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An Analysis of Financial Fraud Detection and the likelihood of Bankruptcy of Scandinavian Banks

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Abstract

The relationship between accounting manipulations and bankruptcy likelihood is a challenging topic in the financial field. Earnings quality and financial stability are one of the key drivers for any company. The goal was to examine the degree of influence of fraudulent accounting on bankruptcy likelihood and the performance measures. Beneish M-score model and Jones model were chosen to evaluate earnings quality, Altman Z-score model was used to analyze the level of distress.

The secondary data were gathered from 33 Scandinavian banks' annual financial reports and stock market for the period 2011-2018, the analysis was done in timeline of 7 years. SPSS software was applied to conduct descriptive statistics, correlation analysis and multiple linear regressions. The overview of the data was showed in descriptive statistics, and the correlation analysis presented the degree of association between variables. Multiple linear regression showed the main result, providing the findings related to the effect of accounting manipulations on bankruptcy likelihood and the performance measures. The opted methods allow to test the hypothesis.

The findings showed that some of the Scandinavian banks could apply earnings management. Z-score was at a satisfactory level, representing that most of the sampled banks are financially healthy. The result presented that discretionary accruals affect negatively on Z-score, i.e. earnings manipulations increase the bankruptcy likelihood. This correlation is more applicable for larger banks from the selection. The positive relationship between earnings manipulations and the performance measures was detected. The findings showed that fraudulent accounting increase performance ratio values, but in broad perspective earnings manipulations can become a trigger of bankruptcy likelihood.

Keywords/tags (subjects)

Earnings quality, accounting manipulations, bankruptcy, Jones model, Beneish M-score model, Altman Z-score model

Miscellaneous

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Abbreviations

AML	Anti-Money Laundering
SPSS	Statistical Package for the Social Science
FASB	Financial Accounting Standard Board
IASB	International Accounting Standard Board
IFRS	International Financial Reporting Standards
FAs	Forensic Accounts
NPL	Non-Performing Loans
FDIC	Federal Deposit Insurance Corporation
BRRD	Bank Recovery and Resolution Directive
SRB	Single Resolution Board
ESAs	European Supervisory Authorities
EBA	European Banking Authority
ESMA	European Securities and Market Authority
ESRB	European Systemic Risk Board
DSRI	Days Sales Receivables Index
GMI	Gross Margin Index
DEPI	Depreciation Index
SGAI	Sales, General, and Administrative Expense Index
TATA	Total Accruals to Total Assets Ratio
LEVI	Leverage Index

1 Introduction

The correlation between accounting manipulations and bankruptcy likelihood is a challenging topic in the financial field. Earnings quality and financial stability is an important issue for researchers, investors, and the society. Therefore, researchers make attempts to find the degree of influence of earnings management on performance and study consequences of fraudulent accounting.

Current research is aimed at detection of earnings manipulations and its effect on the performance. The investigation is based on ongoing situation of Scandinavian banks by the end of 2018. Therefore, this chapter introduces current problems in banking sector of Scandinavia, presents the motivation for the research, main questions, and approach.

1.1 Overview of Scandinavian Banks and motivation for the research

Nordic countries have a high level of trust in every sector, and it is well known fact that people there follow all the rules strictly. Nordic countries have been in the top list of least corrupted countries in the world for a long time. For instance, Denmark was number one in the Transparency International Corruption Perceptions Index, while Sweden and Finland shared a third place (Romberg 2019). Moreover, Scandinavian banks have recovered better after financial crisis in 2008 than other European banks (Berglund, & Makinen 2016, 3). However, there are a large number of news and articles can be found which reveal largest Scandinavian banks and their involvement in money laundering scandals. Such type of behavior from banking industry that has gone public caused a resonance in the society. The performance of these banks worsened after their manipulations. For instance, Danske Bank's shares have fallen by half in one of the largest money laundering scandals, Nordea was one of the banks which was caught in several investigations of financial crime and its shares have reduced by fifth (Milne 2019). Between 2007 and 2015, 200 billion euros from uncertain sources were channeled through Danske's Estonian branches (Billions of Kronor May Have Been Laundered through Major Swedish Banks 2019).

The Nordic region was always highly stable with a very few accidents of financial criminal activity. It was common to think that these countries have minimal chances to be involved in anti-money laundering (AML) scandals. Nordic banks were not previously affected by technological and operational process transformations while other European banks were going through this. (Dasgupta 2018.) Moreover, Nordic people assume that they live in a society where everyone wants to do a right thing, where rules are strictly followed.

Nowadays compliance and AML seem to be in the spotlight in Nordic countries. The above scandals at Denmark's Danske Bank, Swedish and Finnish banks have turned to be a catalyst toward improvement of regulatory system in Nordic countries. Finland-based Nordea admitted that it has invested more than 730 million euros during the last three years, which were directed in areas such as fighting financial crimes and staffed more than 1500 employees. Sweden's Handelsbanken hired more people in IT sphere to develop artificial intelligence (AI) in areas such as fraud prevention. (Jensen 2019.)

More and more banks develop AI to apply it in their operations. The main goal of banks is to provide secure and swift transactions. AI is designed to control and analyze transactions and detect fraudulent ones. Moreover, mobile apps monitor the activity and find out suspicious transactions, which involve huge amount of money. (Riley 2018.) AI has a potential to enable changes in AML capability. However, many specialists are skeptical about AI, and they believe that it cannot yet replace human's mind. (Gregory 2018.) Nevertheless, AI is applied by Nordic banks since 2017. However, it is delegated a partial responsibility to control suspicious transactions. (Iversen 2019.)

Currently Scandinavian banks are going through investigations and big changes. During past months some major Nordic banks' CEOs have been fired. Several countries investigate dirty money flows in the Baltic countries. (Olsen 2019.) Many investors try to stay aside from Nordic banks. These scandals caused a fall in banks' stocks. (Hoikkala & Pohjanpalo 2019.)

Current situation in Nordic region, where all top banks were involved in money laundering, attracts a lot of attention. Performance of Nordic banks has fallen, and it is

expected to worse further. The level of trust from the side of society and from the side of investors reduces as well. Nordic countries are very sensitive to the corruption, and such type of actions influenced banks' reputation. These scandals arise a question if Nordic banks have been hiding negative aspects of their operations and if it is possible that banks could manipulate accounting information. Another question that comes to mind if these scandals have affected the level of banks' distress.

Such unusual for Nordic region actions of banks turned to be a motivation for current research work. The author of the thesis is interested to find out how the above events are shown numerically. The author is motivated to go in deeper analysis to research if fraudulent accounting is applied by banks and what are the consequences of these actions. Analysis of ratios is an important step towards understanding the current situation of banks' performance, which in its turn is one of the significant indicators. On the broader scale, current work analyzes the situation of financial sector of Nordic region. The research will study the performance during post-crisis period and if scandals have influence on the level of distress. Therefore, the research work contains the descriptive statistics of models' variables, which represent the earnings quality and the financial health of the Scandinavian Banks.

1.2 Research questions and approach

The research objective is to evaluate the reporting quality by two mathematical models and the financial health of Scandinavian banks.

The main research questions are:

1 Do accounting manipulations affect bankruptcy likelihood?

2 Do accounting manipulations influence banks' performance measures?

To answer the research questions, the accounting data of 33 Scandinavian banks was obtained during the period of 1st January 2011 and 31st December 2018, two banks were studied in timeline of 1st January 2011 and 31st December 2017, and two other banks during the period of 1st January 2012 and 31st December 2018 due to the absence of financial reports at the moment of study.

A quantitative research approach was applied in the current work. Only secondary data gathered from banks' annual reports during the studied period was used to answer the research questions. During the first step of the research the required information was gathered in excel and then transferred to SPSS (Statistical Package for the Social Science) program for the further analysis. Quantitative research was based on hypothesis testing.

To bring validity to the research, two types of accounting quality models will be applied. First type of model is accrual based, second uses specific accruals. The nature of accruals can vary from company to company. Use of different models allows to detect abnormal accruals by involving different accounting items and environmental factors (Yurt, & Ergun 2015, 35). For each type of models, the most frequently used ones, according to literature review, will be applied in this study. As an accrual-based model, Jones Model, have been chosen, as it is widely accepted in the literature. One of the most frequently used technique to evaluate the quality of financial reporting is Beneish M-score model, which uses specific accruals and allows assessing the probability of accounting manipulation with publicly available information (Beneish 1999, 26). To measure banks distress, Altman Z-score model is applied.

To answer the research questions, the analysis will include multiple linear regressions. Firstly, Z-score will be regressed on predictors M-score and Discretionary Accruals. The aim is to find statistically significant correlation between earnings manipulations and bankruptcy likelihood. Secondly, Beneish M-score model's variables and discretionary accruals will be regressed on Altman Z-score model's components. It will allow to analyze how accounting manipulations influence on performance ratios, which are the variables of Z-score model. Therefore, the descriptive statistic will be interpreted. It will reveal if some of the statements are manipulated. Further, the regression will show if manipulated statements influence Z-score.

The findings show that some of the Scandinavian banks might apply earnings management in their financial reports. Moreover, the statistically significant correlation is found between discretionary accruals and bankruptcy likelihood. The research proves that abnormal accruals decreases Z-score value, i.e. increases the risk of bankruptcy. At the same time, the research demonstrates that M-score model's indexes influence Z-score ratios.

1.3 Structure of the thesis

The research paper is structured in a logical way, so that it shows the study step by step. The second chapter describes the main concepts which are used in the current research work, such as earnings quality, accounting manipulations, bankruptcy, Beneish M-score model, Jones Model, Altman Z-score model. This part explains the significance of the topic. Empirical study is also included, which represents other researchers' works that conduct similar studies. This sub-chapter is developed to prove the efficiency of applied mathematical models for current topic. The third chapter represent a description of applied research approach and method to achieve credible results. The fourth chapter describes the results of the study, which is the principal part of the thesis. The last chapter is a discussion part, where the author makes a conclusion and summarizes the findings, as well as explains how they answer the research questions and support the hypothesis. Another part of this chapter is the description of the limitations of the research and suggested recommendations for the future research.

2 Theoretical Background

In this chapter, main concepts will be studied in order to be able to analyze further research results, point out important issues and answer the research questions. This thesis is aimed at studying of two possible relationships: between accounting manipulations and bankruptcy likelihood, and between accounting manipulations and performance measures. According to the set target, the theoretical background will include such themes as quality of earning, accounting manipulations and the overview of bankruptcy. For the future evaluation of issues three main models will be used during the whole process of the work. Those mathematical models are Beneish M-score model, Jones Model and Altman Z-score model; and they will be discussed in order to understand the usage of those equations and come up with correct interpretations of the results. The Beneish and Jones models help to find out if a company manipulates their financial results based on the information from annual reports. Altman model analyzes the risk of bankruptcy based on data from company's reports and daily market data.

2.1 Earnings Quality

The main point that should be raised about earnings quality is that it has a vital role during the whole process of financial reporting. Accounting data effects on a final decision of people, who operate on the market: investors, shareholders, stakeholders and so on. Some companies tend to manipulate the financial results to attract the capitals and show the company usually from the positive sight. In order to minimize risks of an opportunity of hidden information, high standards of quality were developed, and moreover, companies must follow those standards during the reporting of financial data. Nowadays, financial reports have similar structure, which will be studied further, and reporting standards will be discussed late in this chapter.

The reason why the earnings quality is very important is that companies with low quality of reporting have unstable earnings and the possibility of overstatement is higher (Keefe 2017). Consequently, investors would prefer companies with high quality, because it makes better a capital market efficiency (Ewert, Wagenhofer 2010). Nevertheless, earnings quality demonstrates current operating performance, then it is one of the characteristics of future performance, and what is more significant, it indicates a real value of a company.

First, in this chapter a definition of 'earnings quality' should be explained. According to Dichev, Graham, Harvey and Rajgopal (2013, 1), there are several argues about how to define correctly earnings quality, so that this definition would describe all the nuances of this phenomenon. As one of the examples of its understanding can be an article of Richardson, Sloan, Soliman and Tuna (2001), where Sloan talks about quality of earnings as earnings persistence. However, there are other definitions that can be listed: predictability, significance of accruals, absolute value of company's performance, etc. Various explanations of this term open the idea that stays behind and proves the importance of this issue. The most vital characteristics of earnings quality are consistent reporting during actual cash flows and absence of items, which affect earnings sustainability. Earnings are considered to be highly qualified if they cover long-run profits of a firm. (19-20.)

One of the important facts about earnings quality is that it can differ in diverse companies from different business sectors, even if there are not any manipulations in financial reporting. The reason for that is that some firms needs more forecasting and estimations, especially it concerns companies in growing industries. Mistakes in estimations can decrease a persistence of company's earnings and make them incorrect for the evaluation. Dechow and Schrand (2004) took as an example a biotechnology company, where the first profit appears after creating and testing a drug. Before that step the quality of earnings in such companies is low: current earnings cannot be used correctly in terms of estimation of future performance and understanding the real value of the firm. Basically, it could be a mistake to determine this company to have low-quality earnings, as this rule does not work in such types of companies. (7-8.)

Although the principle of earnings quality is vague, it can be explained in one sentence. The quality of earnings can become better if accruals smooth out unvalued changes in a cash flow, and it decreases if accruals hide those changes. In order to evaluate the earnings quality, an analyst cannot consider only earnings itself, but the analyst has to focus on cash flow statement, balance sheet and income statement all together. The "smoothing effect" is one of the most important issues during a process of creating accounting standards, that will be discussed later. The main aim of standards is to make financial data reliable and relevant. A reliable information is easy to be checked and it should be reasonably free from mistakes. A relevant information is recorded on time and provides the opportunity to make a valuation of a company (ibid., 8-10).

According to Melumad and Nissim (2008), researches in professional and academic literatures describe earnings as the combination of the following characteristics:

- conservatism – the quality conservatively estimated earnings is high since they are unlikely to be overstated in the sense of future performance,
- economic earnings – the quality of earnings is high when they are reported accurately and reflect the changes in value of the firm according to its operation activities,

- persistence – earnings are of high quality if they are sustainable, i.e. current level of earnings is approximately the same as future one. This definition relates to volatility of earnings,
- stability – high earnings quality implies the law volatility, and
- predictability – high quality of earnings means that earnings must be predictable (91-92).

All above characteristics are related with each other; however, they have contradictory implications. For instance, management can measure the value assets and liabilities by unrecognized gains and losses; and doing by that, they may improve earnings quality as the change in value, but the predictability and persistence are reduced. Another "smoothing effect" of accruals can be caused by improving the predictability and persistence but weakening the relationship between earnings and cash flow. (ibid., 92-98.)

Theoretical researches define earnings quality as an accuracy of accounting reporting process, and they are permanent. Empirical researchers describe earnings quality as a sign of sustainability and studied the information and ratios which relates to the future changes. (ibid., 93). A great number of studies, which were made by such researcher as Sloan, Dechow, Dichev, Lev and Nissim, showed the connection between future earnings and accruals and cash flow. Other researches, Fairfield, Bushee, Penman, studied the earnings implications in financial statement decomposition and many other measures. Practitioners tend to explain earnings quality as earnings persistence. This is due to the fact that equity value is measured by applying a multiple to earnings, so called multiple-based method. A multiple measures company's financial well-being. The higher sustainability, the bigger is multiple. This method is a demonstrating valuation, because it shows current earnings, which relate to future performance, hence it calculates an intrinsic value of a firm. Moreover, earnings sustainability decreases uncertainty and minimize an information asymmetry between company and investors. (What is a "Multiple" 2017.)

Since earnings quality is one of the most significant and demonstrative characteristics of reporting process, there are quite many standards that are improved constantly. Standards setters, such as the Financial Accounting Standard Board (FASB)

and the International Accounting Standard Board (IASB), formulate and develop a framework which controls the reporting and increases quality. They do not define earnings quality, but they list a number of significant characteristics that are aimed to achieve a high-quality financial report as well as relevance, comparability, timeliness and understandability. (Ewert, & Wagenhofer 2010.)

The impact of the International Financial Reporting Standards (IFRS) has been studied by Arum in 2013, and the research showed that there are positive signs in the relevance and the reliability of a financial reporting quality (Hassan 2015, 94). As one of the consequences of IFSR adoption is the usage of fair value accounting. The fair value is seen in the standards of share-based payments (FRS2), investment properties (FRS140), intangible assets (FRS138) and others (Wan Ismail, van Zijl, Dunstan 2010, 3). Another advantage of IFSR is that it requires a higher level of disclosure. This disclosure system supports high-quality standards and it gives to investors a truthfulness of financial reporting. The probability of earnings management is less, when more disclosure is required: it will be detected by internal monitoring bodies.

Ewert and Wagenhofer studied the IFSR period, i.e. the period after adoption of IFSR. They have concluded that the earnings quality is higher if the stricter accounting standards are applied, because there is a smaller number of accounting choices due to the fact that standards establish clear rules (ibid., 9). Different accounting standards has a straight impact on the earnings quality, and they are associated with different levels of the earnings quality. If a company does not follow any accounting standards, there is too high flexibility in reporting. Consequently, it ruins the true value of financial performance of a company. Accounting practices which encroach IFSR are called accounting manipulations.

2.2 Accounting manipulations

The main purpose of accounting standards is to minimize the level of manipulation and to provide an intrinsic value a firm. Rosner R.L defined a term earnings manipulation as a combination of both – earning manipulations and fraudulent accounting (Shahzad 2016, 1). Those account, which are estimated as “discretionary accruals”,

can be named as earnings management or accounting fraudulent. According to Athanasakou VE et al., the often use of aggressive accounting and so-called discretionary accruals causes earnings manipulation. (ibid., 1.)

The main reason of accounting manipulations is to inflate revenue and to report the growth of financial statement artificially. Companies, which tend to manipulate statements, try to create a strong performance and a false impression of the company's strength. By ignoring the rules of standards, firms take an advantage over others and take the strong position on the market and attract more investors. Even though, those standards are developed every year, there are still many cases of manipulation in the world, and this topic remains vital. Nowadays, there are quit many companies, which have a perfect environment for this activity. (ibid., 2-5.)

Different researchers highlight at least three main factors of earnings manipulation: compensation of executives, flexibility of IFSR standards, difficult to detect the manipulations. The first reason can be explained in the way that the profit of executives is highly tied with the company's performance. Consequently, the higher performance means the higher profit of the executives. Hence executives are more motivated to have better financial statements, in order to increase their compensation. The second factor relates to regulations, such as IFSR or GAAP standards, which cannot provide the full protection from this activity. For financial specialist, it is not a problem to avoid those rules, as there is a huge amount of latitude to influence the company's performance and statements. It allows managers easily to build a preferable picture of financial situation. In modern reality, the corruption has an influence on auditors, and companies have the relationship with the independent auditors. Therefore, the third reason of the manipulation is that it is difficult for investors to detect accounting manipulations. (ibid., 5-7.)

One of the ways to control reporting quality is the auditing, which has a positive effect on financial reporting properties (Vanstraelen, & Schelleman 2017). Those companies, which are voluntary audited, have higher financial quality compare with companies, who refuse to be audited. Another point is that higher quality auditors ensure higher quality reporting. Financial reporting always was an essential part for investors; however, nowadays audited financial statements are more argumentative for the decision-making process. The main value of audited reports is that they improve

the quality of financial statements and provide determine market values of the company. An auditor's role is also finding of errors in financial statements. It improves internal decision making and accuracy of workers who are responsible for the reporting. (Ittonen 2010, 7.)

Nevertheless, even auditors are not able to detect creative accounting due to several nuances. The reason is that there is a thin line between accounting manipulation and doing what is legally allowed (Sharma, 2015). Consequently, management level can easily control accounts and keep the fact of manipulations in secret. Therefore, traditional internal auditing cannot guarantee the detection of manipulations. Firstly, some auditors do not have required knowledge to find the fraud. Secondly, there is not enough practices in the world of accounting manipulation and many auditors just do not have the experience in order to detect, analyze and prevent the fraud. The last reason is that managers such as Chief Financial Officers (CFO) and accountants plan how to deceive both internal and external auditors, and therefore, the detections of mismatches turns to be almost impossible. (Sharma, & Panigrahi 2012, 37.) As it was mentioned earlier if managers want to hide the fraud, then there is no one who can notice manipulations.

When financial managers know the limitations of an auditing process, traditional and standard auditing deficient tool to detect accounting manipulations. Due to some limitations, internal auditing is not able to collect all necessary data to analyze the report. Therefore, external auditing can provide more significant results. The reason is that this auditing is allowed to apply forensic accounting, which are important in detecting of fraud, which cannot be find by internal auditing. Forensic accounting is the process of deep investigation with astounding conceivable exactness. (ibid., 37-38.)

Forensic accounting – forensic auditing – financial forensic is the most reliable examination of companies' reports. Nowadays, all Government organizations, large financial firms have their own forensic auditing divisions. The reason is that they can provide a "master proof" in trial. Forensic accountants (FAs) are allowed to investigate any suspicious movements inside organizations. Moreover, they are tightly connected working with law requirements, and therefore, they can protect company in court. (Myers 2016)

There are several approaches of accounting manipulations. The first one is to increase current earning by artificial increase of revenue or decrease of expenses. This manipulation makes a company's financial statement more reliable for investors. The second approach is opposite to the first one, it aims at decreasing current earnings by reducing revenue or increasing current expenses. From the first sight there is no reason to aggravate financial statements, but companies use this tactic in order to avoid ineligible acquisition. (Adkins 2016.) Some companies tend to change some elements of the depreciation policy, which increases or decreases internal capital and assets. Another method is to include or exclude of some expenses in purchase cost or production cost, and by doing so they increase or decrease profit and internal capital. Some companies create extra-balance financing accounts which are not included in the consolidation report, and it increases liabilities. One more approach is to create accounting transactions, which changes future estimates on optimistic or pessimistic, and it helps to change profit internal capital, liabilities and assets. Some companies hide revenues or add future revenue in order to influence profit and internal capital. Another way is to assess transactions at different price that market or falsify the prices in order to influence profit, liabilities, assets. (Popescu, & Nisulescu 2013, 6.) There were some examples how companies change their statements in reports, and how it influences on the revenue, assets, and liabilities. Accounting manipulations can be hided in Income Statement and Balance Sheet depending on what picture company wants to build for investors and other companies. Therefore, the detection process can take time, and anyway can be inefficient.

Manipulations are divided on two categories according to the nature of manipulation behavior. They are "macro" and "micro" manipulations. Policy makers start using macro manipulations when they get aware of new regulations which do not fit a company. Therefore, they start bringing new alternative picture of the economic reality, which is more suitable for them. This strategy allows to reject new rules in order to suit policy makers' purposes. Micro manipulations are used to hide real results of a company. Preparers create altering accounting disclosures in order to present financial statements in the way they would like to have. Micro manipulations allow to keep stakeholders from the truth and intrinsic view of a company. (Tassadaq, & Malic 2015, 544.)

Both fraudulent and creative accounting present the wrong depiction of companies' statements and its position on the market. More and more companies start manipulating financial results in order to influence investors decision making and their interpretation of financial statements. Creative accounting has become a root of many financial scandals. Therefore, there are many proposals to remove those practices, and it makes governments develop reporting standards, which aim is to minimize the possibility of creative accounting. The use of accounting manipulations has different effects on the future of company. For example, one research has proved that Enron's manipulation of financial statements for several years with high probability has ended up with its bankruptcy (Ndebugri, & Senzu 2017, 12).

Accounting manipulations give only short-term benefits for the company, because they can increase prices of shares. Anyway, macro manipulations increase the risk for investors.

In history there were different examples of companies which used accounting manipulations, and it led to failure. The Enron Corporation is already mentioned, then WorldCom Inc, Parmalat, Leisurenet. They had come to the same result; those companies have decreased their companies' value. Creative accounting is the right way to minor accounting fraud and the violation of IFSR. Companies have practiced creative accounting at lower level in order to keep them hidden, but it has led to operational problems. (Bekteshi 2017, 332.)

Many researches show that there is a high probability of bankruptcy if companies use accounting manipulations. Nevertheless, companies were able to operate successfully on the market and show their statements in a preferable way. Moreover, investors were able to have profits from companies for the few years of those practices. After some period, accounting manipulations start showing its results and lead to financial losses. It is difficult for investors to analyze the future of the company and build the correct possible scenario. Therefore, it is important for them to check what standards a company uses and read auditing reports before decision making.

2.3 Bankruptcy

Bankruptcy is the procedure under federal law that allows the debtor who has unmanageable financial responsibilities to get a financial relief. As the first step, a debtor needs to sign the petition to begin the case and go to the federal court. A debt can be divided on two types: secured and unsecured. Secured debt is the one which has a collateral attachment to it, for example a house. And if debtor is unable to pay all financial responsibilities, then this house will be as collateral for the debt. Unsecured debt is such type of loan which is not secured by collateral, for instance, credit card. (International Property and Transactional Law Clinic 2010, 1.)

Company which is near to failure has different scenarios depending on the situation. One of the scenarios is the liquidation, which provide the opportunity to the company to eliminate or forgive all or some unsecured debts. Another way is the reaffirming of the debt with the creditor. One more opportunity is when a debtor can pay back all or some part of the loan to the creditor on a long-term basis. The last scenario requires higher income, but it allows to protect valuable assets. (What is Bankruptcy 2011.)

One of the most important reasons of why companies go bankrupt is the effect of market. Macroeconomic environment has an influence on company's performance. There is a strong correlation between the level of macroeconomic characteristics, such as interest rate, inflation, unemployment rate, and firm's earnings. Therefore, many researches have proved that macro-economic environment can be the reason company failures. (Bhattacharjee, & Higson 2007, 3.)

Banks and financial institutions face one more problem as well. Banks unlike other kinds of business have a huge part of their assets in loans. Loans are the least liquid and the riskiest asset. Therefore, if bank has a higher equity in a percentage of assets, it is less likely to fail. It means that the less equity a bank has, the less protection from loan losses it has. (Wheelock, & Wilson 2000, 14.) Consequently, stable macroeconomic environment supports healthy functioning of banking sector because it diminishes a credit risk. It has been found that the growth of GDP is the main challenge to loan portfolio quality, the growth unemployment rate accelerates the non-performing loans (NPL) ratio.

Macro-economic risk is the main source for banks of systemic risk which has a huge impact on performance of banking sector. The main problem is that unstable macro-economic environment raises the quantity of NPL to total gross loans. The increased NPL ratio is the signal of deterioration of banking sector performance. According to Festic and Beco (2008, 118), there are several macro variables, which has an influence on banks' performance:

- indicators of domestic economic activities, such as growth of GDP, investment expenditures, unemployment rate, inflation rate,
- indicators of the external economic environment, for example import statements and export results,
- different price indicators, such as consumer price index, real estate prices, exchange rates, and
- monetary variables, for instance interest rates, monetary aggregates, loans to the business sector.

The above variables have a tight connection with changes of macro-economic environment. Capital inflows could be a reason of domestic credit's growth. Borrowing of huge among of foreign currency and lending it in domestic currency because of depreciation of domestic currency result in decreasing of profitability and NPL performance. Falling prices on assets may cause a banking distress. Increase in asset prices, a high level of investment, growth of export increases the credit risk due to the fact that this risk is growing during boom period but materializes during worsening period. Growth of unemployment decreases the need for loans. (ibid., 120.) Therefore, it can be stated that any macro-economic shock can be destructive for the banking system. That is why governments develop regulations for banking sector.

The world of regulations has divided in to two parts: financial sector and sector of private business. If private business bankruptcy is treated under national law, financial sector has more opportunities to overcome the risk of failure. After Great Depression in 2008, financial institutions and banks are treated under different low and their policies can be described as "to big to fail". Every government shields large banks, which have a huge economic impact, from the collapse. Nowadays laws and frameworks are developed in a way that significant financial institutions are highly

protected from failure. The main aim is to avoid the probability of repetition of Great Depression.

The main task of the new law system is to protect banks and financial institutions from systemic risk, which makes banks unable to function properly and, therefore, causes distress. The weakness of financial system is that failure of one bank causes the failures of others, the same has happened during the Great Depression when 9000 banks has collapsed. The failure of banking system is extraordinary costly for governments, and it makes to develop strong regulatory actions to avoid systemic risk. (Helwege 2009, 3.)

The USA and European Union has similar systems vis-à-vis protection of large banks and financial institutions. New acts and Directives will be studied in order to show how actions work today. Governments have an experience of the work of systemic risk, and they know how to minimize it and even how to eliminate it.

2.3.1 Bankruptcy of banking and financial institutions in US

Banking and financial institution have been put to different standards of bankruptcy process than other types of industries. This difference excepts the possibility for banks and financial institutions to face bankruptcy and deal with normal corporate laws and corporate failure. (Lubben 2011, 1259.) Previously, banks could be involved in bankruptcy because of diverse reasons: being government-insured and creditors-depositors. Nowadays, such institutions can face failure because of being creditors.

The USA has a huge protection of their banks. Many articles highlight that America has developed the strongest system to maintain a smooth work of large banks or financial institutions. The new Dodd-Frank Act puts banks to the new resolution regime, which covers all large and important financial institutions with more that 85% of their activities in finance (ibid., 1260). The aim of this act is to shield the financial system. However, it moved one problem to the new perspective, and banks with 84% of their activities in finance are not covered by the new procedure. Basically, this bankruptcy disconnection was moved to different group of firms. Anyway, new legislation is the attempt to divide banking and finance from the bankruptcy. Many researches highlight that this attempt of reformation opens new potential sources of

systemic risks for the whole financial system. Systemic risk is the situation when banks or financial institutions are unable to deal with certain types of contracts and loss liquidity in the system. (Morrison 2010, 242.) The main problem is that government wants to develop new system but does not take any attempts to integrate the new system with the existing structure.

Federal Deposit Insurance Corporation (FDIC) is an authority which protects banks and financial institutions from collapsing. Nevertheless, it is important to highlight that FDIC does not try shield companies from bankruptcy, the main idea is to provide liquidity and ensure that systemic risk has decreased. However, they have exception for financial institutions: they provide a special treatment for financial institutions in order to protect the economy. (ibid., 248.)

It is normal for the market to sort out companies which cannot survive for some reason. The same is for the banking sector. However, financial system is too interconnected, and the USA cannot take risks and let system collapse because of systemic risk, which has a “chain reaction”. FDIC highlighted that bankruptcy is the way to deal with problems of particular business, but it is not the way to deal with problem of an entire economy. The bankruptcy of those companies and banks that belong to “too big to fail” are problem of both particular business and the entire economy. The US government has Bankruptcy Code’s safe harbors. Safe harbors are a special offer of protection to all possible financial contracts, for example swaps, repos and other financial derivatives. It means that when big company fails, counterparties to the protected financial contracts can ignore bankruptcy filing and they can terminate contracts, and then seize collateral. There are two problems which cannot be solved with safe harbors. The first one is that it protects derivatives counterparties, but not company and ordinary stockholders. The second problem is that it cannot deal with liquidity. Therefore, there are a lot of consequent difficulties due to the fact that big amount of transactions is terminated; and other liquid collateral are seized. Mass collateral sales and too much hedging as a result decrease the price of collateral and increase price of hedging. Finally, the infection will spread over the system, because companies with the same collateral will have losses in their balance sheet. These effects influence the entire marketplace. (ibid., 247-250.)

Basically, there are four approaches to deal with bankruptcy. The first approach is to do nothing and treat company under Code as it is. There are cases when companies' bankruptcy does not have to happen. Second approach is to modify Bankruptcy Code and make more amenable to failure. However, this approach increases the risk of systemic risk. It means that safe harbors cannot stop collapse when companies are near to failure. The just help to reduce the probability. Only infusions from government can help company to survive. The second approach is more reliable than leave Bankruptcy Code as it is. Anyway, there is a need for government intervention when important company fails. The third way is to apply policy that allows an early rescue and provide government all the power of bankruptcy court. Sometimes, it is possible for the government to take the power over the company, to give the power to House Bill. And the last approach is the connection of Bankruptcy Code with House Bill. The Bankruptcy Code determines creditor priorities during liquidation process. Those assets that are not considered as systematically important are transferred to courts to determine payoffs. (ibid., 253.) Bankruptcy Code alone cannot resolve the collapse; therefore, government intervention is the only way to rescue an important company.

After 2008 crisis, governments decided to protect large banks in order to avoid similar collapse, and Dodd-Frank Act provides the power to protect a failing bank using Bankruptcy Code or Orderly Liquidation Authority (Jackson 2013). Basically, banks and financial institutions cannot become bankrupt, because regulations of authorities. In fact, FDIC has a total control over resolution process of failing banks since Great Depression. FDIC is able to provide assistance to failing banks without its closing. Even in case when FDIC closes failing banks, they sell bank's assets to other banks, and in most cases, they achieve that. (Hynes, & Walt 2010, 1001-1002.)

2.3.2 Bankruptcy of financial institutions in EU

European Union acts similarly to the USA when a large bank, which has a huge role in the economy, is near to fail. There are two options, which EU can provide to banks depending on the situation: resolution and liquidation. The EU Bank Recovery and Resolution Directive (BRRD) provide resolution to the EU banks or financial institutions, and liquidation is regulated by national insolvency law. (Merler 2017, 1.)

Single Resolution Board (SRB) is an EU authority, which deals with banking problems. The chairman of the organization admitted that the majority of banks do not have strong influence on the economy, therefore resolution procedures are used only for the few (ibid., 2). EU uses its public funds in resolution procedures.

Nevertheless, this system creates new problems in EU as well as in US. Due to the fact that different companies are not treated equally in case of failure, the outcomes of liquidation procedures are uncertain for diverse participants. Moreover, EU faces the problem of different financial level of different governments, which makes the liquidation aid unclear. (ibid., 3-4)

Current EU environment makes banks and financial institutions merger in order to create larger banks which could have more critical function on the economy. This tendency has started from 1990's, when banks have started merger in order to avoid acquisition by foreign companies, and nowadays those banks are the largest in the EU. For example, Amsterdam Rotterdam Bank (AMRO) united with the Algemene Bank Nederland (ABN) in 1990 in order defense themselves from being acquired by other banks. (Thalassinos 2008, 45.) Those rearrangements of EU financial system have decreased the number of independent banks, and few banks control the huge part of the market. However, as a total centralization is insignificant.

The financial crisis in 2008 has pushed EU to improve laws for regulation and supervision of financial sector. Starting from 2010, European Commission has developed 30 sets of rules to ensure that financial sector is efficiently regulated. These rules represent the basic framework for all 28 EU countries. (ibid., 47.)

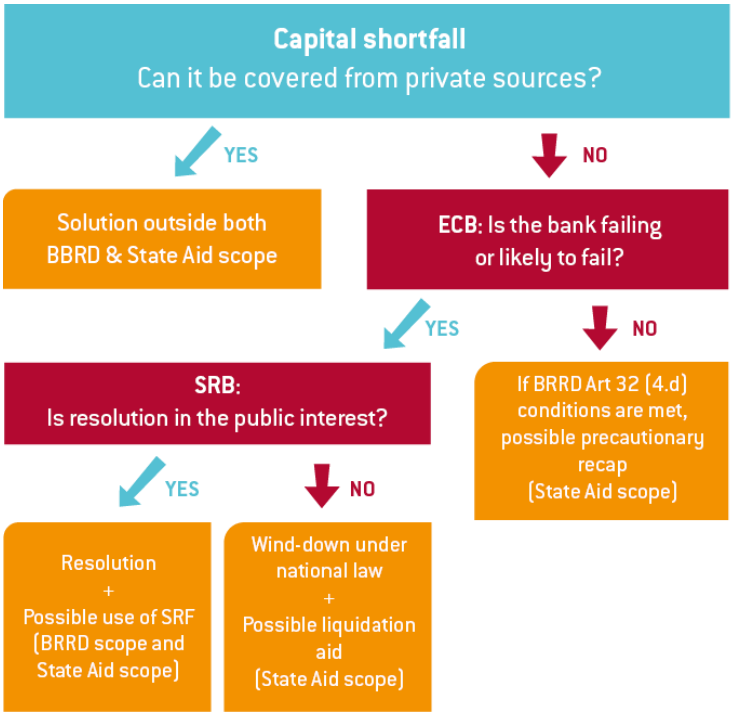

Figure 1. Use of public funds (Adapted from Merler 2017, 5)

Figure 1 shows how EU manages public funds according to the legislation; how EU decides on what option, resolution or liquidation, is applicable to the financial institution, banks which are near to fail. Firstly, European Commission checks if they are able to cover financial problems from private sources. If bank can do it without extra support, it does not get a state aid. If it happens that bank is not able to cover itself, then European Commission declares that bank is likely to fail or failing. If bank is likely to fail and this bank has critical functions in the economy, then BRRD is applied, and bank is under resolution. If bank's failure does not influence the economy, then bank is treated under national law, and European Commission provides possible liquidation aid. (Comprehensive EU response to the Financial Crisis 2014.)

Before 2008 crisis EU had 27 regulations for financial system and were not able to shield banks from failure because of its systemic nature. After crisis European commission has developed around 30 proposals to strengthen banks and to have more effective financial sector. Moreover, the existing system does not make taxpayers to suffer from banks mistakes. It provides the financial stability in Europe and sustainable recovery. (ibid.) In order to maintain effective supervision, financial sector is protected on EU level. It allows to have national supervision and EU-wide supervision, which are important for financial stability in EU.

European commission (2014) admits that EU changes in regulation of financial sector were huge, and in 2011 they have established following European supervisory authorities (ESAs) to ensure better work:

- the European Banking Authority (EBA), which responds for banking supervision,
- the European Securities and market Authority (ESMA), which responds for the supervision of capital markets, and
- the European Insurance and Occupational Pensions Authority (EIOPA) whose responsibility is insurance supervision.

Another important establishment for controlling the economic situation in Europe is a European Systemic Risk Board (ESRB). The authority entered into force in December of 2010. The main task of ESRB is to oversee the financial situation in Europe, to assess systemic risks and potential macro-economic risks and to protect European citizens form financial failure. (Mission & Establishment.)

If banks need an urgent recapitalization, then European Commission is allowed exceptionally to provide the rescue aid. Special supervisor confirms Banking Communication that there is a need for an immediate intervention in order to save bank from failing. This urgent rescue aid can be granted by Member State before actual plan approval. (State aid 2013.)

The EU regulations of bankruptcy procedure are also developed in a way to save important institution from failure. European Commission still improves rules in order to shield the economy from collapse. The main aim of this law is to avoid the repetition of the Great Recession. Due to the fact Europe has an experience of banking sector failure, European Commission has included all possible nuances in regulatory system.

2.4 Instruments for analysis

There are a lot of methods in literature, which are aimed at detecting of earnings management, and there is no unity of concepts. Differences in financial systems, legal systems and economic policies, and especially in accounting and reporting standards create obstacles in determination of single description of accounting quality. Fi-

nancial managers can manipulate accounting statements in order to make it look different from original position. They can follow different incentives and motives: they can use the right choice that is provided by flexibility of accrual method to affect financial statements or they can use different techniques and applications that can be counted as a fraudulent accounting. (Yurt & Ergun 2015, 35-36.) Therefore, several methods were developed to evaluate the extents to which financial statements reflect the truth.

Usually, in other researches, the reporting quality is checked by using only one technique. Current research will include two different techniques based on two widely accepted in the literature models. Jones Model is an accrual-based model, Beneish M-score model uses specific accruals.

The reason of application of two different techniques is that it increases the effectiveness of the research. Jones Model measures firm's performance via total accruals. Firstly, if managers want to apply earnings management, usually they realize that by transactions recorded as accruals. Therefore, measuring of accruals is the most effective way to evaluate reporting quality. Accruals in the literature are classified as voluntary and compulsory. The characteristic of the transactions is to identify if it is voluntary or not. If transaction is stated as accrual and it is not realized in cash inflow or outflow, then this transaction I recorded for earnings management. (ibid., 61.)

As to alternative to total accruals, Beneish M-score model uses specific accruals in order to measure firm's performance. This model evaluates changes of accruals based on the predetermined level of accruals. (ibid., 37.)

One of the main research questions is to find correlation between management manipulation and bankruptcy likelihood. In order to measure banks' distress, the most frequently used technique is chosen. Altman Z-score Model is the most preferable among researchers who study the level of distress in companies.

2.4.1 Models to analize reporting quality

Jones Model: Accrual Based

The financial statements, which are organized to present the information based on time, are prepared on the accrual basis. Accrual means the recording of financial

event on time to the relevant account with periodicity principle regardless of cash inflow or outflow. According to the accrual basis, transactions and other events are reported when the transaction take place, but not when receiving cash or cash equivalents. Assets other than cash are also result of accrual-based accounting. When accountants add accruals to operating cash flow, they produce an earning variable which is less noisy than operating cash flow. Accruals hide the noise in operating cash flow that come from manipulation application in working capital items such as prepayments, account receivables, inventory and account payable. Therefore, accruals are used to evaluate companies' performance. (Yurt & Ergun 2015, 36; Ball & Shivakumar 2015, 1.)

Reporting standards allow certain discretion to report accounting accrual, but the level is estimated. Therefore, accruals can contain management's expectations about future cash flows or management's intention to manipulate accounting statements. Due to the fact that accruals are easily manipulated than cash flows, application of accrual accounting provides managers with flexibility in reporting. It causes earnings management. (Yurt & Ergun 2015, 37.)

Methods of accrual examinations divide company's profit on two components: earnings that are collected in cash and paid expenses, and accruals that have not been converted to cash. Since cash flows are independent from the accounting policies, managers increase the amount of accruals to make profit look high. That is why accruals are tested by researchers to detect earning management. (ibid., 38.)

There are 9 main accrual based models: the Healy Model (1985), the Deangelo Model (1986), the Jones Model (1991), the Industry Model (1991), the Modified Jones Model (1995), the Dechow and Dichev Model (2002), the McNichols Model (2002), the Larcker and Richardson Model (2004), the Francis et al. Model (2005). They vary that some of them measure discretionary accruals as total accruals and some separate total accrual into discretionary and non-discretionary. (ibid., 38-40.)

For the analysis Jones Model was chosen to evaluate earnings quality. Jones Model formula is the following:

The first step is to calculate total accruals in the following way:

$$TACC_t = \Delta CA_t - \Delta Cash - \Delta CL_t + \Delta DCL_t - DEP_t$$

Where:

ΔCA_t – Change in current assets in year t

$\Delta Cash$ – Change in cash and cash equivalents in year t

ΔCL_t – Change in current liabilities in year t

ΔDCL_t – Change in short-term debt included in current liabilities in year t

DEP_t – Depreciation and amortization expense in year t

The second step is to calculate regression coefficients:

$$\frac{TACC_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{\Delta REV_t}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}} + \varepsilon_t$$

Where:

$TACC_t$ – Total accrual in year t

ΔREV_t – Revenues in year t less revenues in year t – 1

ΔREC_t – Delta revenues in year t less delta net receivables in year t – 1

PPE_t – Gross Property Plant and Equipment in year t

A_{t-1} – Total Assets in year t

α_1, α_2, α_3 – Parameters to be estimated

ε_t – Residuals in year t

The third step is to calculate nondiscretionary accruals:

$$\frac{NDACC_t}{A_{t-1}} = \hat{\alpha}_1 \frac{1}{A_{t-1}} + \hat{\alpha}_2 \frac{\Delta REV_t}{A_{t-1}} + \hat{\alpha}_3 \frac{PPE_t}{A_{t-1}}$$

Where:

$NDACC_t$ – nondiscretionary accruals

ΔREV_t – Revenues in year t less revenues in year t – 1

ΔREC_t – Delta revenues in year t less delta net receivables in year t – 1

PPE_t – Gross Property Plant and Equipment in year t

A_{t-1} – Total Assets in year t

α_1, α_2, α_3 – Parameters to be estimated

Formula to calculate discretionary accruals:

$$DACC_t = TACC_t - NDACC_t$$

The Jones Model is more sophisticated, and it tries to separate discretionary and nondiscretionary accruals. Another advantage of this model is that it brings the assumption that nondiscretionary accruals are not constant. Formula controls changes of discretionary and nondiscretionary accruals by having change in sales and gross amount of fixed assets. These parameters control changes in the nondiscretionary accruals as the result of the firm's economic position. Jones also divided variables of current period (t) by total assets of the previous period (t – 1). The main idea of the model is to detect change of accruals of current period from the previous period, the reason for that is the change of discretionary accruals, because nondiscretionary accruals do not change from period to period. For this reason, the Jones Model is preferred by researchers who wants to test for earnings management. Other models are modification of Jones and Modified Jones models. Accruals take an important place in studies because they often can be a subject of manipulation.

Beneish M-score Model: model which uses specific accruals.

The alternative way to total accruals is the detection of manipulation by using specific accrual account. Such models are supposed to reveal earnings management in specific accrual account. Such approach provides researcher with several advantages. First, researcher can apply knowledge of reporting standards on the key

factors that can influence accrual behavior. Secondly, researcher can detect discretionary accruals in sectors which apply them more often. Thirdly, these models help to measure the relationship between specific accrual account and the explanatory variables. (Yurt & Ergun 2015, 53.)

Nevertheless, specific accruals have some disadvantages. Researcher cannot determine which specific accrual was used in earnings management, because manipulation be applied by using different accruals. Another problem can occur because of the fact that the amount of companies which apply earnings management with a specific accrual account is less that the number of companies which do it via total accruals. (ibid., 54.)

Beneish M-score model is widely used in the literature. Model brings the assumption that there is a relationship between some financial values and frauds. Model contains financial items which relate to total assets, gross sales, claims and debts, marketing and general management expenses, depreciation. Beneish tested that all variables reveal financial fraud.

Beneish M-score model is one of the reliable tools. The M-score model was developed in 1999 by American Professor of Accounting – Daniel Beneish. It provides with wide perspective of the analysis, as it includes eight ratios with addition to total accruals. The model helps auditors to detect fraudulent accounting. This formula has eight variables that at the end are converted to M-score, which shows the probability that financial reports contain accounting manipulations. (Talab, Flayyin, & Ali 2017, 289.) The model correctly identifies companies with fraudulent accounting with an accuracy between 38% and 76% and misclassifying non-fraudulent companies between 3.5% and 17.5% (MacCarthy 2017, 162).

The model's formula is the following:

$$\text{M-score} = -4.84 + 0.920 * \text{DSRI} + 0.528 * \text{GMI} + 0.404 * \text{AQI} + 0.892 * \text{SGI} + 0.115 * \text{DEPI} - 0.172 * \text{SGAI} + 4.679 * \text{TATA} - 0.327 * \text{LEVI}$$

Where:

DSRI = days sales in receivable index

$$DSRI = \frac{Receivables_t / Sales_t}{Receivables_{t-1} / Sales_{t-1}}$$

Days sales in receivables index ratio shows if receivables and revenues are in or out of balance. The point is that disproportionate increases in receivables comparing to sales can be a sign of manipulations. Therefore, Beneish has suggested that the large changes in these statements are associated with higher probability of revenue overstatement. If DSRI ratio is greater than 1 then it means that the percentage of receivables has increased. (Beneish 1999, 10.)

GMI = gross margin index

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

Gross margin index ratio measures changes of gross margin. Gross margin deterioration is a negative signal of company's statements (Lev, & Thiagarajan 1993, 195). If this ratio values more than 1, then gross margin has deteriorated. Therefore, Beneish included GMI ratio to the formula as one of the variables, which detect earnings manipulations. (ibid., 11.)

AQI = asset quality index

$$AQI = \left(1 - \frac{Current\ Assets_t + PPE_t}{Total\ Assets_t}\right) / \left(\frac{Current\ Assets_{t-1} + PPE_{t-1}}{Total\ Assets_{t-1}}\right)$$

Asset quality index ratio measures non-current assets other than property plan and equipment (PPE) to total assets. If AQI is greater than 1, then firm probably increased cost deferment and try to show higher profit. (ibid.,12)

SGI = sales growth index

$$\mathrm{SGI} = Sales_t / Sales_{t-1}$$

Sales growth index ratio growth does not the sign of earnings manipulations, but fast growth is viewed by professional as a probability that companies can be involved in

statement fraud. If company with large stock prices losses has growth, it is the indicator of applying accounting manipulations. (ibid., 13.)

DEPI = depreciation index

$$DEPI = \left(\frac{Depreciation_{t-1}}{Depreciation_{t-1} + PPE_{t-1}}\right) / \left(\frac{Depreciation_t}{Depreciation_t + PPE_t}\right)$$

Depreciation index ratio defines the probability that company has increased assets useful lives. If the ration values greater than 1 then a firm has applied new methods of income manipulations. (ibid., 14.)

SGAI = sales, general, and administrative expense index

$$SGAI = \left(\frac{SGA\ Expense_t}{Sales_t}\right) / \left(\frac{SGA\ Expense_{t-1}}{Sales_{t-1}}\right)$$

Sales general and administrative expenses index ratio help to analyze the disproportionate increase in sales, which is a sign of financial statement fraudulent. Therefore, Beneish suggested that there is a relationship between SGAI and earnings manipulations. (ibid.,15.)

TATA = total accruals to Total Assets

$$TATA = \frac{\Delta CA - \Delta Cash - \Delta CL - \Delta CMofLTD - \Delta ITP - \Delta DA}{Total\ Assets_t}$$

Where:

CA – Current Assets

CL – Current Liabilities

CM of LTD – Current Maturities of Long-Term Debt

ITP – Income Tax Payable

DA – Depreciation and Amortization

Total accruals to total assets ratio show how cash underlies to the reported earnings. Higher positive accruals are the sign of accounting manipulations. TATA ratio helps to define extend to which company's managers tend to make discretionary accruals to

change earnings. Higher positive accruals mean higher likelihood of accounting fraudulent. (ibid., 15.)

LEVI = leverage index

$$LEVI = \left(\frac{LTD_t + Current\ Liabilities_t}{Total\ Assets_t}\right) / \left(\frac{LTD_{t-1} + Current\ Liabilities_{t-1}}{Total\ Assets_{t-1}}\right)$$

Leverage index ratio measures total debt to total assets. If LVGI values more than 1, then company has an increase in leverage. Beneish and Press (1993, 341) stated that changes in leverage of company's capital structure are referred to the stock market default effect. (ibid., 16.)

Beneish Model detects changes in income and expenses. Abnormal increase in income as well as abnormal decrease in expenses are a sign that earnings management is applied. Moreover, the model contains the principle of accrual, which calculates change in working capital other than cash less depreciation. Model can detect fraud or manipulation of accounting by using data from financial reports of companies. M-score model is used by many researchers due to its easiness of application and for the possibility to estimate which accrual account with high probability is manipulated. (ibid., 17-18.)

Beneish M-Score model is one of the most usable formulas, however, the model can make two types of errors. The first error, Type I, is when non-manipulators are identified as a manipulator, and the second error, Type II, is when manipulating companies are shown as non-manipulators. Beneish in his work admitted that costs of Type I and Type II errors cannot be objectively measured. (Dechew, Ge, Larson, & Sloan 2011, 22.) Usually, most M-scores are negative, which is a positive sign of company perspective. The higher M-score indicates that a firm is more likely manipulates its accounts. Beneish concluded that companies with M-scores greater than -2.22, can be classified as manipulators and they should be further investigated by auditing committees. However, due to the fact that model makes errors, Beneish proposed that M-score more than -1.8 indicates that a company is manipulator. (Beneish 2004, 32.)

Despite the fact that M-score model cannot point out the exact area of fraudulent, and calculates the probability with errors, it stays effective to define the likelihood of

manipulations. The model can evaluate the probability of accounting manipulations with only two years data. (Lotfi, & Chadegani 2017, 31.)

2.4.2 Model to analyze bankruptcy likelihood

Z-Score Model is one of the most well-known and effective formulas for predicting company' distress. Altman has developed three models: 1968, 1983, and 1993. Nevertheless, in 1977, Altman with his colleagues, Haldeman and Narayan, have generated new ZETA model. This model is used to classify bankrupt companies up to five years before the failure. The model can predict the risk of bankruptcy over 90% prior to one year and 70% prior to five years (Altman, Haldeman, & Narayanan 1977, 31). According to the research, new ZETA Model is more accurate than the original model (1968), but calculations did not show the significant difference in results. Moreover, some of the variables of original and new models are similar. Therefore, many researches use the original Z-Score model to predict the risk of bankruptcy.

Original Z-Score Model can predict the company's failure for up to two years before the bankruptcy. It is important to admit that this formula cannot set time frames when company can go bankrupt, but it is able to predict the probability and help company undertake preventive strategy in advance. (Khaddafi, Falahuddin, Heikal, & Nandari 2017, 238.) Variables of this ratio were classified into five standard categories: liquidity, profitability, leverage, solvency and activity. Altman (2000, 8) concluded that those five variables are doing the best together to predict the probability of bankruptcy. Finally, he has developed the following formula:

$$\text{Z-Score} = 0.012X_1 + 0.014X_2 + 0.033X_3 + 0.006X_4 + 0.999X_5$$

where:

X_1 = working capital/total assets (WC/TA),

X_2 = retained earnings/total assets (RE/TA),

X_3 = earnings before interest and taxes/Total Assets (EBIT/TA),

X_4 = market value of equity/book value of total liabilities (MVE/TL),

X_5 = sales/total assets (S/TA);

The working capital/total asset ratio measures the net liquid assets relative to the total capitalization used in the business. Working capital is the difference between current assets and current liabilities.

The retained earnings/total assets ratio refers to earnings surplus over entire life of the company relative to total size of assets. This ratio measures the overall profitability of the firm. Moreover, it takes into account the age of a company. Therefore, young firm has lower RE/TA ratio due to the lack of time to build up cumulative profit. Consequently, this model considers younger company as more likely to go bankrupt. Another important point is that this ratio measures the leverage of a company.

The earnings before interest and taxes/total assets ratio measures the real productivity of company's assets without any tax and leverage factors. Bankruptcy occurs when total liabilities exceed the earning power of assets, therefore, model counts a fait valuation of a firm.

The market value of equity/book value of total liabilities ratio measures how much company's assets can decline before the liabilities exceed and company goes bankrupt. Equity is the total market value of shares of the stock, and it adds a market value dimension.

The sales/total assets ratio = capital turnover ratio shows the sales generating ability of a company's assets. On individual basis this ratio is the least significant measure, moreover it can be removed from the model. However, this ratio adds validity to the result due to its unique relationship to other variables. Basically, this ratio counts capacity of a firm dealing with competitive conditions.

Z-score shows the state of a company, whether it is healthy at the moment or there is a risk of bankruptcy. The result is based on value of Z-score in the following way: if Z-score values less than or equal to 1.81, firm is experiencing significant financial difficulties and the risk of bankruptcy is high; if Z-score values between 1.81 and 2.67, firm is in a gray area, meaning that company has risks to go bankrupts, but at the same time can overcome difficulties depending on management actions; and if Z-score is more than 2.67, then a company is in a very healthy state, therefore, the

probability of bankruptcy is really low. (Khaddafi, Falahuddin, Heikal, & Nandari 2017, 328.)

As it was mentioned earlier, Z-score model have two types of errors. I Type is when a bankrupt firm is classified as non-bankrupt. II Type is when model defines a non-bankrupt firm as a bankrupt one. Z-Score model can predict the bankruptcy one-year prior with an accuracy of 95%, before two years with 72%, three years in advance with 48%, and prior to four years with 36%. (Altman 1993, 89.)

2.5 Empirical study

MacCarthy (2017) has studied if Altman Z-score and Beneish M-score models can predict financial manipulations and company's failure of Enron corporation. The author has gathered data for 5 years covering the period from 1996 to 2000. During the research, Beneish M-score model showed that accounting statements were manipulated by management during studied years. Moreover, MacCarthy has concluded that the usage of both Z-score and M-score models together could better protect stakeholders. Altman Z-score alone could predict the failure prior to five years, it showed a distress 3 years before bankruptcy. Author concluded that Altman Z-score cannot work in conditions of accounting manipulations. As it was discussed earlier, one of the reasons that management manipulates earnings is to hide company's distress. That was the case of Enron, therefore, Beneish M-score and Altman Z-score together were defined as more effective to predict the failure. (3-10.)

Study of Bhavani and Tabi (2017) has showed a different result. In this case Altman Z-score model has noticed the fact of manipulations, whereas, Beneish M-score model was not able to detect any fraud. Authors has studied Toshiba case during the period from 2008 to 2014. They concluded that for the Toshiba case Beneish M-score model was not an effective tool in detecting of financial fraudulent, and the probability of bankruptcy helped to find accounting manipulations. (1-4.)

Razali and Arshad (2014) studied the relationship of effective corporate structure and the likelihood of fraudulent accounting by using M-score and Z-score models. As the sample authors took 227 Public listed companies of Malaysia. The studied period was from 2010 to 2011. The research showed that the effective corporate structure

reduces the probability of accounting manipulations, and therefore, increasing the credibility of financial reports. (2-8.)

Ofori (2016) also studied Enron Corporate by analyzing statements with M-score and Z-score models. The purpose of this study is to find out how easily corporate's financial fraud could be detected. His research showed that Altman Z-score model was able to detect manipulations in 1997, and Beneish M-score model identified accounting fraudulent. Z-score showed that statements of 1998, 2000 and 2001 indicated signs of firm's bankruptcy. Beneish M-score model concluded that Enron has started manipulating earnings in 1998. Finally, author has concluded that both models could save investors from losing their funds. (2-6.)

Khaddafi, Falahuddin, Heikal, Nandari (2017) tested the probability of banks' failure listed in the Indonesia Stock Exchange using Alyman Z-score model and analyzed bankruptcy predictions during the period from 2011 to 2013. Authors had 29 samples. Model defined 14 banks as bankrupts during all three years; and other banks had different states every year: in 2011 there were 13 banks in healthy condition and two banks in gray area, in 2012 there were 10 banks in healthy condition and 5 in gray area, and in 2013 there were 11 banks in healthy condition and 4 banks in gray area. (328.)

Mavengere (2015) in his research tests Altman Z-score and Beneish M-score as investment models that can be applied in financial analysis by stakeholders. He took financial statements of Zimbabwe company during the period from 2011 and 2014. The researcher detected that in 2011 the company was in the "grey zone" according to Z-score, and from 2012 to 2014 it had a financial distress. Beneish M-score model detected company as earnings manipulator in 2011 and 2014 and non-manipulator in 2012 and 2013. His research has proved that these two models together can be used by investors to detect the probability of bankruptcy and earnings manipulations. It allows to avoid the likelihood of losses. (2-9.)

Mahama (2015) made a research about Enron corporation. He used the same two models to detect manipulations of its financial statements and find out if investors and stakeholders could notice it in advance. The author of the work has analyzed Enron's reports from 1996 to 2000. Both models have detected that Enron has been

manipulating its statements since 1997. However, researcher has highlighted that models did not show any signals which could make analysts to beware of. The effect is explained that models are based on accounting ratios which are based on accounting data that can be manipulated. Enron has been manipulating financial statements for a long time. This fact was an obstacle for models to show dangerous sign. (1-2.)

Talab, Flayyin and Ali (2017) has done a research earnings management practices in listed banks of Iraqi Stock Exchange with the use of Beneish M-score. The objective of the research was to test model on Iraqi banks, which were detected as manipulator in other researchers, which used different models. The model detected fraudulent accounting almost in all banks in Iraqi. They concluded that Beneish M-score model is an effective tool in detection of fraudulent accounting. (1-5.)

Gusarova and Shevtsov (2017) has done the research where authors test Beneish M-score and Altman Z-score models together on the sample of 18 British companies. Almost all studied companies are near to fall in bankruptcy. However, there is no evidence that majority of companies can be named as manipulators. Their study showed that there is no connection between manipulations and bankruptcy. (84 -86.)

Nia (2014) investigated the difference between the mean of financial ratios of manipulating and non-manipulating companies. The T-test was used for the hypothesis testing. The author of the research concluded that there is a difference between two types of firms. Moreover, she proved that fraudulent companies had a higher Total Debt/Total equity ratio, showing that fraudulent companies are more likely to have a financial distress. (43.)

2.6 Hypothesis development

The main role of hypothesis is to provide clarity and to help the researcher to focus on a research problem. The significance of the hypothesis is that it can give a direction of the research based on the literature review. The researcher at the beginning of work does not know the result but it is possible to build an assumption. Hypothesis is a statement about the relationship between different variables. (Kabir 2016, 56.)

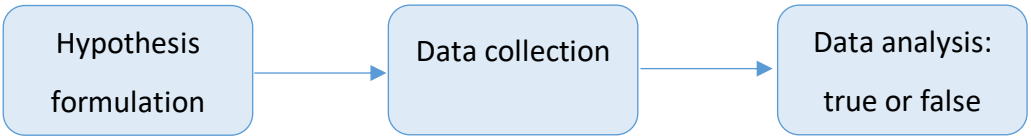

Figure 2. Process of hypothesis testing (Adapted from Kumar 2011, 31)

Figure 2 shows the process of hypothesis testing. At the final stage after data collection, the author of the thesis should prove or disprove the hypothesis. Hypothesis should be empirically tested and give a certain answer: true or false.

The empirical study showed that those companies which were couth up on manipulations have turned to be bankrupt, however, no one can give a certain answer if accounting manipulations contributed into companies' distress. Basically, researches are divided on two groups: those, which admit some relationship and those, which disprove the connection of this phenomenon. Even though, the connection between earning manipulation and bankruptcy likelihood is not certain, the author of the thesis will try to prove that there is a connection between these events. Therefore, the hypothesis will be formulated in the following way:

1 Do accounting manipulations affect bankruptcy likelihood?

H_0: There is no correlation between accounting manipulations and bankruptcy likelihood.

H_1: There is a correlation between accounting manipulations and bankruptcy likelihood.

Empirical study showed that manipulations can influence the performance. Therefore, the research will be focused on proving the relationship between these events. The hypothesis is the following:

2 Do accounting manipulations influence banks' performance?

H_0: There is no connection between manipulated statements and the performance.

H_1: There is a connection between manipulated statements and the performance.

3 Methodology

This chapter explains which research approach will be used in order to answer the reserch questions. In order to define correct research approach, the first step is to analyze the nature of the reserch problem: wherhter it can be answered directly on the questions or it is better to build a hypothesis and answer research questions through them. (Creswell 2008.) Research methods of data collection and data analysis shape the research, and the choice of methodology can evolve during research progress. Therefore, the author of the thesis will study possible research approaches and methods in order to explain the reader the necessity of chosen methodology.

3.1 Research approach

In order to define which approach needs to be used in the research, the first step is to analyze the level of abstraction. There are two sides how the research can be handled: qualitative and quantitative. Both methods are applied according to the nature of the research problem. Depending on what kind of data the work is based, the researcher chooses suitable techniques. (Walliman, 2011, 69-71.) Therefore, the first step is to study approaches and define which one can be applied to the current research.

Qualitative research is used when the author wants to explore the meaning individuals and groups ascribe to a problem. The process of this research involves elaborated questions. The data is typically collected through surveys or interviews, and sometimes it can be gotten without direct contact with the studied subjects, for instance studying of letters or autobiographies. Data analysis is inductively built from particular to general terms. (Creswell 2008, 32.) Inductive style is used because the researcher starts from individuals' opinion and come up with the complex vision on the situation. Qualitative data cannot be measured or counted because it is built on views. Qualitative research requires a certain and careful definition of the meaning of words. The data of qualitative research cannot be registered in certain numbers. Therefore, its reliability and validity can be checked by analyzing the variety of sources that describe the same event or issue. (Walliman 2011, 73.) Good qualitative

research cannot be based on researcher's own belief system. Therefore, it must apply standards of trustworthiness, for example member-checking or audit trials. (Jackson, Drummond, & Camara 2007, 26.)

Quantitative research is used to test the objective theories by analyzing variables and relations between them. These variables can be numerically measured by certain instruments, and data can be shown in the form of statistics. (Creswell 2008, 41.) Basically, quantitative research explains the phenomenon by numerical data which is analyzed by mathematically based methods (Muijs 2004, 1). Quantitative researchers analyze data deductively, and they usually rely on hypothesis testing. Nature of quantitative research is not flexible: it makes a researcher to follow the certain order. An author of work starts by setting questions and hypothesis if needed, then goes through literature review, collects data. The last steps are to analyze information and make a conclusion. (Eyisi 2016, 94.) According to Muijs (2004, 7) quantitative research can carry the following types of research questions:

- the first is when an author wants a qualitative answer, and questions can start with "How many?",
- the second is when researcher studies a numerical change,
- the third is when state of something is studied, and it explains the phenomenon, and
- and the last one is when an author wants to explain something, for example finding the relationships between events, and is based in hypothesis testing.

Quantitative research can be applied if phenomenon is studied in breadth based on large number of units. This approach can only test the hypothesis or theory, but it cannot develop them. Quantitative research is built on certain variables and appearance of new one during the research is not applicable. Quantitative methods are applied when analyzing cause and effects and do not focus on meaning of an event. (ibid., 9.)

Two opposite sides of research approach have been studied, and the author of the thesis has decided to organize above ideas in Table 1:

Table 1. Comparison of research approaches

Characteristic	**Qualitative research**	**Quantitative research**
Purpose	*Studying meaning ascription to a problem*	*Studying of variables' relationships*
Type of data	*Discretional*	*Numerical*
Analysis	*From particular to general terms*	*Statistical approach*
Scope inquiry	*Thematic scope*	*Specific question*
Design	*Flexible, can evolve during the study*	*Non-flexible, certain order*
Approach	*Inductive*	*Deductive*
Sampling	*Small, but deep sampling*	*Large, but breadth sampling*

The research is aimed at studying of two possible relationships: between earnings manipulations and bankruptcy likelihood, between earnings manipulations and the performance. The research is based on numerical data which are analyzed by three mathematical models. Therefore, the research uses quantitative research approach. The author of the thesis is not going to make an in-depth analysis but studies the phenomenon by looking for the connections between variables. In the thesis, financial reports of 33 Scandinavian financial institutions will be analyzed in timeline of 7 years.

In order to answer the research questions, the research will be done through the hypothesis testing. There are two types of hypothesis, which are applied to each question: the null hypothesis and the alternative hypothesis. The null hypothesis is neutral, and it is opposite to alternative hypothesis. Usually, the alternative hypothesis is the one which is wanted to be true (Muijs 2004, 16). Due to the fact that the research will be based on standard statistical tests, the null hypothesis will be tested.

3.2 Research design

Research design is the general plan about how the author answers the research questions. First, the author must clear out the purpose of the research. Depending on the research questions, author can give descriptive, exploratory or explanatory answer. An exploratory study is aimed to find out new insights and assess phenomenon in a new light. A descriptive research created a portray of people or events and can be a continuation of exploratory research. An explanatory research is used when the author wants to establish relationships between variables based on quantitative data. (Saunders, Lewis, & Thornhill 2009, 138 -140.) Current research studies relationships between variables, therefore, the work caries out the explanatory purpose.

Quantitative research strategies are often applied when the author wants to study causal relationships or analyze associations and relations between variables (Hall, & Roussel 2013, 156). Basically, quantitative research can be divided on two main types: experimental and non-experimental designs. Experimental method studies the validity of a hypothesis or demonstrates the known fact under controlled conditions. The main idea of this kind of research is to control the environment as much as possible. In non-experimental research, it is not possible to shut out external influence. In experimental study the research can manipulate the variable to influence the outcome of the work. Non-experimental study uses variables as they are in practice. (Muijs 2004, 13.) In order to apply non-experimental research, the author can use the following methods: survey and historical researches, observation and analysis of existing databases. Survey research is popular strategy used for exploratory research. It allows to collect quantitative data and analyze it by using quantitative techniques. (Saunders, Lewis, & Thornhill 2009, 144.) Observation research provide the researcher with the direct access to social interpretations. Analysis of existing databases organizes the research without collecting author's own data but instead using officially available data. (Muijs 2004, 51-57.)

Current research will be carried out without manipulating any variables, because the data for the thesis will be gathered from financial reports and market daily data as it is. Therefore, the thesis is designed as non-experimental research. Due to the fact

that data are collected from existing databases, the research is based on archival research strategy. Even though the data originally were collected for different purpose and it was not gathered for making the research, this strategy allows the researcher to study phenomenon over the time (Saunders, Lewis, & Thornhill 2009, 150).

3.3 Data collection and sampling

The research work can be based on two types of data: primary and secondary data. Primary data are collected specifically for the certain research, while secondary data are officially published for some other purposes, but also can be used to analyze other research questions. Certain types of research projects can be built on secondary data. Secondary data can be qualitative and quantitative, and it can be used for both descriptive and explanatory research. According to Saunders, Lewis, and Thornhill (2009, 258), secondary data are divided on three sub-groups: documentary data, survey-based data, and gathered from multiple sources.

Documentary secondary data are usually used in analysis, which can be combined with primary data. This group of data includes such sources as newspapers, journals, books or minutes of meeting, notes, reports to shareholders etc. Documents also can be used to collect qualitative data as well to generate statistical research. Documentary secondary data also exists in the form of non-written material, for example video and voice recording, DVD's, pictures etc. (ibid., 258.)

Survey-based secondary data uses the questionnaires which were analyzed for the original purpose. Such data are collected by companies, and they make it officially accessible. Survey-based data can be collected through censuses, ad hoc surveys and regular surveys. Censuses are usually made by government. Since participation is obligatory, it provides a wide coverage of population. This type of survey responds to the needs of government, which are cleared out in document. These data can be easily found in Internet. Ad hoc surveys include data that can be collected by organization, government or independent researcher. These data are more specific in its subject matter. Organization can provide the aggregated data, or ask to reanalyze the survey results, or it can be found in an archive. Regular surveys are those which are repeated over the time. These surveys originally can be carried out by government

and by non-government bodies. For instance, it can be a general market research. It is a good source of information which can be used for different purpose. (ibid., 259-261.)

The last one is multiple-source secondary data which can be based on documentary and survey secondary data or combination of both. The main point which distinguish this type of data is that it is collected from different sources and it forms another data. A multiple-source data can be collected by different ways, the choice depends on thesis's research questions. The first variant is to extract and combine selected variables, the second is to use series of company's documents to create own secondary data, and the third one is to use a series of snapshots for cohort studies. (ibid., 262.) Current research is based on multiple-source secondary data, which will be gathered from companies' financial reports, which include income statement, balance sheet and cash-flow statement, and daily market data of Scandinavian banks and converted to author's own secondary data. Statements from the reports and stock market are enough to apply Altman Z-score, Jones and Beneish M-score models. Financial reports were found in the Internet on official websites of banks.

The sampling is an important stage of any research. The aim of a correct sampling is to represent the population in the study. A good sampling always has similar characteristics across the whole population. Therefore, the first step in the sampling process is to define correctly a target population. The next step is to define a sampling technique. Thirdly, the researcher needs to come up with a sample size. (Taherdoost 2016, 19-25.)

There are two approaches to sampling distinguished in the literature: nonprobability and probability sampling techniques. The first one is a technique in which unit of a population does not have a specifiable possibility of being chosen. This approach produces samples that are not representative and sometimes it does not allow to generalize results. The researcher can follow different types of the nonprobability approach. Accidental or convenience sample is the one which allows the researcher to choose part of the population in any manner that is convenient to be included in the sample. This type is not effective as it can collect nonrepresentative population which in turn causes a systematic error. Quota sample means that the researcher

identifies relevant categories of the population. Judgmental sampling is an acceptable kind of sampling in the literature. It is based on judgments of the researcher and is selected with a specific purpose in mind. Snowball sampling works as a network: it starts with a few cases and spreads out. Another approach that can be used by researchers is to select samples specifiable purpose. The study includes sample that are the representatives of the population. (Fox, Hunn, & Mathers 2009, 36-38.) The current research uses nonprobability sampling, judgmental sampling type. This approach allows to choose sampling based on own experience and follow the required criteria and the research purpose. In order to answer research questions, the study needs to obtain a 7-year period between 2012 and 2018. The data were collected form financial reports and NASDAQ site. The thesis examines only banking sector, which were randomly picked up according to selected criteria.

For the current research the data of 33 Scandinavian banks were obtained in time horizon of 7 years. The sample size was limited by the available information. The author of the thesis has found only 33 Scandinavian banks which publish reports in English. The period of studied years is between 1st January 2011 and 31st December 2018, two banks were studied in timeline of 1st January 2011 and 31st December 2017, and two other banks during the period of 1st January 2012 and 31st December 2018 due to the absence of financial reports. In order to be able to collect the information which belong to the study period, mainly listed banks on NASDAQ OMX Nordic Stock were chosen for the research.

The research is based on three mathematical models: Jones Model and Beneish M-score mode, which analyze the reporting quality, and Altman Z-score, which measures bankruptcy likelihood. All model consists of independent and dependent variables.

M-score is calculated from eight variables: DSRI, GMI, AQI, SGI, DEPI, SGAI, TATA, and LVGI. In order to calculate the components, the following information is gathered from financial reports of the company: Revenue (Rev), Cost of Goods (COGs), Receivables (Receiv), Current Assets (CA), Property Plant and Equipment (PPE), Depreciation (Depr), Total Assets (TA), SGA Expense (SGA), Net Income (NetIn), Cash Flow from Operating Activities (CFOA), Current Liabilities (CL), Long-term Debt (LTD).

Z-score is calculated from five ratios: working capital/total assets, retained earnings/total assets, EBIT/total assets, equity value/total liabilities, sales/total assets. The statements for the equation are gathered from financial reports and NASDAQ site. The following information is needed: Revenue (Rev), Operating Income (OpIn), Current Assets (CA), Total Assets (TA), Total Liabilities (TotLiab), Retained Earnings (RetEarn), Value of Equity (EquVal).

To calculate discretionary accruals in Jones model, the following statements are gathered from banks' financial reports: Revenue (Rev), Property Plant and Equipment (PPE), Total Assets (TA), Cash Flow from Operating Activities (CFOA), Net Income (NetIn).

Based on above financial statements, which are gathered from annual reports and market data, models' variables are calculates as follows in Table 2:

Table 2. Variables description (Adapted by the author)

Variable		Label	Definition	Source
Model	Components			
Beneish M-score Model	M-score	M-score	=-4.84+0,92*DSRI+0.528*GMI+0.404*AQI+0.892*SGI+0.115*DEPI-0.172*SGAI+4.679*TATA-0.327*LVGI Evaluates if company is manipulator or non-manipulator.	Calculated from Independent variables
	Days Sales in Receivables Index	DSRI	Measures the ratio of day's sales in receivables versus prior year ratio day's sales in receivables. Determines revenue inflation.	Annual reports
	Gross Margin Index	GMI	Measures the gross margin ratio versus prior year. Determines if earnings are manipulated.	Annual reports
	Asset Quality Index	AQI	Measures as the ratio of non-current assets other that PPE to total assets versus prior year.	Annual reports
	Sales Growth Index	SGI	Measures as the ratio of sales versus prior year. Evaluates the growth of sales.	Annual reports
	Depreciation Index	DEPI	Measures as the ratio of the depreciation rate versus depreciation rate of prior year. Determines useful assets life assumption.	Annual reports

Continues on the next page

	Sales General and Administrative Expenses Index	SGAI	Measures as the ratio of SGA expenses versus ratio of SGA expenses of prior year. Determines if there is a disproportionate increase in sales	Annual reports
	Total Accruals to Total Assets	TATA	Is calculated by subtracting of CFOA from Net income and dividing by total assets. Determines total accruals.	Annual reports
	Leverage index	LEVI/LVGI	Measures as ratio of total debt to total assets versus prior year. Assess manipulations in debt statements.	Annual reports
Altman Z-score Model	Z-score	Z-score	$=0.012X_1+0.014X_2+0.033X_3+0.006X_4+0.999X_5$ Assesses the distress level.	Calculated from Independent variables
	Working Capital to Total Assets Ratio	X1	Is calculated by dividing working capital to total assets. Measures liquidity.	Annual reports
	Retained Earnings to Total Assets Ratio	X2	Is calculated by dividing retained earnings to total assets. Measures accumulative profit compare to assets	Annual reports & market data
	EBIT to Total Assets Ratio	X3	Is calculated by dividing earnings before interest and taxes to total assets. Assess how much profit assets produce.	Annual reports
	Equity Value to Total Liabilities Ratio	X4	Is calculated by dividing equity value to total liabilities. Measures equity value versus liabilities.	Annual reports
	Sales to Total Assets Ratio	X5	Is calculated by dividing revenue to total assets. Measures how much assets produce in sales.	Annual reports
Jones Model	Discretionary accruals	DA	Is calculated by subtracting non-discretionary accrual from total accruals	Calculated from Independent variables
	Nondiscretionary Accruals	NDACC	Is calculated with SPSS Regression, based on ratios.	Annual reports
	Total Accruals	TA	Is calculated by subtracting of CFOA from Net income and dividing it by Assets of previous year.	Annual reports

The choice of three models is an improvement of this work. Usually, other researchers use one or maximum three models for the analysis. However, literature review

showed that the nature of the phenomenon can vary from company to company. The usage of diverse models adds validity to the research.

All variables showed in Table 2 represent ratios, which are scaled. The absolute size of variables is scales by assets, which allows to disengage assets size of the company, evaluate the real size, and be able to compare ratios.

3.4 Data Analysis

Real-life data are not organized the way it needs to be for the researcher. Therefore, it cannot be used directly. To start the analysis process, the researcher needs to sort out the valuable information. (Gorman, & MacIntosh 2015, 174.)

A common way to organize data is to use tables, with records as rows and attributes as columns. It is difficult to avoid the mistakes when the information is entered. To make sure that data is collected correctly, sometimes double entry can be used. (ibid., 175.) The first step for the current research is to collect the needed data in excel spreadsheets and calculate the variables, M-score and Z-score as it is showed in Table 2 and gather data to calculate discretionary accruals further. In the research only scaled variables are used, therefore, equity value needs to be scaled in order to understand the value of equity regardless of assets size. The next step is to gather all components and variable in one excel file and prepare it for the SPSS program. To avoid mistakes in raw data, all the suspicious variables are checked and re-entered in case of mistakes. Then the collected information is transferred to SPSS software for the further analysis.

To present a sample in an illustrative way, the researcher can use descriptive statistics or graphs. The choice is depended on the type of the research, whether the information needs to be showed in quantifiable way or intuitive. (ibid., 176.) In order to organize the information for the current research the descriptive statistic will be used. This type of analysis allows to interpret a big data set of metric information. The research is based on financial statements of 33 Scandinavian banks and daily market data. Overall, a total of 60,723 pieces of data is collected for the analysis. Banks' reports do not have current and non-current division. Therefore, the following

types of data are collected from three parts of financial report and stock exchange site and then applied accordingly:

- for Income Statements, 8 types of data are collected, including net interest income, net fee and commission income, operating income, earnings before interest and taxes (EBIT), cost of goods, general administrative expenses, depreciation, net profit,
- for Balance Sheet, 18 types of data is needed, including loans to central banks, loans to credit institutions, loans to the public, cash and balances with central banks, investments, property plant and equipment, deferred tax assets, current tax assets, prepaid expenses and accrued income, assets held for sale, deposits by credit institutions, deposits and borrowings from the public, debt securities, current tax liabilities, accrued expenses, subordinated liabilities, liabilities held for sale, and retained earnings,
- for Cash Flow Statements only cash from operating activities is taken, and
- from stock exchange the information about number of shares and the price of share for each day between 1st January 2011 and 31st December 2018 is collected. The daily market data will be taken from NASDAQ Nordic at www.nasdaqomxnordic.com

After collecting the data and putting it into SPSS software, nondiscretionary accruals are regressed, and after that discretionary accruals are calculated. The next step is the application of the descriptive statistics, which is used for analysis of variables. The aim of descriptive statistic is to interpret the summarized data, to present the main facts about the research results and to identify the characteristics of the observed phenomenon (Adams & Khan 2014, 171). The table includes the mean, maximum and minimum values, as well as standard deviation. The mean is the average of values which represents a center of distribution. Standard deviation demonstrates how close the scores are centered around the mean. Descriptive analysis provides with a high level of objectivity and neutrality. (Baha 2016, 4.)

The correlational analysis examines the extent of relationships between studied variables. The correlation exists when one variable increases or decreases with respect to another variable. This type of analysis is considered as more complicated than

graphic or diagram. The researcher collects the data and study the degree of relationship and association between variables. Correlation method only represent the relationships between variables, but it does not describe the nature. Therefore, such analysis cannot show the reason why variables are not correlated. (ibid., 7-9.) The Pearson product-moment correlation is used to show the degree of strength. The coefficient can range between r = +1 and r = -1 (Adams, Khan, & Raeside2014, 180). Current research also uses the correlational method to study the phenomenon. The main questions of the thesis are aimed at finding the relationships. Therefore, the finding of associations between variables is the most suitable way to make the research.

The next step of the study is to make a regression analysis, which is one of the most frequent tools. This method allows to analyze relationships between dependent and independent variable. The regression analysis is an effective way to define significant relationships and to make predictions. The regression can be bivariate, when there is only one independent variable, and multiple, when there are several independent variables. (Sarstedt 2014, 194.) The output of the regression is the following statistics: estimates, confidence interval, model fit, R square change, descriptive, Durbin-Watson test. These measures are presented in two tables – Model Summary and ANOVA. (Field 2009, 167.) In the current research multiple linear regressions will be used. This method ads the validity and reliability to the research. Moreover, it is a common and effective way to study relationships and associations between variables.

3.5 Evaluation of validity and reliability

Steward and Kamins (1993, 18) highlighted that the author who uses the secondary data has an advantage. The point is that researcher can evaluate the quality of information prior to actual use. Evaluation of validity is an important step, because on this stage the author checks if he measures what he wants to measure. Muijs (2004, 66) argued that validity is probably the most important aspect of the design. Validity proves the truthfulness of the research (Altheide, & Johnson 1988, 584).

Validity has three main aspects, which are equally important: content validity, criterion validity and construct validity. Content validity analyzes if content of the chosen variables is right to measure what the author wants to study. On this stage the theory plays the main role. The better knowledge of theory about subject allows to define instruments that is content-valid. (Muijs 2004, 66.) An extensive literature review helps to reach a content validity. For current research literature review showed that correct instruments were chosen to study phenomenon: models and its variables as well as statistics straightly measure and answer to the research questions. The instrument stayed unchanged during the whole process of the research.

Criterion validity also refers to the theory. Theoretical background explains what variables relate to the research and which one can help to answer the research questions. Secondary data for the thesis covers the chosen population: for the research the data of Scandinavian financial institutions for the required period was taken. Information was collected from financial reports of official websites of organizations and stock market, which belong to credible and reliable sources. Data for models' components of three formulas was extracted and unwanted data have been excluded.

Construct validity is more complex aspect, which is related to the internal structure. As above issues, it is based on theoretical background as well. (ibid., 68.) The most common way is to study how other researches has coped with similar study (Saunders, Lewis, & Thornhill 2009, 273). If they had some problems, it allows other researchers to overcome these difficulties. Sampling was obtained according to empirical literature review. In order to gain validity several models were chosen for the research. Bigger sampling was done to increase validity as well.

The last element to measure quality of the research is reliability. It refers to consistency of a measure. (Muijs 2004, 72). The main step is to understand if the instrument can produce consistent measurement. The instrument can be called reliable if the research collects the same data set, analyses it with the same instrument and gets similar results. (Kumar 1999, 168.) In case of current research, three mathematical models use for analysis statements from financial reports which do not change over the time. It allows to carry out a consistent research and provide reliability. Current method of data collection eliminates the influence of factors which can affect

the reliability. Moreover, the results turn to be objective as they are segregated from anyone's mood. The data are collected consistently on annual basis during the certain period.

4 Research results

In this chapter results of the research will be analyzed. The following information is divided on three subchapters – descriptive statistics, correlation analysis and analysis of the models. Descriptive statistics familiarize with data, variables of models and reporting quality of Scandinavian banks as well as bankruptcy likelihood. Correlation analysis includes study of the relationships between models' components. This part is aimed at the understanding of how variables influence each other. And the last subchapter is the main part of the results, which represents the influence of M-score and discretionary accruals on Z-score, i.e. influence of earnings manipulations on bankruptcy likelihood.

4.1 Descriptive Statistics results

Table 3 summarizes the descriptive statistics of all components of models used in the analysis. The table represents minimum and maximum values as well as mean and standard deviation of values during the tested period. Based on the table, earnings management and the financial state of studied Scandinavian banks will be analyzed and interpreted.

Out of table 3, it is seen that Scandinavian banks' M-score mean is high enough and it is equal to -2,045. The result proves that Scandinavian banks do earnings manipulations, because the M-score is more than -2,22. Nevertheless, theory states that because of misclassification costs of Beneish Model, the M-score should not be more than -1,8. Otherwise, a company needs to be investigated further. Taking into account the above correction, it can be stated that overall Scandinavian banks are not likely to be manipulators. The minimum value of M-score is -3,002, which shows the excellent state of earnings quality of some Nordic banks. However, the maximum

value is equal to -1,088 showing that Beneish Model identifies some banks as manipulators, and it defines the financial statements as fraudulent. It means that some of the Scandinavian Banks should be investigated further for IFRS.

Days Sales in Receivables Index (DSRI) Ratio mean is 1,664. It represents that receivables have been increasing during the studied period. The large change in this statement affirm that the probability of overstatement is high. This result represents that Scandinavian banks tend to manipulate their receivables' statements during the studied period. Gross Margin Index (GMI) Ratio mean is low enough and equal to 0,677. Overall Gross Margin of banks has not been deteriorated. Maximum values of GMI is 0,815. It can be stated that Sales Revenues of banks are high enough and Beneish M-score model has not suspected any manipulations in this statement. Asset Quality Index (AQI) ratio mean is 0,907. This value lays out that manipulations in this statement were not admitted. The result demonstrate that Scandinavian banks do not try to increase profit in their reports by overstatement. Sales Growth Index (SGI) variable does not represent large changes (Standard Deviation = 0,140). Fast growth in this statement has not been found, therefore, Scandinavian banks are not likely to be manipulators. In average Depreciation Index (DEPI) ratio is low and equal to 0,918 meaning that most of the banks do not increase assets' useful lives. Nevertheless, maximum DEPI value is 1,21. It states that some Scandinavian banks apply earnings management trying to increase their income. Sales, General, and Administrative Expense Index (SGAI) ratio does not show any disproportional increase in sales (Standard Deviation = 0,062). This statement has not been manipulated during the tested period. Total Accruals to Total Assets (TATA) ratio is positive (mean = 0,025). It represents that Scandinavian Banks apply accruals in their statements, however, the major part of the banks are non-manipulators. At the same time maximum is high showing that financial data was tampered. It is possible that they do earnings management. Leverage Index (LEVI) ratio is high because of the nature of the operations. High LEVI ration (mean = 1,19) can be explained that banks have their liabilities in the form of borrowings and deposits. Due to the fact that these operations are the main part of their operating income, banks always have increased leverage. Moreover, the change is high enough (Standard Deviation = 0,225). It can be stated that year by year liabilities have been constantly growing, which is a good sign of banks financial health, but

it indicates that banks take more debt to operate. Overall, out of 8 variables 4 of them have a suspicious change, which highlight that statements have been manipulated during the tested period. These variables define that earnings management could have been applied to increase income.

Z-score mean is high, and it is equal to 3,966. It represents that the major part of the Scandinavian banks is financially sound. Banks are in a very healthy state, and the probability of bankruptcy is really low. Nevertheless, there are banks which experience financial difficulties (Minimum = 1,622). The risk of bankruptcy of these banks is high and the probability to improve the state by effective management actions is low.

The working capital/total assets ratio (X1) mean is 0,214 meaning that the working capital of the Scandinavian banks is equal to 21,4% of the total assets. The retained earnings/total assets ratio (X2) mean is low, and it is equal to 0,085. Due to the nature of business, banks finance their assets through borrowings, generate income through debt. Therefore, banks usually have the low retained earnings/total assets ratio. This result shows that the leverage of banks is high. In case of banks high leverage is a sign of safety. The EBIT/total assets (X3) ratio mean is also low for Scandinavian banks, it is equal to 0,026. Such result is caused by high number of total liabilities. The value of equity/total liabilities ratio (X4) mean is 6,314. Overall, the mean is high compare to the maximum, which is 11,894. Overall, Scandinavian banks are in a good financial health, however, there are banks which have a low ratio (minimum = 0,733). Those banks have a higher risk of bankruptcy. Capital turnover ratio (X5) result is 0,23. The low ratio represents that banks invest in too many account receivables to support its sales. This result is also a consequence of the business nature. A high number of receivables is a good sign for the bank's financial health. Overall, the ratios show the good state of Scandinavian banks.

Beneish M-score and Altman Z-score models defined banks as highly leveraged. In the case of banks such result is positive and represents the good financial health of banks as high leverage is optimal for them. Therefore, European Union develops regulations toward banks in order to minimize lending risks. Due to the fact that banks play a central role in economy, governments have to control that liabilities do not exceed assets and it does not cause financial crisis.

Table 3. Descriptive Statistics Results

Descriptive statistics					
	N	Minimum	Maximum	Mean	Standard Deviation
DSRI	227	0,870	2,458	1,664	1,123
GMI	227	0,539	0,815	0,677	0,195
AQI	227	0,843	0,972	0,907	0,092
SGI	227	0,886	1,084	0,985	0,140
DEPI	227	0,626	1,210	0,918	0,413
SGAI	227	0,944	1,031	0,987	0,062
TATA	227	-0,035	0,084	0,025	0,084
LVGI	227	1,031	1,349	1,190	0,225
M-score	227	-3,002	-1,088	-2,045	1,353
X1	230	-0,633	0,206	0,214	0,593
X2	230	0,010	0,159	0,085	0,105
X3	230	-0,035	0,087	0,026	0,086
X4	230	0,733	11,894	6,314	7,892
X5	230	0,036	0,425	0,230	0,275
Z-score	230	1,622	6,311	3,966	3,316

4.2 Correlation Analysis

Table 4 presents a pairwise correlations between all models' components that have been used in the analysis. This table comprises dependent variables, including M-

score, Z-score and discretionary accruals, and all components of Beneish M-score and Altman Z-score models. On this stage the correlations with significance levels at the 0,01%, and 0,05% were taken for the analysis and interpreted. The correlation analysis results table has been done in SPSS program. Pearson correlation two-tailed test significance has been applied.

Out of table 4, it is seen that almost all components of Beneish M-score and Altman Z-score models are significantly correlated. It can be admitted that models can be used together in order to analyze the financial state of banks. Revenue (Rev) is positively correlated with Cost of Goods (COGs), Receivables (Receiv), Current Assets (CA), PPE, Depreciation (Depr), Total Assets (TA), SGA expenses, Net Income (NetIn), Current Liabilities (CL), Total Accruals (TACC), Operating Income (EBIT), and Retained Earnings (RetEarn). The positive correlations mean that the increase in revenue causes the increase in other values. The result shows that bank with bigger amount of liabilities have a higher revenue. There is a significant negative correlation between Revenue and Cash Flow from Operating Activities (CFOA), which indicates that high revenue decreases the value of CFOA. Cost of Goods is positively correlated with the same variables as the revenue, but COGs, SGA expense, Current Liabilities, and Long-Term Debt (LTD) have a stronger negative result on CFOA, whereas Receivables, Current Assets, PPE, Depreciation, Total Assets, and Net Income do not have a strong impact on CFOA.

Discretionary Accruals (DA) are positively correlated with Net Income, it represents that banks with higher net income are more likely to apply discretionary accruals in this statement. However, PPE have a negative significant correlation with Discretionary Accruals. It represents that discretionary accruals are more likely not to be applied in PPE in Scandinavian banks.

Long-term debt is significantly correlated with Z-score. It proves that long-term debt improves the financial health of the banks. Long-term debt is also positively correlated with Revenue, Cost of Goods, Receivables, Current Assets, Depreciation, Total Assets, SGA expense, CFOA, Current Liabilities, and Total Liabilities. At the same time Long-Term Debt is negatively correlated with Total Accruals. The result represents that banks with higher value of long-term debt have a better financial health, and

less accruals. Overall, total liabilities have a positive effect on other financial statements, except equity value, but the influence is low, and it is not significant. The result proves that high leverage influences the financial state of Scandinavian banks positively.

Total Accruals have a positive significant correlation with Revenue, COGs, Receivables, SGA expense, Net Income, Current Liabilities, Operating Income, and Retained Earnings. TACC is negatively correlated with CFOA, and Long-term Debt. It represents that accruals are more likely to be applied in revenue, cost of goods, receivables, net and operating income, general expenses, short-term liabilities, and retained earnings.

Overall, almost all variables of Beneish M-score and Jones Models, which show financial reporting quality, and Altman Z-score, which detects bankruptcy likelihood, have significant correlations. When investigating the impact of financial reporting quality on bankruptcy likelihood, it is seen that scores are correlated but not significantly, however the components by itself influences each other a lot.

Table 4. Correlation Analysis Results

	Rev	COGs	Receiv	CA	PPE	Depr	TA	SGA	NetIn	CFOA	CL	LTD	MScore	DA	TACC	EBIT	TotLiab	RetEarn	EquVal	ZScore
Rev	1	,911**	,897**	,672**	,162**	,413**	,823**	,903**	,689**	-,149*	,918**	,234**	-,002	,095	,302**	,902**	,789**	,404**	-,026	-,128
COGs	,911**	1	,776**	,813**	,193**	,515**	,824**	,987**	,427**	-,237**	,935**	,238**	-,003	,040	,293**	,915**	,796**	,234**	-,025	-,091
Receiv	,897**	,776**	1	,548**	,261**	,423**	,813**	,770**	,569**	-,112	,884**	,269**	,000	,074	,243**	,715**	,785**	,442**	-,024	-,090
CA	,672**	,813**	,548**	1	,110	,337**	,756**	,823**	,265**	-,115	,788**	,367**	,007	,025	,107	,761**	,750**	-,032	-,019	,010
PPE	,162**	,193**	,261**	,110	1	,168**	,210**	,186**	-,039	,030	,263**	,032	-,004	-,316**	-,079	,058	,198**	,041	-,013	-,033
Depr	,413**	,515**	,423**	,337**	,168**	1	,477**	,457**	-,029	-,085	,477**	,270**	-,002	-,029	,037	,278**	,491**	,083	-,016	-,015
TA	,823**	,824**	,813**	,756**	,210**	,477**	1	,829**	,460**	0,031	,932**	,683**	,000	,028	,014	,715**	,998**	,188**	-,021	,003
SGA	,903**	,987**	,770**	,823**	,186**	,457**	,829**	1	,443**	-,247**	,944**	,234**	-,002	,045	,308**	,939**	,798**	,226**	-,023	-,085
NetIn	,689**	,427**	,569**	,265**	-,039	-,029	,460**	,443**	1	,112	,490**	,106	,002	,131*	,182**	,666**	,459**	,472**	-,018	-,111
CFOA	-,149*	-,237**	-,112	-,115	,030	-,085	,031	-,247**	,112	1	-,132*	,328**	,015	-,033	-,970**	-,210**	,128	-,045	-,011	,056
CL	,918**	,935**	,884**	,788**	,263**	,477**	,932**	,944**	,490**	-,132*	1	,381**	,001	,038	,180**	,861**	,911**	,257**	-,027	-,053
LTD	,234**	,238**	,269**	,367**	,032	,270**	,683**	,234**	,106	,328**	,381**	1	-,002	-,010	-,332**	,092	,723**	-,098	-,017	,132*
MScore	-,002	-,003	,000	,007	-,004	-,002	,000	-,002	,002	,015	,001	-,002	1	,004	-,014	-,001	,000	,000	-,001	,013
DA	0,095	,040	,074	,025	-,316**	-,029	,028	,045	,131*	-,033	,038	-,010	,004	1	,064	,097	,021	,057	-,010	-,070
TACC	,302**	,293**	,243**	,107	-,079	,037	,014	,308**	,182**	-,970**	,180**	-,332**	-,014	,064	1	,369**	-,015	,159*	,006	-,082
EBIT	,902**	,915**	,715**	,761**	,058	,278**	,715**	,939**	,666**	-,210**	,861**	,092	-,001	,097	,369**	1	,678**	,270**	-,018	-,101
TotLiab	,789**	,796**	,785**	,750**	,198**	,491**	,998**	,798**	,459**	,128	,911**	,723**	,000	,021	-,015	,678**	1	,154*	-,021	,016
RetEarn	,404**	,234**	,442**	-,032	,041	,083	,188**	,226**	,472**	-,045	,257**	-,098	,000	,057	,159*	,270**	,154*	1	-,012	-,102
EquVal	-,026	-,025	-,024	-,019	-,013	-,016	-,021	-,023	-,018	-,011	-,027	-,017	-,001	-,010	,006	-,018	-,021	-,012	1	-,049
ZScore	-,128	-,091	-,090	,010	-,033	-,015	,003	-,085	-,111	,056	-,053	,132*	,013	-,070	-,082	-,101	,016	-,102	-,049	1

Note: **p<0,01; *p<0,05

Number of observations: 259

4.3 Analysis of Models

The investigation of relationships between variables of Beneish M-score and Jones Models, which show financial reporting quality, and Altman Z-score, which detects bankruptcy likelihood, showed that there is a connection between financial manipulations and bankruptcy likelihood. It has been found that discretionary accruals, which is a variable of Jones Model, have a statistically significant negative influence on Z-score. However, the influence of M-score on Z-score has not been detected. At the same time, it has been admitted that components of M-score (see Table 2) has an influence on components of Z-score (see Table 2). It proves that manipulated variables affect the performance ratios, which are used in Z-score model.

In order to analyze the final data and access the relationships between variables and scores, multiple linear regression has been applied in SPSS program. The analysis uses only scaled variables, and they represent ratios. The first step is to regress the dependent variable, Z-score, on predictors M-score, DSRI, GMI, AQI, SGI, DEPI, SGAI, TATA, LVGI, Equity Value, and Discretionary Accruals. This regression shows the relationship between earnings manipulations and bankruptcy likelihood. The second step is to regress each Z-score component on components of M-score. This regression represents how manipulated variables influence the performance ratios. For the analysis, the confidence interval was estimated with an accuracy of 90,0%.

4.3.1 Relationship between earnings manipulation and bankruptcy likelihood

Table 5 presents the influence of the variables on Z-score. It is seen that there are two predictors which have been determined as significant: Discretionary accruals (p = 0,100) and Equity Value (p = 0,000). From regression coefficients, it is seen that discretionary accruals have a negative impact on Z-score, i.e. high value of abnormal accruals decreases the value of Z-score. Discretionary Accruals decrease Z-score value by 0,348. Even though, the impact is not high, but it is statistically significant. The t-test concludes that there is a linear correlation between discretionary accruals and Z-score. It represents that banks, which do more data manipulations have a lower Z-score and they are more likely to go bankrupt. The literature review has shown that companies which apply data manipulations are aimed at improving of financial

health by overstatement. As a result, discretionary accruals are more likely to be detected in banks with lower Z-score.

Another significant predictor, equity value, also has a negative influence on Z-score. This result shows that bigger banks has a higher risk of bankruptcy. From column B, it is seen that Equity Value has a strong influence on Z-score. During the research the largest Scandinavian banks which were involved in money laundering scandal and medium-sized banks were studied. Statistical calculations show that higher equity value decreases Z-score value by 1,022. As an outcome, it can be stated that bigger banks, which do more data manipulations are more likely to go bankrupt.

The result demonstrates that the financial health of the banks is affected by two statistically significant predictors which have negative impacts in the case of current research. The first one is indirect – the size of a bank. Large banks are more entitled to public pressure. Due to the fact that the information about manipulation is accessible through the media, people are aware of how large banks act. As a result, fraudulent accounting causes a negative reaction from the side of investors, people from the industry, and public. The second impact is direct from the statistical calculations. Discretionary accruals increase the probability of bankruptcy likelihood. That is why, laundering money scandal has caused the fall of shares. The information about manipulations has harmed the reputation, and it has become more riskier to invest in Scandinavian banks.

The result shows that numerically, data manipulations increase the bankruptcy likelihood in case of banks. However, from the literature review, it is known that governments protect the financial system and large banks are secured from failure.

Table 5. Z-score Regression

Model	Regression Coef-ficients	t-statistics	Significance
M-score		0,627	0,531
DA	-0,348	-1,651	0,100
DSRI	-0,503	-0,997	0,320
GMI	-0,270	-0,355	0,723
AQI	-0,113	-0,366	0,715
SGI	0,242	0,834	0,405
DEPI	-0,001	-0,452	0,651
SGAI	-2,863	-1,044	0,297
TATA	1,689	0,284	0,777
LVGI	-0,031	-0,440	0,661
Equity Value	-1,022	-4,480	0,000

Dependent Variable: Z-score

Table 6 and table 7 represent the model summary and the overall fit statistics of the Z-score regression on discretionary accruals. The R square is equal to 0,077, it means that the linear regression explains 7.7% change in the dependent variable. The F statistic is high and equals to 18,7. Moreover, the p-value (Sig. = 0,000) shows that the result is statistically significant. The result shows that the model significantly improves the ability to predict the outcome of the variable. Even though, the explanatory power is not high but according to F-test, it is significant, and the null hypothesis can be rejected. The Durbin-Watson test is 1,8 showing that this change is common in time series data and the assumption is certainly met. The value of the Durbin-Watson test is between 1 and 4, representing that there are no correlations between errors.

Table 6. Model Summary

Model	R	R Square	Durbin-Watson
multiple linear regression	,277[a]	0,077	1,836

Dependent Variable: Z-score

Table 7. ANOVA

Model		Sum of Squares	df	Mean Square	F-test	Signifi-cance
	Regression	1592,578	1	1592,578	18,655	,000
	Residual	19122,935	224	85,370		
	Total	20715,513	225			

Dependent Variable: Z-score

4.3.2 Relationship between earnings manipulations and the performance measures

Another important part of the research is to study the influence of earnings manipulations on the performance. To test the hypothesis and to answer the research questions the multiple linear regressions of M-score components on Z-score components are interpreted. Even though, the correlation between M-score and Z-score was not detected, some of the variables are still correlated.

The Table 8 represents the regression of X1 on predictors M-score, Discretionary accruals, Equity Value, DSRI, GMI, AQI, SGI, DEPI, SGAI, TATA, LVGI. Discretionary accruals, Equity Value, DSRI, AQI were defined as statistically significant. From column B, it is seen that Discretionary Accruals and DSRI, have a positive impact on X1, whereas, Equity Value and AQI affects negatively on X1.

The increase of receivables in Scandinavian Banks improves the financial health of banks. DSRI has a low positive value on Z-score (regression coefficient = 0,035). The t-test shows the linear correlation between two variables, rejecting the null hypothesis. In descriptive statistics, M-score noticed an anomaly change in this statement. It has been detected that banks can manipulate their receivables statements in order to improve the financial health by applying data manipulations. The linear regression shows that the increase in receivables statistically improves the financial state and increases the working capital. The regression proves that potentially manipulated

variable affects positively the financial health. However, when statements are manipulated, Z-score can give a wrong assessment of a financial state. Due to this fact, it is difficult to analyze the real financial health.

In this regression, Discretionary Accruals have a positive impact on Z-score. It means that banks which do data manipulations have a higher value of Working Capital/Total Assets Ratio. From regression coefficients, it can be stated that the influence of Discretionary accruals is not high, but statistically it is significant ($p = 0,068$). From regression coefficients, it is seen that discretionary accruals increase the ratio by 0,013. T-statistics shows the linear correlation between two events. The manipulated DSRI and discretionary accruals are both have a statistically significant positive impact on Working Capital to Total Assets ratio. The result shows that manipulations have a small but constant impact on working capital statements.

At the same time higher Assets Quality Index decreases the Z-score value. The higher number of non-current assets affects negatively on Z-score. The research shows that Z-score is less in companies with higher Equity Value. The regression represents the same result, larger banks have a higher financial distress. From regression coefficients, it is seen that AQI decreases Working Capital to Total Assets ratio by 0,020. The result is statistically significant with $p = 0,058$.

From Appendix 1, the linear regression explains 7.5% change of the variance in the data. Durbin-Watson test is equal to 1,9 showing that there is a common change in time series data and the assumption is certainly met. Appendix 2 represents that the regression as statistically important (Sig. = 0,074), and the F-test is equal to 1,735. The result shows that the model improves the ability to predict the outcome of the variable.

Table 8. X1 Regression

Model	Regression Coef-ficients	t-statistics	Significance
M-score		0,627	0,531
DA	0,013	1,834	0,068
Equity Value	-0,015	-1,908	0,058
DSRI	0,035	2,081	0,039
GMI	0,019	0,756	0,451
AQI	-0,020	-1,905	0,058
SGI	-0,013	-1,346	0,180
DEPI	0,000	0,800	0,424
SGAI	-0,123	-1,327	0,186
TATA	0,033	0,164	0,870
LVGI	-0,003	-1,363	0,174

Dependent Varaible: X1 – Working Capital/Total Assets Ratio

Table 9 represent the regression of Retained Earnings/Total Assets Ratio (X2). This regression shows only one significant predictor – DSRI (Sig. = 0,081). The increase in receivables affects positively on this ratio (regression coefficient = 0,013). In this regression, discretionary accruals are not statistically significant, but they still improve the Retained Earnings/Total Assets Ratio.

As it is stated above, the main source of finance for banks comes from borrowings, and they do not focus on retained earnings. Due to the business nature of banks, retained earnings are not important for the financial health of Scandinavian Banks. The descriptive statistic shows the low value of the ratio, representing banks as highly leveraged, because they generate income mainly through debt. Therefore, there are no correlations between M-score components and Retained Earnings/Total Assets Ratio.

From the Appendix 4, the f-test is equal to 1,198 with p = 0,294. It represents that the result is not significant. The model does not predict the outcome of the variable. In Appendix 3, it is seen that the regression explains only 5,3% change in the dependent variable.

Table 9. X2 Regression

Model	Regression Coefficients	t-statistics	Significance
M-score		0,627	0,531
DA	0,005	1,582	0,115
Equity Value	0,001	0,365	0,715
DSRI	0,013	1,751	0,081
GMI	0,006	0,551	0,582
AQI	0,004	0,789	0,431
SGI	-0,004	-1,073	0,284
DEPI	-0,000	-0,193	0,847
SGAI	0,030	0,767	0,444
TATA	0,014	0,169	0,866
LVGI	0,000	0,434	0,664

Dependent Varaible: X2 – Retained Earnings/Total Assets Ratio

Table 10 shows the regression of EBIT/Total Assets Ratio (X3). The regression defines 3 significant predictors: Discretionary Accruals, Equity Value, and SGI. Discretionary Accruals and Equity Value have a small positive influence on EBIT/Total Assets Ratio. The t-test shows that there is a linear correlation between these variables. Discretionary Accruals increase earnings before interest and taxes. The regression shows that Scandinavian banks can apply fraudulent accounting in order to perform higher income. As a result, discretionary accruals improve EBIT/Total Assets ratio, and consequently, abnormal accruals improve the Z-score, but the influence is too low (regression coefficient = 0,007). Therefore, such accounting manipulations can be an obstacle to detect a realistic financial health of a bank. Therefore, the application of several model provides with an advantage in detecting of financial fraudulent accounting and the real impact on financial health.

Sales Growth Index has a negative effect on Z-score. Descriptive statistics shows that there is no significant sales growth in Scandinavian Banks. The regression shows that low Sales Growth affects negatively on financial state of the banks. The effect of the index on ratio is statistically significant. From column B, it is seen that the index decreases EBIT/Total Assets ratio by -0,005.

Appendix 5 represents that this regression explains 32,3% change in the dependent variable. Durbin Watson test is equal to 1,912 representing that this change is common, and there is no concern. From Appendix 6, the f-test is equal to 10,276, and p =

0,000. It represents that the model is statistically significant, and it improves the ability to predict the outcome of the variable.

Table 10. X3 Regression

Model	Regression Coefficients	t-statistics	Significance
M-score		0,627	0,531
DA	0,007	9,403	0,000
Equity Value	0,002	2,709	0,007
DSRI	0,000	0,194	0,847
GMI	-0,001	-0,516	0,606
AQI	-0,000	-0,055	0,956
SGI	-0,005	-4,545	0,000
DEPI	0,000	1,072	0,285
SGAI	0,001	0,052	0,959
TATA	-0,012	-0,569	0,570
LVGI	0,000	0,183	0,855

Dependent Varaible: X3 – EBIT/Total Assets Ratio

Table 11 presents the regression of Value of Equity/Total Liabilities Ratio. The regression has only one statistically significant predictor – equity value (Significance = 0,000). As it was stated above, banking sector is highly leveraged. Therefore, banks always have a higher number of liabilities. From the regression, it is seen that banks with higher equity, have a lower value of Equity/Total Liabilities Ratio. It shows that currently, large Scandinavian Banks have an exceeding number of liabilities, and it starts to affect negatively on financial health of the banks. Even though, the descriptive statistics shows that this ratio is normal for the major part of the banks, the regression shows that it is risky for banks to continue increasing the number of liabilities. From regression coefficients, it is seen that this variable, equity value, decreases Value of Equity/Total Liabilities Ratio by 2,1. T-test shows a linear correlation between these variables.

Discretionary Accruals are not statistically important in this regression, however, from column B it is seen that it has a negative impact on Value of Equity/Total liabilities Ratio. From regression coefficients, they decrease the ratio by 0,7. At the same time t-test shows the linear correlation between abnormal accruals and the ratio. As

it is noticed above discretionary accruals and equity value have a negative impact on Value of Equity/Total Liabilities Ratio, consequntly on Z-score.

From Appendix 8, f -test is equal to 1,953, but this regression is statistically important because the significance level is at 0,04. Appendix 7 shows that the regression explains only 4,1% change of the variance of the data. Durbin-Watson test is 1,877: it represents that this change is common, and assumption is met.

Table 11. X4 Regression

Model	Regression Coefficients	t-statistics	Significance
M-score		0,627	0,531
DA	-0,693	-1,448	0,149
Equity Value	-2,100	-4,050	0,000
DSRI	-1,049	-0,915	0,361
GMI	-0,586	-0,339	0,735
AQI	-0,232	-0,329	0,742
SGI	0,539	0,817	0,415
DEPI	-0,001	-0,230	0,819
SGAI	-5,178	-0,831	0,407
TATA	4,634	0,343	0,732
LVGI	-0,067	-0,416	0,678

Dependent Varaible: X4 – Value of Equity/Total Liabilities Ratio

Table 12 demonstrates the results of the regression of Net Sales/Total Assets ratio. There are three statistically significant predictors: Discretionary accruals, Equity Value, and SGI.

The regression shows that abnormal accruals have a positive impact on Net Sales/Total assets Ratio. From regression coefficients column, it is seen that discretionary accruals increase the ratio by 0,013. T-test shows a linear correlation between these variables. The correlation is statistically significant. The significant level is very high: p = 0,000. From descriptive statistic results, M-score model admitted that variables are manipulated in order to increase the income statements. Therefore, discretionary accruals have a positive impact in this regression.

Banks with higher equity value have higher capital turnover. Regression coefficients shows that the impact of equity value variable is low, but it still increases Net

Sales/Total Assets Ratio by 0,006. T-test shows that there is a linear correlation between dependent and independent varaibles.

This regression also shows that SGI have a negative impact on financial health. This variable decreases Net Sales to Total Assets Ration by 0,010. T-test shows that there is a linear correlation between variables. The significant level is at 0,001. As it is admitted above, banks have a low sales growth. Therefore, the regression shows that SGI affects Net Sales/Total Assets Ratio negatively. More likely, larger banks have a lower ratio value. From descriptive statistic, it is seen that overall banks invest in too many account receivables because of the business nature. However, low sales growth decreases the financial health. The result shows that banks provide many loans, but the revenue relatively is not high.

Out of Appendix 9, it is seen that the regression explains 16,4% change in the dependent variable. Durbin-Watson test detects these changes as common and the assumption is met. From Appendix 10, F-test is 4,219 with p = 0,000 representing that the regression is statistically significant, and the model increase the ability to predict the outcome of the variable.

Table 12. X5 Regression

Model	Regression Coefficients	t-statistics	Significance
M-score		0,627	0,531
DA	0,013	5,841	0,000
Equity Value	0,006	2,617	0,010
DSRI	0,005	0,920	0,358
GMI	0,001	0,190	0,849
AQI	-0,001	-0,205	0,838
SGI	-0,010	-3,249	0,001
DEPI	0,000	0,408	0,684
SGAI	0,001	0,042	0,966
TATA	-0,046	-0,762	0,447
LVGI	0,000	0,156	0,876

Dependent Varaible: X5 – Net Sales/Total Assets Ratio

The research shows that the usage of Jones Model, Beneish M-score Model and Altman Z-score Model together is more effective. Jones Model and Altman Z-score

model has detected the statistically significant correlation between discretionary accruals and bankruptcy likelihood. At the same time the correlation between M-score and Z-score has not been detected. However, M-score model provides with overall understanding how manipulated and non-manipulated variables can affect the performance. Firstly, Descriptive statistics show the broad picture about potentially manipulated variables and the financial health. Secondly, correlation analysis showed that there are relations between M-score and Z-score variables. Thirdly, multiple linear regressions describe how variables are correlated.

5 Conclusion and discussion

This chapter of the thesis summarizes the results of the findings in order to complete the hypothesis testing and to answer the main research questions. The next goal of this part is to discuss the interconnection between research results and the theoretical background. The chapter covers practical implications for investors, researchers, and companies, as well as limitations of the study, and the recommendations for the further research possibilities.

5.1 Discussion about the findings

The research findings were able to answer all questions stated in the thesis and test each hypothesis. Two relationships have been studied: correlation between earnings manipulation and bankruptcy likelihood; correlation between earnings management and the performance. For the analysis correlation method with application of multiple linear regressions was used. Standard statistical tests were analyzed in this work: t-test, R square, Durbin-Watson test and F-test.

1 Do accounting manipulations affect bankruptcy likelihood?

H_0: There is no correlation between accounting manipulations and bankruptcy likelihood.

H_1: There is a correlation between accounting manipulations and bankruptcy likelihood.

The research results concluded that the null hypothesis was rejected, and the alternative one was proved. The statistically significant correlation between abnormal accruals and Z-score, which analyzes the financial health, was found. Findings showed that discretionary accruals have a negative impact on Z-score, i.e. earnings manipulations increase bankruptcy likelihood. T-test showed that there is a linear correlation between these variables, rejecting the null hypothesis. The regression analysis presented that discretionary accruals statistically decreases the value of Z-score. The lower Z-score, the higher is a financial distress.

At the same time the regression showed another statistically important predictor – Equity Value. It was concluded that banks with higher equity value statistically have a lower Z-score. Basically, the result shows that larger banks are more likely to go bankrupt. The introduction of the thesis introduced with the current situation of the banking sector in Scandinavia. It was mentioned that the performance of Nordic banks fell, as well as their shares. It could influence the Z-score, which shows the financial health. Taking into account that only large banks were involved in scandal, Z-score was strongly affected by equity value.

Theoretical background highlights that it is difficult to find a strict connection between earnings manipulations and bankruptcy likelihood. The researchers were divided on those who prove the correlation and the one who argues with that. In the current research, the relationship between these events was showed numerically. However, the results did not show how it influences the financial health directly in practice. Therefore, findings were analyzed deeply, and provided the possible correlation between equity value and discretionary accruals.

The regression showed that Z-score, i.e. financial health, is affected by two statistically significant predictors – discretionary accruals and equity value. Both variables decrease Z-score value in the case of current research. The scandal with largest banks attracted the attention from public after appearance of the information about money laundering. The scandal caused the fall of the performance.

From theory, companies can do earnings management due to the following reasons: hiding of the real financial statements, improving the performance by overstatement. Therefore, discretionary accruals can be found in companies with worsen financial position. They can provide companies with time to improve the financial situation and hide difficulties. At the same time accruals can hide the real revenue of a company and create a desirable for managers image. Accounting manipulations can be applied for a long time. However, in the current case the information about manipulations was accessible through the media, and people were aware about banks' actions. It can be stated that accounting manipulations turned to be a potential trigger of financial distress. In introduction part, it was stated that there was a negative reaction from the side of investors and public.

The author of the thesis agrees that it is difficult to define a direct connection between earnings manipulations and bankruptcy likelihood. Moreover, it is incorrect to conclude that discretionary accruals lead to bankruptcy. However, when the information about any manipulation turns to be published, the financial distress increases. Therefore, it can be admitted that earnings manipulations can be a trigger of bankruptcy likelihood. Finally, it can be stated that there is a connection between earnings management and bankruptcy likelihood.

The research showed good Z-score mean, representing that the major part of the Scandinavian banks is financially healthy. The theoretical background highlights that the failure of large banks is impossible, because governments control and secure financial system from the systemic risk. Findings showed that Z-score in large banks fell, but not dramatically. Scandinavian banks are still in a good financial state, but the performance worsened.

2 Do accounting manipulations influence banks' performance measures?

H_0: There is no connection between manipulated statements and performance measures.

H_1: There is a connection between manipulated statements and performance measures.

The null hypothesis was rejected, and the alternative one was accepted. The analysis of five regressions showed that components of M-score model and discretionary accruals influenced the components of Z-score model, i.e. performance measures. Descriptive statistics interpreted what statement could be potentially manipulated. The anomaly change was found in DSRI, DEPI, TATA and LEVI variables. Manipulations in DSRI were detected in major part of banks, and DEPI, TATA and LEVI were manipulated in some banks. Therefore, the statistically significant relationship between DSRI and Z-score ratios was found, whereas the statistically significant correlations between other variables and Z-score ratios were not detected. The result shows that banks tampered receivables, liabilities, extended assets life, and amortization numbers.

The research showed that DSRI variable had a statistically significant influence on Working Capital to Total Assets ratio. Potentially manipulated statement improved the financial health of banks. Other researchers noticed that Z-score gave more errors when statements were manipulated. Earnings management does not allow to assess the objective financial health. Nevertheless, the regression showed a statistically significant correlation between these variables, proving that there is connection between earnings manipulations and the performance measures. The regression presented that discretionary accruals increase Working Capital to Total Assets ratio. The model concluded that manipulated variable, DSRI, and discretionary accruals improve the performance. The regression also had a third statistically important predictor – equity value. The result demonstrates that larger banks were able to improve the performance by overstatement. The second regression also presented that DSRI increase Retained earnings to Total Assets ratio.

In the third regression, discretionary accruals also had a statistically important influence on EBIT to Total Assets Ratio. Equity value was also defined as important predictor. The model proves, that large banks improved the ratio by overstatement. Earnings management influenced the performance positively. Numerically, discretionary accruals increased the value of the ratio. In the regression on Net Sales to Total Assets ratio, discretionary accruals increased the value of the dependent variable. Equity value was defined as significant predictor. The model supports the argument that earnings manipulations influence the performance measures.

The research showed that earnings manipulations create obstacles for Z-score as it was mentioned in theory, because they improve the value of the performance measures. In the analysis of components of all models, the statistically significant impact of discretionary accruals and manipulated variables was found. Findings proved the alternative hypothesis: there is a connection between manipulated statements and the performance measures. In current research it was found that discretionary accruals and manipulated variables affect performance measures positively, but in the broad perspective discretionary accruals influence negatively on financial health.

5.2 Practical implications of the results

The correlation between earnings manipulations and bankruptcy likelihood is actively studied by other researchers in the financial field. Earnings quality is one of the crucial aspects of the reporting process. Accounting manipulations are despised by businesspeople and researchers as well. Therefore, this topic attracts a lot of attention. However, findings vary in different works. Researchers admit that the connection is not clear, and no one can explain how actually earnings manipulations influence the financial health.

This study suggests the unique explanation which is supported by numbers. The research was built on current situation of case companies. The findings were formulated with perspective to ongoing events and statistical results. The outcome of the research may be of interest to researchers from the financial field who aimed at studying of a broad picture of the connection between earnings manipulations and bankruptcy likelihood as well as how manipulations influence performance measures. Since the results of current work are based on the numerical valid data, researchers can use it for further statistical analysis of earnings manipulations and the performance. At the same time, the research highlights the importance of usage of several models to detect financial fraud. It provides an advantage to analyze financial reports on earnings management considering that the nature of accruals varies from firm to firm.

In addition, the research provides investors with a clue of earnings quality and financial health of Scandinavian banks. Moreover, descriptive statistics interpret the performance measures and gives a big picture of current situation in Scandinavian financial sector. The thesis suggests a further investigation of banks and gives the idea which statements should be checked on fraudulent accounting before investing.

Besides researchers and investors, the findings of the work can be useful for companies. The research provides firms with an idea how earnings management can influence the financial state. The thesis highlights that any manipulations repel investors and possible clients because the reputation gets worse. Therefore, earnings management can turn to be a trigger of financial distress.

5.3 Limitations and recommendations for the further research

The current research has several limitations, which could affect the result. Therefore, this subchapter includes the suggestions of improvements for the further research work. The main limitation is the sample size of companies. The research studies only 33 Scandinavian banks due to the limits of available data and language barrier; it is not all banks represented on the Nordic market. That is why the results do not cover the broad picture and do not represent the whole market as well as limiting statistical research. In addition, chosen banks represent only Nordic market. It limits the implication of the research in other countries because of different economic situations and different mentality of people in business.

The second challenge of the research is the model applicability to banking sector. Jones model and Altman Z-score model are modified in the way that they are able to analyze financial sector as well. However, Beneish M-score model can give errors when analyzing financial institutions. Since banks are highly leveraged organizations, the author of the thesis should keep in mind that some changes are typical for this business nature.

Based on occurred challenges, the further same research can be done. As for recommendation, the author of current work suggests expanding the sample size to the rest European Union. The research will be broader and will represent the whole picture of the topic. Moreover, it will be interesting to compare financial health and

earnings quality of Central, Western, and South European banks, as well as to study effects of accounting manipulations in whole Europe.

Another recommendation is to use one more model which assess the earnings quality. The author suggests using the third type of models which is based on frequency distribution. It is not complicated but it analyzes the overall behavior of statements. At the same time, it is possible to replace Beneish M-score model and take another model which is based on specific accruals. Additionally, the researcher can analyze extra performance measures which are more exponential for banking sector. To do so, the study can use alternative performance measures which are published by European banks.

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Appendices

Appendix 1. Model Summary. X1 Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Multiple linear regression	,273[a]	0,075	0,032	0,313577003	1,948

Dependent Varaible: X1 – Working Capital/Total Assets Ratio

Appendix 2. ANOVA. X1 Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1,706	10	0,171	1,735	,074
	Residual	21,141	215	0,098		
	Total	22,847	225			

Appendix 3. Model Summary. X2 Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Multiple linear regression	,230[a]	0,053	0,009	0,134080286	2,135

Dependent Variable: X2 – Retained Earnings/Total Assets Ratio

Appendix 4. ANOVA. X2 Regression.

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	0,215	10	0,022	1,198	,294
	Residual	3,865	215	0,018		
	Total	4,081	225			

Dependent Variable: X2 – Retained Earnings/Total Assets Ratio

Appendix 5. Model Summary. X3 Regression.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Multiple linear regression	,569[a]	0,323	0,292	0,032778383	1,912

Dependent Varaible: X3 – EBIT/Total Assets Ratio

Appendix 6. ANOVA. X3 Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	0,110	10	0,011	10,276	,000
	Residual	0,231	215	0,001		
	Total	0,341	225			

Dependent Varaible: X3 – EBIT/Total Assets Ratio

Appendix 7. Model Summary. X4 Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Multiple linear regression	,289[a]	0,083	0,041	21,154795617	1,877

Dependent Varaible: X4 – Value of Equity/Total Liabilities Ratio

Appendix 8. ANOVA. X4 Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	8738,445	10	873,845	1,953	,040
	Residual	96217,956	215	447,525		
	Total	104956,401	225			

Dependent Varaible: X4 – Value of Equity/Total Liabilities Ratio

Appendix 9. Model Summary. X5 Regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
Multiple linear regression	,405[a]	0,164	0,125	0,094735769	1,882

Dependent Varaible: X5 – Net Sales/Total Assets Ratio

Appendix 10. ANOVA. X5 Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	0,379	10	0,038	4,219	,000
	Residual	1,930	215	0,009		
	Total	2,308	225			

Dependent Varaible: X5 – Net Sales/Total Assets Ratio