX, JAYA, KJEN
3.	*Grey Company*	ASSA

Source: Data processed, 2025

5.1.2 Company Classification in 2020

The classification of entities in 2020 is presented in detail in Appendix 10. In 2020, 7 entities were identified as *manipulators* and 16 other entities were classified as *non-manipulators*. The summary of entity classification results in 2020 is shown in Table 12.

Table 12 *Summary of company classification results in 2020*

No	Class	Company Code
1.	*Manipulator*	ACTION, BIRD, TAXI, WEHA, HELI, SAPX, KJEN
2.	*Non-Manipulator*	ASSA, CMPP, IMJS, LRNA, MIRA, SAFE, TMAS, TRUK, BPTR, JAYA, SDMU, TNCA, PURA

Source: Data processed, 2025

5.1.3 Classification of Companies in 2021

The classification of entities in 2021 is presented in detail in Appendix 11. In 2021, there is 1 entity identified as a *manipulator*, 18 entities classified as *non-manipulators*, and 1 entity identified as a *grey company*. The summary of the company classification results in 2021 can be seen in Table 13.

Table 13 *Summary of company classification results in 2021*

No	Group	Company Code
1.	*Manipulator*	TAXI
2.	*Non-Manipulator*	ACTION, ASSA, BIRD, CMPP, IMJS, LRNA, MIRA, SAFE, TMAS, WEHA, HELI, TRUK, BPTR, JAYA, KJEN, SDMU, TNCA, PURA
3.	*Grey Company*	SAPX

Source: Data processed, 2025

5.1.4 Company Classification in 2022

The classification of entities in 2022 is presented in detail in Appendix 12. In 2022, 2 entities were found to fall into the *manipulator* category, 16 entities fell into the *non-manipulator* category, and 2 entities were classified as *grey companies*. The summary of the company classification results in 2021 can be seen in table 14.

Table 14 *Summary of company classification results in 2022*

No	Class	Company Code
1.	*Manipulator*	CMPP, PURA
2.	*Non-Manipulator*	ACTION, BIRD, IMJS, LRNA, MIRA, SAFE, TAXI, TMAS, WEHA, HELI, TNCA, BPTR, SAPX, JAYA, KJEN, SDMU,
3.	*Grey Company*	ASSA, TRUK

Source: Data processed, 2025

5.1.5 Classification of Companies in 2023

The classification of entities in 2023 is presented in detail in Appendix 13. In 2023, 1 entity was found to fall into the *manipulator* category and 19 entities fell into the *non-manipulator* category. The summary of company classification results in 2021 is shown in Table 15.

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Table 15 *Summary of company classification results in 2023*

No	Class	Company Code
1.	*Manipulator*	SAPX
2.	*Non-Manipulator*	ACTION, BIRD, TAXI, WEHA, HELI, ASSA, CMPP, IMJS, LRNA, MIRA, SAFE, TMAS, TRUK, BPTR, JAYA, SDMU, TNCA, PURA, KJEN.

Source: Data processed, 2025

5.2 Company Category Percentage

The percentage for each company included in the *manipulator*, *non-manipulator*, and *grey company* categories is obtained by comparing the total companies in the population with the total sample, then multiplying by 100%. The following is the percentage value for each category:

Table 16 *Percentage calculation of manipulator companies, grey company, and non-manipulator*

Year	Manipulator	Grey Company	Non-Manipulator
2019	$= \frac{3}{20} \times 100\%$ $= 15\%$	$= \frac{1}{20} \times 100\%$ $= 5\%$	$= \frac{16}{20} \times 100\%$ $= 80\%$
2020	$= \frac{7}{20} \times 100\%$ $= 35\%$	$= \frac{0}{20} \times 100\%$ $= 0\%$	$= \frac{13}{20} \times 100\%$ $= 65\%$
2021	$= \frac{1}{20} \times 100\%$ $= 5\%$	$= \frac{1}{20} \times 100\%$ $= 5\%$	$= \frac{18}{20} \times 100\%$ $= 90\%$
2022	$= \frac{2}{20} \times 100\%$ $= 10\%$	$= \frac{2}{20} \times 100\%$ $= 10\%$	$= \frac{16}{20} \times 100\%$ $= 80\%$
2023	$= \frac{1}{20} \times 100\%$ $= 5\%$	$= \frac{0}{20} \times 100\%$ $= 0\%$	$= \frac{19}{20} \times 100\%$ $= 95\%$

5.2.1 Companies Classified as Manipulators

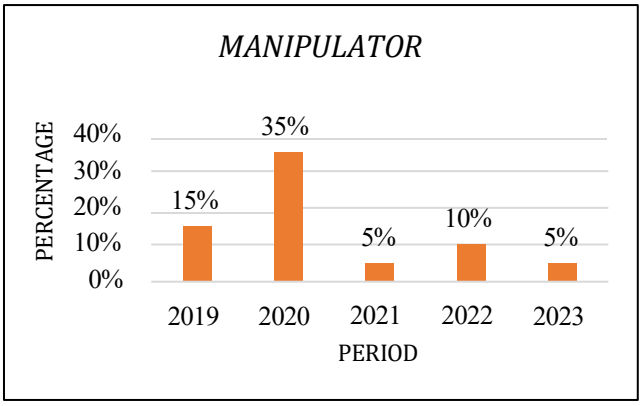

Fig. 1 *Percentage of companies that are classified as manipulators*

Based on the results of research utilising the *Beneish Ratio Index* on 20 entities over a period of five consecutive years presented in detail in Appendix 57. It was found that in 2019 15% of companies fell into the *manipulator* category. In 2020, this figure increased by 20%. Then, in 2021, there was a drastic decrease of 30%. The year 2022 showed a slight increase of 5%. However, in 2023, it again decreased where the percentage figure this year was the same as in 2021, namely only 5% of entities classified as *manipulators* out of 20 entities studied. Based on the

analysis of the ratios, it is revealed that the SGAI (*Sales, General, and Administrative Expense Index*) ratio has the highest average indicating manipulation. This is reinforced by the results of the classification of entities, where all the entities studied have SGAI (*Sales, General, and Administrative Expense Index*) ratios that indicate *manipulators*. This reveals that the majority of entities identified as *manipulators* have unfavourable prospective conditions.

The results of this study are in line with the findings revealed by Zulzilawati & Wahyuni (2021) that most companies that are considered *manipulators* show unfavourable future opportunities. Within the framework of *signalling theory*, this manipulative action is a negative signal that can mislead external decision makers. Companies with unfavourable prospects are often under pressure to communicate positive signals to maintain market confidence. Therefore, the evidence of manipulation identified in this study serves as a concrete representation of a corporate entity's failure to deliver reliable and accurate signals. This is in line with the principles of *signalling theory* that emphasise the significance of reliable positive signals in objectively reflecting the company's prospects.

5.2.2 Companies that are Classified as Grey Company

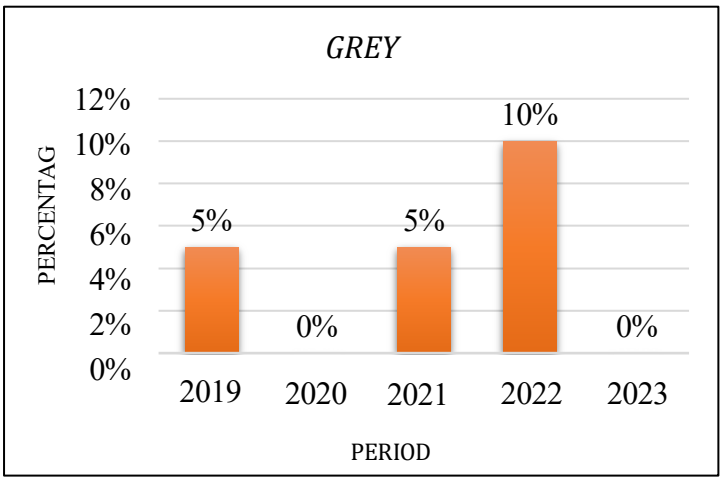

Fig. 2 *Percentage of companies that are classified as Grey Company*

Based on the results of research utilising *the Beneish Ratio Index* on 20 entities over a period of five consecutive years presented in detail in Appendix 57. It was found that in 2019 there were 5% of entities included in the *grey company* category. In 2020, no entities classified as *grey companies* were detected. Then, in 2021, there was another increase of 5% or there was only 1 entity classified as a *grey company*. 2022 is the highest percentage level than other years, namely 10% of entities classified as *grey companies*. In 2023 there were no transport and logistics sector entities identified as *grey companies*. Based on the ratio calculation analysis, it is known that 75% of the entities classified as *grey companies* have a *Sales Growth Index* (SGI) ratio that indicates a *grey company*. Warseno (2023) reveals that unstable sales growth is one of the early indicators of potential fraud or financial statement engineering, which often occurs to hide actual performance. According to Beneish (1999) in the study Isnawati et al., (2022) revealed that basically growth does not always indicate a grey company.

However, companies that experience growth are often seen as more likely to engage in financial statement manipulation.

Companies identified as *grey companies* are companies that show indications of financial statement manipulation, but the level of manipulation does not exceed the threshold value that has been determined based on the calculation of the ratio index. This condition reflects the possibility of manipulative efforts that are not significant enough to be classified as *manipulator* companies, but also do not fully meet the criteria as *non-manipulator* companies. The results of these findings are in line with studies conducted by Nursafitri et al., (2023) which reveal that companies classified as *grey companies* are considered to have manipulated with immaterial values. This means that entities identified as *grey companies* show obscurity. In *signalling theory*, corporate entities act as signal senders that aim to reduce information uncertainty for stakeholders, especially investors and creditors who have limited access to internal company information. However, entities classified as *grey companies* that are indicated to carry out earnings management with a low level of significance send signals that are vague and unclear. This kind of signal does not present a clear representation of the fundamental condition of the corporate entity, but rather produces uncertainty and ambiguity that has the potential to cause doubts among investors. Thus, entities identified as *grey companies* are in a position that requires further evaluation and supervision to clarify the signals conveyed and maintain transparency and market trust.

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5.2.3 Companies Classified as Non-manipulators

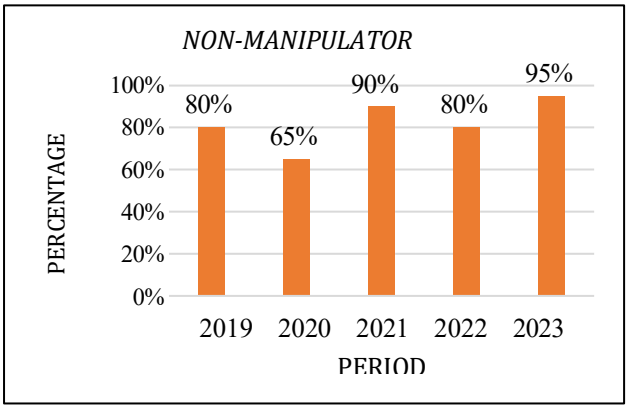

Fig. 3 *Percentage of companies that are classified as non-manipulators*

Based on the results of research utilising the *Beneish Ratio Index* on 20 entities over a period of five consecutive years presented in detail in Appendix 57. It was found that in 2019 80% of entities were included in the *non-manipulator* category. In 2020, this figure decreased by 15%. Then, in 2021, there was another increase of 25%. The year 2022 showed a decrease of 10%. In 2023 is the highest percentage level, namely 95% of companies classified as *non-manipulators* of the 20 companies studied, which means that in 2023 most of the transportation and logistics sector companies were not found to have indications of fraud in the financial statements. Companies that are not involved in manipulation are companies that do not show signs of engineering based on predetermined parameters. The number of companies in this category tends to remain constant and become dominant during the study period, with the highest peak reaching 19 companies in 2023.

The consistency of several companies in this category, such as AKSI, BIRD, IMJS, LRNA, and MIRA, indicates a fairly transparent financial reporting in accordance with applicable accounting principles. This reflects a good quality of corporate governance and a commitment to delivering reliable information to stakeholders. These results are in line with the basic principles of *signalling theory*. In signalling theory, corporate entities function as signal senders that seek to minimise information asymmetry between management, which has access to more comprehensive internal information, and external parties who have limitations in available information. The submission of transparent and accurate financial reports is a positive signal sent by the company to reflect the quality of management that is committed to information disclosure that can strengthen the trust of stakeholders.

6. Conclusion

This study aims to identify companies classified as *manipulators*, *grey companies*, and *non-manipulators* by applying a comparison of company ratios with the *Beneish index* as a parameter. Based on the results of research conducted through the use of the beneish ratio index on twenty entities in the transportation and logistics sector over a period of five consecutive years, it can be concluded that:

a. *Manipulator* Companies

In accordance with the results of the study of potential financial statement irregularities using the *beneish* ratio index in the transport and logistics sector corporate entities during the period 2019 to 2023, it was found that the category of corporate entities classified as *manipulators* stated that there were fluctuations in the level of financial statement manipulation throughout the observation period. At the beginning of the period, the number of companies indicated to have manipulated was moderate, then experienced a significant increase in the following year. However, after that the number tends to decrease and is relatively stable until the end of the period, which indicates an improvement or increased awareness of companies in preparing financial reports in a more transparent manner.

b. *Grey Company*

In accordance with the results of the study of potential financial statement irregularities using the *beneish* ratio index in corporate entities in the transportation and logistics sector during the period 2019 to 2023, it was found that only a small number of corporate entities were identified as *grey companies*. This category reflects a signal of potential financial statement manipulation with a low level of materiality. This finding shows that indications of fraud in this category tend to be rare and not consistent from year to year. In fact, in some years in the study period, no corporate entities were identified that met the criteria for this category. Overall, these findings reflect the trend that immaterial fraudulent practices are increasingly rare in the transport and logistics sector.

c. *Non-manipulator* Company

In accordance with the results of the study of potential financial statement irregularities using the *beneish* ratio index in corporate entities in the transport and logistics sector during the period 2019 to 2023, it was revealed that the *non-manipulator* group showed positive trend dynamics during the study period. The majority of companies operating in the transport and logistics sector show no indication of financial statement manipulation. Although there was a decline in certain years, overall there is an increasing trend in the number of corporate entities that disclose financial documents by considering fairness and conformity to generally recognised accounting standards. This finding reflects an increased awareness and compliance with applicable financial reporting standards in the transport and logistics corporate sector.

6.1 Research Limitations

The author suggests that future researchers expand the object of study by involving various industrial sectors to obtain a wider sample in order to obtain more in-depth findings. In addition, other method approaches can also be used as a comparison to the *Beneish Ratio Index* method, in order to obtain a broader picture of indications of financial statement fraud.

6.2 Research Implications

a. Companies need to implement an *early warning system* based on predictive analytics to detect financial risks that may arise earlier. Thus, management can take mitigation steps earlier to avoid manipulation or a worsening financial situation.
b. Companies are advised to implement integrated digital technology along with advanced automation systems to strengthen accountability and minimize manual intervention. Through the implementation of information technology-based reporting systems such as *Enterprise Resource Planning* (ERP) or *cloud-based* accounting software, companies can reduce dependence on manual intervention that is prone to error or manipulation.
c. Companies are advised to provide a confidential reporting mechanism (*whistleblowing*) facility that guarantees the confidentiality of the reporter's identity and provides protection against retaliation and ensures that each report is followed up with fair and transparent procedures.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: ***Study conception and design****: Latifah Anjarini, Hanifah Puspita Sari;* ***data collection****: Hanifah Puspita Sari;* ***analysis and interpretation of results****: Latifah Anjarini, Hanifah Puspita Sari, Ahmad Saifi Athoillah;* ***draft manuscript preparation****: Hanifah Puspita Sari, Ahmad Saifi Athoillah. All authors reviewed the results and approved the final version of the manuscript.*

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