Dividends and risks in banks

An investigation of a relationship between dividends and risks in Nordic banks

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Abstract

Banks represent one of the most important parts of the economy in the world. As a result, decisions of bank management affect not just the direct bank stakeholders but the state of the economy and society as a whole. This became evident during the latest financial crisis in 2007 where the failure of one bank resulted in the domino falling that affected banks globally. The regulators increase their attention to the risks that bank face and their measures and requirements. Therefore, the research within the banking area has important consequences from both theoretical and practical side.

The purpose of this project is to investigate whether there is a relationship between dividends that Nordic banks pay and different types of risks such as market, credit (including default), liquidity and operational. The results of the research will contribute to the knowledge in finance and help different stakeholders to understand possible reasons for different dividends level.

The methodological position works as a foundation for the conduction of the research. The epistemological and ontological views applied in this project are positivism and objectivism. The deductive research approach and quantitative research strategy are used for the research and thus the collection and analysis of the archival data of 19 Nordic banks over five year time horizon. The research can therefore be described as a panel study.

Based on the previous research papers the following proxies for risks have been used in the research: market risk – capital requirement for market risk to total assets, credit risk – loan loss provisions to total assets, default risk – Altman Z-score, liquidity risk – liquidity coverage ratio, operational risk – economic capital (capital requirement) for operational risk to total asset.

Ordinary Least Square regression analysis is performed over the collected data in order to fulfil the purpose of the project. The tests results identify that there are no statistically significant relationship between dividends and market, credit, default and liquidity risks and the statistically significant negative relationship between the dividends and operational risk in Nordic banks. These findings contribute to a new knowledge within the finance and banking area in particular. Additionally, this project might be used as a foundation for the further research within the field. The findings are also useful for stakeholders in understanding banks risk level.

Key words: dividends, market risk, credit risk, default risk, liquidity risk, operational risk, Denmark, Sweden, Norway, Finland.
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Chapter 1. Introduction

This part of the project presents the problem background of the research that introduces the previous researches within the dividend-risk relations research area. It is followed by the research gap within the investigation of dividends and different types of risks within banking that leads to the research question and the purpose. The theoretical and practical contributions as well as delimitations of the project are also described. The chapter ends with the disposition in order to give the readers an overview of the whole project.

1.1 Problem Background

Banks acquired a vital role in the economy a long time ago. They started to operate as intermediates between counterparties. They have helped to redistribute the wealth. Nowadays banks are becoming more universal. They act not only as intermediates but also provide additional financial services and are involved in securities markets. As a result the role of banks is becoming more and more important with the development of the global economy. Furthermore, it is common for some countries to have a few large banks; these banks basically form the essential part of the banking sector. It concerns Nordic countries that will be analyzed in this paper. Knowing that only a few banks have a substantial influence on the country economy it is necessary to take actions in order to make sure that these banks are safe on all levels. Thus the supervision and management of banks are essential part of stable economies.

The role of the banks in the recent financial crisis 2007 was substantial. American banks eased the requirements for lending and specifically mortgages. They also created advanced securities that in some sense cause the beginning of banks failures. Banks’ unstable situation spread instability and financial difficulties across the world quite quickly. One of the reasons why the banks faced so many problems during the financial crisis is the gap in risks consideration. It became obvious that banks as well as banks’ regulators did not cover in full the risks problems. First of all, the definitions of the risk and related concepts were not completely accurate that led to incomplete coverage of possible risks that banks may face. Furthermore, the measures of defined risks were not the best reflection of real risks that banks faced and it still remains a major problem. Thereby the risk management and regulations did not fulfill their purpose effectively. As a result of it the Basel Committee introduced new regulatory framework known as Basel III. It involves new definition of capital, new measures of liquidity risk (Liquidity Coverage Ratio and Net Stable Funding Ratio) as well as an inclusion of counterparty credit risk in regulated measurements (Hull, 2012, p.289-295). Despite the taken actions it is obvious that a lot of banks have lost trust of their customers and other stakeholders. It will take a long time and several means to restore this trust.

One way of communicating with the outside stakeholders is through dividends that the banks pay. The dividends are well-known source of indication of a market valuation of companies. One of the most famous theories in this field is the view of Miller and Modigliani (1961, p. 428) that prove that dividend policy is irrelevant in perfect capital markets. There are also two opposite views on the dividend policy: some state that the high dividends payout ratios are more preferable than the low ones (Allen et al., 2000); others argue for low-dividend payout (Black, 1976 cited in DeAngelo & DeAngelo...
It is clear that the dividends are ambiguous question in terms of companies’ valuation. Nevertheless it is obvious that most companies want to send a signal to their stakeholders using dividend payout policy. High dividends are preferable for the companies that want to show their worth. It is beneficial to have a high proportion of sophisticated investors that have tax advantages and thus prefer high dividends. (Allen et al., 2000, p. 2530) Furthermore, there is another theory that implies the signaling effect of dividends and refers to the life cycle of the companies. It proves that the young firms have more profitable opportunities whereas mature firms have less attractive profitable opportunities and higher profitability (DeAngelo et al., 2006, p. 228). It is possible to see that some signals exist when the companies decide whether to pay dividends and how much should be paid.

In addition to the valuation of the companies dividends also send a signal about another significant characteristic: risks that are associated with the company. Charitou et al. (2011, p. 1540) find evidence that the dividend increase is associated with the reduction of “default risk beyond other systematic risk changes”. These findings are closely related to the signaling theory as the companies will increase their dividends only in case where they are absolutely sure in their future. In addition to this research Cohen & Yagil (2009, p. 1204) have established that financially distressed firms change the amount of their dividends more frequently than financially stable firms. It is evident that the researches within the relationship between the dividends and risks cover different aspects of the problem.

There are quite a few different risks that banks face. One of the most substantial and traditional is credit risk that includes default risk. It is the risk of losses due to debtor’s non-payment (Switzer & Wang, 2013, p. 91). There are some possible measurements of these risks but it has been chosen to follow the previous research within the area and use loan loss provision to total assets as a credit risk proxy and Z-score as default risk proxy. The other substantial risk that bank face is market risk that arises as a result of unfavorable changes in market prices (Vyas & Singh 2010, p. 16). The most frequently used measure for this type of risk is Value-at-Risk (VaR). However considering that few banks disclose the VaR and the disclosed numbers are calculated using different confidence internals is has been decided to use the capital requirements for the market risk. In order to take into account the different sizes of banks, the ratio of capital requirements to total assets is used as proxy for market risk. As a result of financial crisis, liquidity risk has occupied one of the central places in banks risk management. This risk is the risk of not being able to meet monetary obligations when they must be paid (Hull, 2012, p. 447). The newly introduced measure of the liquidity risk is used as a proxy for the liquidity risk that is liquidity coverage ratio. The final risk that is under consideration of this project is operational risk that arises “from inadequate or failed internal processes, people and systems or from external events” (BCBS, 2011b, p. 3). It is difficult to measure this type of risk precisely, but it has been decided to use economic capital for operational risk to total assets as a proxy for operational risk.

However, there are not so many research papers that concentrate on dividend-risk relationship within the banking industry. It is stated by Onali (2014, p. 1) that most researchers exclude the regulated industries from their investigation. Nevertheless, there are some authors that investigate the relationship between risk and dividend payout ratio in banks. High risk, growing banks tend to have lower dividend payout ratios according to Haq & Healey (2012, p. 698). In particular, the authors investigate the relationship
between the equity, credit and interest rate risk and the dividend payout ratio within the European banks and find that only equity risk has a statistically significant negative relationship with the ratio (Haq & Healey, 2012, p. 709). The significant negative relationship can be explained by the traditional view on the dividends: dividends are the costly mean to signal banks solvency and reduce the information asymmetry and thus banks only reduce dividends as an emergency mean to save finance (Haq & Healey, 2012, p. 701).

In addition to this research, Onali (2009, p. 4, 11) investigates the relationship between the credit and default risks and dividends and concludes that a default risk is positively related to the dividends but the results for credit risk are similar to the Haq & Healey results. The positive relationship of default risk and dividend payout ratio is confirmed with the later and broader study by Onali (2014, p. 20). This relationship can be explained by the hypothesis of risk-shifting mechanism of dividends: banks that experience high level of default risk would want to transfer this risk to the bank creditors and to the taxpayers in case of bailouts (Onali, 2014, p. 2). The existence on the risk-shifting mechanism comes from the public guarantees and the deposit insurance regulations that allow banks to extract wealth from depositors and the insuring agency through high dividends when they have high default risk (Onali, 2014, p. 5). High dividends can decrease the value of assets to lower than the value of debt and thus increase the default risk. In order to achieve high dividends, banks tend to realize their safer assets that results in riskier assets in the balance and thus higher risk of default (Acharya et al., 2011, p. 8-9). However these researches have been done using data prior and during financial crisis up to 2010 that is the first year after recession caused by the financial crisis 2007. Considering the significant change of attitude towards banks it would be interesting to see whether the message of dividends remains the same, becomes stronger or weaker as concerns risks indication. Moreover the researches put more attention on banks in big European countries such as Germany and the United Kingdom or US and have not investigated thoroughly the Nordic region banks. Furthermore, the researchers selectively include types of risks and measurements of the chosen types of risks in their own investigations. It would be interesting not only to update the results of the conducted tests but also to include additional type of risks to investigate their relationship to dividends and consequently additional measures of these types of risks. Thus the research gap that exists and is aimed to be fulfilled is the time period, region and types of risks that have not been included in the previous researches such as market, liquidity and operational risks.

1.2 Research question
Banks play a vital role in economies and have a huge effect on all other companies that operate in the same countries. The recent financial crisis showed that banks’ failures may heavily affect not only national economies but also the global economy. Therefore, the risk measurement is highly important matter and the dividend as an indication of risks level is an interesting and important issue to investigate. Taking this statement in the consideration, the research question of this project is:

What is a relationship between dividend payout ratio and risks in Nordic banks?

1.3 Purpose
The main aim of the project is to determine whether there is a relationship between the bank dividends and different types of risks. The time period that has been chosen for the project is from 2010 to 2014 that is not affected by the recession but include the
possible changes caused by the financial crisis. Additionally, a purpose is to determine what kind of the relationships (positive or negative) there is. It has been decided to investigate credit (that includes default), market, liquidity, and operational risks in relation to the dividends. It is known that there are several possible tools to determine the risks. To make the analysis more thorough different methods for risk measurement will be examined. They include capital requirement for market risk to total assets, loan loss provision to total assets, liquidity coverage ratio, Z-score and economic capital to total assets (for operational risk). The additional aim of the research is to provide outside stakeholders an idea how they can interpret the dividend payments in terms of risks. It should give the stakeholders additional knowledge in quick assessment of the banks’ status.

1.4 Theoretical and Practical Contribution
From the theoretical perspective the results of the research will contribute to the discussion about the risks and dividends in banks. As it has been presented during the problem background only a few researches have been done within the chosen area. In spite of these researches are relatively new, they do not cover the period after the financial crisis that has changed the attitude towards banks’ risks substantially and resulted in the introduction of new banks’ regulations and risks measures. Furthermore, some of the chosen proxies for the banks’ risks such as capital requirements for market risk are completely new for this type of the research. The project will also indicate whether the risk and dividends relationship is the same in countries with a few banks forming the banking sector.

As concerns the practical contribution, the results of the research should get outside stakeholders an understanding whether they can rely on the dividends as an indicator of the different types of risks. It will also give them an idea how to interpret the dividends movements in banks. Additionally, the research should give the managers of the banks incentives to apply specific dividend payout policy in order to send a signal to outside stakeholders not only about the valuation but also about the risks banks face.

The target of the project is the outside stakeholders of banks that want to identify the risk level within a particular bank. However, the project is mainly addressed to private investors that do not have enough resources to investigate every possible risk that a bank faces. The results may help them to find an easy way for risk level identification. The result of the project may also be useful for large investors and regulators.

1.5 Delimitations
The research project will cover only chosen measurements of risks and will not cover all possible measures. Furthermore, the population is restricted to the Nordic geographic area that may imply that the results of the project will not be possible to generalize beyond the chosen region. It is also necessary to mention that the time period only covers the post-crisis period and findings may significantly differ from the previous research.

1.6 Choice of subject
The chosen topic is mainly within the finance that is my favorite field within business administration. The knowledge gained from Financial Management course in Umea School of Business and Economics helped to identify the study area that is in my particular interest. Additionally, the study in Belarusian State University within
specialization “Finance and Credit” has helped to uncover major problems within finance and banking. From the very start of my studies, different types of bank risk have been the most appealing to me. The Bachelor’s thesis that was written on topic “Basel III implementation: The change in the UK banks as a result of Basel III framework” has increased my interest in banks. As a result the choice of the banks and their risks was natural for me. The study of dividend signaling theory has made me wondered why there are three different views on the same topic and whether it is also true for dividends and risk relationship. As a result, the provided research question has been created.
1.7 Disposition

Theoretical methodology

- This chapter of the project presents the available options and the choices made within theoretical methodology. They include research philosophy, approach, strategy, methodological purpose of the research, modes of observations, time horizon. The preconception, perspective, literature search and ethical and social considerations are presented.

Theoretical framework

- This chapter include theories that are used for the hypotheses formulation. The chapter starts with the description of specificity of banks. It is followed by the presentation of dividend theories that include the signaling effect and discussion on risks within banks. These theories form a background for the next part of the chapter that presents dividend-risk relations. The chapter ends with the theoretical model that is used for this project.

Practical method

- The practical method of the chapter covers the population and the sample choice of the project. Additionally, the data collection method is described. The hypotheses are formulated and variables are defined for the foundation of the analysis. The statistical tests as well as practical issues arising from their usage are discussed in this chapter.

Empirical findings

- This chapter covers the empirical finding of the analysis. In particular, the descriptive statistics is presented in the first of the chapter. Consequently, the regression analysis and its results are presented in the chapter for the foundation of the analysis covered in the next chapter.

Analysis and Quality Criteria

- This chapter of the project provide a reader with the analysis of the results presented in the previous chapter on a basis of theoretical framework. The formulated hypotheses are accepted or rejected as a result of this analysis. In addition, the quality criteria of the research such as reliability, validity and replicability are discussed.

Conclusions and Further Research

- The final part of the project represents the conclusion of the research. It covers the answer on the research question, theoretical and practical contribution of the research results including the recommendation to the stakeholders. Finally, the limitations of the research are discussed and the recommendations for further research are made.
Chapter 2. Theoretical Methodology

This chapter introduces the author’s choices within epistemology, ontology, research approach, strategy, purpose of the research, modes of observation, time horizon as well as preconceptions and research writing perspective. Furthermore, the literature search for theoretical framework is described and ethical and social considerations are presented.

2.1. Preconceptions

One of the most essential things when writing report is to be objective. It is a difficult task for a single author. However, taking into account the previous experience in writing theses and other academic papers (they include two Bachelor theses that cover two different topics within Finance: Basel implementation and electronic money; term papers on the following topics: electronic money; information technology implementation within business plan creation; functioning and further development of European Central Bank; and payments using bank cards) I have received enough knowledge in critical awareness to be able to separate my own values and beliefs from this project. Furthermore, the feedback from the supervisor and fellow students helps to step back and think about the objectivity and solidity of the choices.

2.2. Perspective

The report is written from the perspective of outside stakeholders that include different types of investors and regulators of the banks. There is an information asymmetry between outside and inside stakeholders that makes it more difficult for the outside stakeholders not only get the information about the banks but also evaluate the real situation of the banks’ conditions. This perspective has driven the methodological choices as well as the choices of data collection methods and literature search that have been restricted by the existence of the asymmetry.

2.3. Research philosophy

In order to investigate the problem and make it reasonable for the readers it is necessary to state the research philosophy that is the base of every research. The choice of a particular methodological position reflects in the further part of the research such as choice of research approach and data collection and processing. According to Trigg (1985, p. 189 cited in Wainwright & Forbes, 2000, p.260) the social sciences’ philosophy “cannot be an optional activity for those reluctant to get on with the ‘real’ empirical work.” It is the essential starting point for all social sciences. The research philosophy consists of two parts that are epistemology and ontology. The explanation and evidence of the choices within these considerations are described in this part of the project.

2.3.1 Epistemology

Epistemological considerations answer to the question what is the acceptable knowledge in the discipline. The central issue within the epistemology is whether the social world, that includes banks and theirs characteristics, can and should be studied using the same procedures and principles as in the natural sciences. There are two opposite views within epistemology that are interpretivism and positivism. (Bryman& Bell, 2011, p. 15)

According to interpretivism supporters, the subjects of social sciences are totally different from the natural science subjects (Bryman& Bell, 2011, p. 16). The social
science subjects are people and their institutions; these institutions also include banks that are subject of this project. The interpretivists “deny the possibility of knowing what is real and reject the possibility of discerning causality” (Easton, 2010, p. 118). They provide their own interpretations of the events and data (Easton, 2010, p. 118). It means that not only the subjects of social science are unique and need to be analyzed in the unique way but also that the analysis itself depends on the researcher and there is no way to say what analysis method is better. Taking into account the research question and that the subject of the project is banks and dividends’ and risks’ measurements it seems more logical to compare them with strict natural science model rather than with the complex world of human beings. It is true that banks are managed by real people and thus may act as a complex society of individuals. However, the matter of the project is numbers and models that are subject to strict logic and very similar to natural science subjects in this context. Therefore, the interpretivism cannot provide the necessary base for answering and full examination of the research question.

It is more natural to use positivism as an epistemological position in this project. It is the opposite view to interpretivism in epistemology. Even though it is almost no disagreement about what research papers are in positivist manner, the philosophy itself is difficult to define (Couclelis & Golledge, 1983, p. 332). Positivism implies the use of the natural science’s method in the studies of social reality and beyond (Bryman & Bell, 2011, p. 15). Positivism can provide explanation and prediction based on “regularities or law-like generalisations in material or social settings” (Easton, 2010, p. 118). It means that banks and their chosen characteristics can and should be analyzed using the natural science methods.

In addition to this main feature, positivism also follows several other principles. First one is the phenomenalism principle that implies that only senses-confirmed knowledge can truly be warranted as knowledge (Bryman & Bell, 2011, p. 15). In case of this project it means that only viewed relationship between dividends’ and risks’ measurements can be recognized as knowledge.

Second additional principle of positivism is the principle of deductivism that means that the aim “of theory is to generate hypotheses that can be tested and that will thereby allow explanations of laws to be assessed” (Bryman & Bell, 2011, p. 15). It involves the generation of the hypotheses regarding the relationships between the dividends’ and risks’ measurements based on the theories and then the test of these hypotheses using statistical tools in order to make a conclusion regarding these relationships.

The next principle of positivism implies that “knowledge is arrived at through the gathering of facts that provide the basis of laws” (Bryman & Bell, 2011, p. 15). It means the knowledge about the relationship between banks’ dividends’ and risks’ measurements should come from the facts regarding the chosen banks and in accordance with the previous theories.

The fourth principle is that the research should be value free or objective in other words (Bryman & Bell, 2011, p. 15). It means that the judgment of the author regarding the relationships under study must not be reflected in the research nor affect the research in any way.
Finally, within the positivism “there is a clear distinction of scientific statements and normative statements and belief that the former are the true domain of the scientist” (Bryman & Bell, 2011, p. 15). It implies that only the scientific statements are used in the project as a true field of study. Even though there are a lot of critics of positivism Pawson (1989, p. 17 cited in Wainwright & Forbes, 2000, p. 261) states “positivism having lost every single epistemological battle over the years seems to have won the war, certainly in terms of research effort and funding”. The main reason is that even though some may criticize the positivism, there is still no better option for a research of the social world.

2.3.2 Ontology

The main question of ontology is whether the social actors can or cannot influence the social phenomena, in other words whether social actors are external or internal to reality (Bryman & Bell, 2011, p. 20). Similar to epistemology, ontology has two main opposite views on this question.

Constructionism (also known as constructivism) is an ontological position that implies that social actors accomplish social phenomena and their meanings (Bryman & Bell, 2011, p. 22). The use of constructionism in this project as an ontological position would mean the assumption that people influence banks as well as the level of dividends and risks in banks. It seems reasonable however the dividend and risk levels are obeyed by specific laws that are created by the actions of people but in fact are out of their influence. Some radical constructivists believe that there is no real and objective world; the world is different for every person and is constructed in the minds of the people (Jonassen, 1991, p. 10).

As a matter of fact, the opposite view of ontology is thus more suitable for the purposes of this research. This opposite view is called objectivism (also known as realism) that implies independent existence of social and natural reality from social actors (Brannick & Coghlan, 2007, p. 62). It means that whatever social actor makes, banks dividends and risks measurements remains unchanged and can only change independently. Objectivism stands for the situation where the learners of the social world are told about it and only supposed to reproduce its structure in their minds (Jonassen, 1991, p. 10). The objectivist position in this project implies that banks and their performance indicators such as dividends and risks measurements are independent of social actors. It should be noted that both ontological positions can be used for this research. The dividends and risks are managed by particular bank managers and therefore can be manipulated by them. Nevertheless, the goal of this project is not to investigate the psychological effects of dividends but rather to investigate the reality that is outside of possible influence of any actor.

2.4 Research Approach

In order to be able to move forward with the research it is necessary to indicate the research approach to the theories. There are two contradicting approaches to theories and their generation and employment; they are inductive and deductive ones (Bryman & Bell, 2011, p. 13). According to Thomas (2006, p. 238), inductive analysis implies the development of theories, concepts or models from reading the raw data. In this project, it would mean the creation of the theories from the collected data about the dividends and risks in banks. Scriven (1991, p. 56 cited in Thomas, 2006, p. 238) refers to the inductive approach as “goal-free” that means that the researcher does not seek
something in particular rather the data “shows” the way of the research. However, taking into account the research question and purpose of the project the creation of theories from the data is unnecessary for the accomplishment of the set task.

The goal of this project is to test the existing theories rather than to create a new one. Therefore, it is more reasonable to use deductive approach in order to answer the research question. It is the most common approach for relationship between research and theory (Bryman & Bell, 2011, p. 11). Deductive approach implies the check whether the data is consistent with the derived hypotheses from the theories and models (Thomas, 2006, p. 238). The process of the deduction looks as follow:

![Figure 1. The process of deduction. Source: Bryman & Bell, 2011, p. 11](image_url)

According to this process, the project follows the next steps: the relevant to dividends and banks’ risks theories are reviewed; the hypotheses regarding the relationship between dividends and risks are derived from the theories; the appropriate for hypotheses-testing data is collected from the banks’ annual reports; the findings from the data are analyzed; the formulated hypotheses are rejected or accepted; and finally, the theory is revised if necessary.

### 2.5 Research Strategy

Many writers on methodological matters distinguish two strategies towards research that are qualitative and quantitative (Bryman & Bell, 2011, p. 26). However, the discussion regarding the practicability of this division is ongoing. The distinction can be refuted under scrutiny and characteristics of these two strategies overlap (Brannen, 2005, p. 175). Nevertheless the attribution of this project to one of the options helps not only to the further research development but also to the better readers’ understanding.

Qualitative strategy usually implies the emphasis on words rather than quantification in the collection and analysis of data. Furthermore, it is most often associated with the inductive orientation, interpretivism and constructionism. (Bryman & Bell, 2011, p. 26) Additionally, the qualitative research strategy is used for the researches that have an aim to uncover and understand something new or unknown (Pervez & Grønhaug, 2005, p. 110-111). The characteristics of qualitative research imply that the aim of qualitative researches is focused on the underlying reasons for the event rather than on the existence of this event. It makes the qualitative research strategy not suitable for the research question and the purpose of this project.

The chosen for this project research strategy is quantitative. This strategy implies that the variables can be measured precisely. These types of researches look at the relationship between variables and test hypotheses. (Beyea & Nicoll, 1997, p. 324). This project is in line with these characteristics. The quantitative strategy implies work with numbers that allows the possibility to use statistical analysis (Babbie, 2004, p. 26). Furthermore, considering that this project follows objectivism, positivism and deductive approach, the choice of quantitative strategy that is usually associated with these considerations is natural. Additionally, similar studies that have been conducted by Onali (2009) and Haq & Healey (2012) have been investigated using quantitative
research that also allows concluding that quantitative strategy is efficient for the chosen type of the research question.

2.6 Purpose of the Research

In addition to the presented in the introduction purposes, the project serves another purpose that affect the research design of the whole paper. In this sense there are three most common purposes: exploration, description and explanation (Saunders et al., 2009, p. 139).

Exploratory studies are associated with the examination of a new interest or when the study subject is relatively new (Babbie, 2004, p. 87). Major weakness of the exploratory study is that it seldom provides solid answers to a research question (Babbie, 2004, p. 89). The relationship between the dividends and risks is not completely new topic; there are several researches even within banking area. So even though this project should give a new and updated perspective on these relationships, it is possible to say that it is not an exploratory study.

Descriptive research aims to describe the situation or the event; the purpose of the researcher is to observe and then to describe what has been observed (Babbie, 2004, p. 87, Saunders et al., 2009, p. 140). It is noted by Babbie (2004, p. 87) and Saunders et al. (2009, p. 140) that the purpose of the studies rarely includes just the description. Usually, descriptive studies are just the starting point of the research. This project has partly a descriptive purpose as it aims to observe and describe the relationships between dividends and risks.

The third general purpose in this context is explanation. As it is clear from the title, the researches with this purpose aim to explain the things and establish relationship between variables (Babbie, 2004, p. 89, Saunders et al., 2009, p. 140). This project involves the establishment of the relationship using collected data and statistical tests and thus can be also referred to explanatory study. Therefore, it is possible to say that it includes both descriptive and explanatory purposes.

2.7 Modes of Observation

The choice of the mode of the observation (Babbie, 2004, p. 219) is referred by Saunders et al. (2009, p. 141) as research strategy. It should be noted that even though the different modes are usually attached to deductive or inductive approaches or one of the three purposes discussed above the choice of mode should be made not based on these attachments but rather in accordance with the given research question and the purpose in introduction (Saunders et al., 2009, p. 141). In order to explain the modes efficiently, the descriptive summary of them is presented as follows:

- **Experiment** is the hardest and rare mode of observation in social science researches (Babbie, 2004, p. 220, Bryman & Bell, 2011, p. 45, Saunders et al., 2009, p. 141). It involves taking actions and then observation of the consequences of these actions (Babbie, 2004, p. 221);

- **Survey** implies collection of a large data from population usually by using sampling (Saunders et al., 2009, p. 144);
Case study focuses on a single phenomenon and investigates it in the details. It is suitable for the research that aims to get a rich understanding of context of a research (Saunders et al., 2009, p. 145-146);

Action research involves the investigation of the problem through the collaboration and participation of the researcher (Saunders et al., 2009, p. 147);

Grounded theory attempts to derive theories from an analysis of themes and patterns based on the collected data (Babbie, 2004, p.291);

Ethnography implies the full involvement of the researcher into the research environment and explanation of the research subject from this point of view (Saunders et al., 2009, p. 145-146);

Archival research uses the documents and administrative records as a source of data (Saunders et al., 2009, p. 150).

The experiment includes construction of the research environment that makes it impossible for the established research question and variables under investigation. The survey could be a good alternative. However, considering the amount of time and that the aim of investigating is the population of Nordic banks it is challenging and unnecessary to contact all banks or the chosen sample. Action research is also not suitable for this type of the research question as it done not intend the involvement or participation. Furthermore, grounded theory is not used in this project because the analysis of the data is based on the theories rather than theories are derived from the data. Ethnography is not suitable for this project because the research question does not involve the inside view of the problem. Therefore, archival research is the most appropriate one. Taking into account that the data is taken from the annual reports (it is described later), the choice of archival research is logical.

2.8 Time Horizon

One of the important questions for the research is to establish the time horizon under investigation. There are two options in choosing the time horizon. First option is to examine the data at a single point of time. Saunders et al. (2009, p. 155) refer to it as a cross-sectional design. The idea of this project is to investigate the relationship between dividends and risks over a post-crisis period from 2010 to 2014. Thus, this project does not have a cross-sectional design.

The second option is to look over the same phenomenon over a comprehensive time period (Babbie, 2004, p. 102). This option is known as longitudinal studies. Babbie (2004, p. 103-104) distinguishes three types of longitudinal studies: trend, cohort and panel studies. Trend studies imply the examination of a chosen characteristic over time and do not include the requirement of the presence of the same sample (Babbie, 2004, p. 103). This project involves the same banks over the period and thus cannot be named a trend study. Cohort study means the investigation of specific subpopulation but does not require the investigation of the same members of this subpopulation in each set of observations. As it has been mentioned, the project involves the investigation of the same banks and therefore cannot be referred to cohort studies. This project is a panel study in which the data collection comes from the same set of people or organization (banks in this case) at several points in time (Babbie, 2004, p. 104).
2.9 Literature Search

The literature search helps not only with the deeper understanding of previous research (Saunders et al., 2009, p. 68) but also to create a theoretical framework that helps the readers with this understanding (Babbie, 2004, p. 487). Literature search should consist of careful reading of journals, books and reports (Bryman & Bell, 2011, p. 103). According to Saunders et al. (2009, p. 68), there are three categories of literature sources that sometimes overlap: primary, secondary and tertiary. The primary sources present the information for the first time (Saunders et al., 2009, p. 69). They include reports by organizations, including annual reports. The annual reports of the selected banks are used in this project for the data collection as it is described later. The secondary sources include journals and books (Saunders et al., 2009, p. 69). Scientific articles compose vast majority of the sources used for the theoretical framework and introduction. Tertiary sources are aimed to help to find the necessary literature (Saunders et al., 2009, p. 69). In this sense, the reference lists of scientific articles and books are used in order to find the original sources.

The scientific articles have been found using search engine of Umeå University library and Google Scholar search engine. The reason for choosing these two different search systems is that they have a different search algorithm that helps to find additional articles that would be missed by using just one search engine. It should be noted that all found sources using Google Scholar have been checked by Umeå University library search engine to make sure that they are reliable. The following key words have been used: bank, dividend, dividend payout ratio, credit risk, default risk, market risk, liquidity risk, operational risk, interest rate risk. Furthermore, the words Nordic, Swedish, Danish, Norwegian, Finnish and European have been used to identify whether the previous research papers have been done with the chosen geographic area.

Considering that my knowledge in Swedish does not reach the level on what it is possible to read a scientific literature only English sources have been searched. It creates the possibility of non-English bias because there can be some research papers in Swedish or some other Nordic languages that investigate the chosen research question. However, this project aims to bring the knowledge to all stakeholders and researchers regardless the nationality and ability to speak Swedish or other Nordic languages. Therefore, it should not be a problem.

The critical assessment of all used scientific articles has been made in order to insure that the articles are used for the established purposes. It is necessary to thoughtfully evaluate the motives and perspective of articles’ authors in order to be able to understand the flow and core findings of the articles and use them in an appropriate manner. In order to insure that the articles are reliable sources it has been decided to use articles from peer-reviewed journal. However, there are several working papers have been used in order to deepen the theoretical framework and present all possible view on the problem. Furthermore, several articles are quite old but they provide unique and valuable point of views that remain relevant and therefore it has been decided to include them as in literature sources.

2.10 Ethical and Social Considerations

Ethics is one of the most important issues that must be taken into account during the research writing. Bryman & Bell (2011, p. 124) divide four stances on ethics:
universalism implies that the ethical principles must not be broken under any circumstances;

situation ethics’ supporters believe that ethical principles should be applied on a case-by-case basis and justify their position by either that “the end justifies the means” or “no choice” argumentation;

prevalence of ethical transgression position is based on the observation that all researches have some elements that are ethically questioned,

anything goes (more or less) stance implies that social researchers’ deception is very small in comparison to committed by modern powerful institutions (such as industry, the police or mass media) and therefore the researcher can do anything.

These options are all recognized by some or other researchers and depend on their personal perspective. I believe that ethical principles must not be violated under any circumstances; it is not worth doing the research if any of the principles is broken because it opens the road for even more violation of ethical standards.

The ethical principles can be broken down into four main areas: whether there is harm to participants, whether there is a lack of informed consent, whether there is an invasion of privacy, whether deception is involved (Diener & Crandall, 1978 cited in Bryman & Bell, 2011, p. 128). This project does not require anonymity or confidentiality of the participants for fulfillment of the “no harm to participants” principle. The banks’ information that is collected for this project is publicly available. Therefore, banks agree to provide this information for the different purposes that also include the researches. Taking into account that this fact it is possible to say that there is no harm to participants. However, it should be noted that the analysis and results may negatively affect banks if the project is done in subjective manner. Thus it is essential to be as objective as possible in order to present truthful and reliable results.

The second area “lack of informed consent” of ethical principles usually concerns the research papers where participants do not know about the research or have not enough information about the research (Bryman & Bell, 2011, p. 132-133). Even though it is applicable to this project, the public submission of annual reports imply that banks are aware that the presented information can and will be used for various purposes (including analyst’ personal interpretation) and understand that they will not be informed every time the information is used.

The invasion of privacy area of ethical principles implies the private information of the research participants. However, considering that the collected data of this project is taken from the publicly available reports there is no invasion of privacy in conducting this research.

The fourth important area of ethical principles is the deception. The deception appears when the researcher presents the research to participants as something different than it actually is (Bryman & Bell, 2011, p. 136). The method of the data collection for this project does not involve nor require direct contact with investigating banks as project participants. It means that the problem of deception does not concern this research.

It should be noted that the results of this research may affect the society. The findings of the project might help investors as well as society in general to find the easier indication of the level of different types of risk. Taken into account that the risks that banks face
become more and more important, their influence on other financial and non-financial performance indicators such as dividends is increasingly interesting and useful for the society to know. This is in order to ensure that the significant risk increase is recognized quickly and the appropriate actions are taken in order to prevent the bank failure as a result of this increase. It could help to prevent or to soften future financial crisis.

The possible findings of the significant relationship between dividends and risks may change the attitude of the outside stakeholders to banks’ dividends as a signal or to banks themselves. Considering that very few people go into a lot of details of the published financial statements, the dividends might become very easy and quick way to assess the level of different types of risks that banks have face. As a result, investors and other stakeholders might get the initial deeper understanding of the banks risk level looking at several key indicators rather than going into the details of each annual report.

The information that is analyzed in this research might influence not only the external stakeholders of banks such as investors but also banks themselves. The possible relationship between the dividend payout ratio and the different types of risks might result in the change of the level of dividends paid. The banks might want to use the signaling effect of the dividends and indicate to investors that the risk level has changed through the dividends. Moreover, the capital structure of banks could change as a result of the findings. If the significant relationship is found between the dividends and credit risk, then the banks might want to adjust the structure of the capital to pay the dividends at the level preferred by the investors.

On the other hand, if there is no relation found between dividends and risks the outside stakeholders will have to find other possible signals for risk level and pay less attention to dividends. It might allow managers to establish dividend level without taking into account possible signal they send in regard to risk level. However, it will be harder to spot the risk level that banks experience and thus determine the potential problems that they might have because of the higher risk level.
**Chapter 3. Theoretical Framework**

*Considering that the research question is concerned with the relationship between the dividends and risks in banks it is essential to examine both aspects of this relationship as well as banks’ nature and the relationship itself in order to form an opinion about it and create hypotheses. This chapter starts with the general discussion about banks that is followed by the separate explorations of dividends and risks. The chapter ends with the examination of the relationship between risks and dividends both in nonfinancial firms and banks.*

### 3.1 Banks and their regulations

Banks are unique in their nature because they act as intermediaries of the economy and traditionally provide loans and take deposits (Hull, 2012, p. 21). Nowadays the role of banks has extended and most of them are also engaged in investment activities (Hull, 2012, p. 21). Even though there are some similarities between banks and nonfinancial companies the differences between them are substantial. Tirole (1994, p. 472) determines five interrelated differences. First one is that banks’ debt is held by small depositors to a larger extent that in nonfinancial companies; second difference is that banks mostly finance their activities externally; third one is that most of banks’ debt is insured; furthermore, smooth functioning of payment system depends on the solvency of banks heavily; finally, banking industry is heavily regulated in comparison to all other sectors. It is possible to see from these differences that the condition of banks is extremely important not just for the parties that are directly involved with them but for all economy participants. As a result of financial crisis it became obvious that not only profitability matters for the banks but also the level of risk they take in order to achieve this profitability.

The regulators try to insure that the risk level does not exceed the certain point but they are not always successful in their actions. Prior to 1988 each country set its own requirements for capital level (Hull, 2012, p. 258). However, with the development of banks and their spread to several countries it became apparent that some common international regulations are needed. As a result, Basel Committee was created and Basel Accord was introduced (Hull, 2012, p. 259). However, throughout the years some of the requirements proved to be ineffective (McAleer et al., 2013, p. 251) and amendments have been developed: Basel II and after the financial crisis 2007 Basel III. Nevertheless, the Basel II cannot be attributed to the failures during the crisis period as it was not implemented in the USA at that time (McAleer et al., 2013, p. 252). Basel accord is intended to limit the level of risk that banks are allowed to take but there is an ongoing discussion regarding the relationship between the bank capital and risk (Haq & Heaney, 2012, p. 699). Some argue (Furlong & Keeley, 1989, Keeley & Furlong, 1990 cited in Haq & Heaney, 2012, p. 699) that the capital requirements decrease the risk and others (Kahane 1977, Koehn & Satomero, 1980 cited in Haq & Heaney, 2012, p. 699) that these requirements may enforce banks to increase risks. Haq & Heaney(2012, p. 709) find that there is a convex association between bank capital and systematic risk as well as between bank capital and credit risk. It is clear that bank capital cannot be accurately proxy for the credit nor systematic risk.

### 3.2 Dividends and their signaling effect

The dividends are one of the tools of communication between the insiders and outsiders of companies. After the recent financial crisis it is become clear that investors and other companies’ stakeholders should also track companies’ risk level together with its value.
It is known that dividends send a signal regarding the value of companies that is a starting point for understanding how they can explain the risk level. That is why it is essential to investigate different points of views on dividends and their signaling effect.

Miller & Modigliani (1961, p. 414) introduced the idea that dividend policy is irrelevant to company’s value under the assumptions of perfect market, rational behavior and perfect certainty. In order to understand this statement it is necessary to define these three conditions. Perfect market assumption means that there are no transactions costs, free and full access to the information and no influence of any actor of the financial market on the state of this financial market (Miller & Modigliani, 1961, p. 412). Rational behavior implies that investors are indifferent to the form of wealth increase (cash dividends or increase of the market value of the shares) and always prefer more wealth (Miller & Modigliani, 1961, p. 412). Perfect certainty means the full investors’ assurance of future investment programs and future earnings of corporations (Miller & Modigliani, 1961, p. 412). It is clear from the description of these three assumptions that the statement of irrelevance of dividend policy does not hold in the real world. DeAngelo & DeAngelo (2006, p. 312) prove that the payout policy is relevant and the investment policy is not the only determinant of value in frictionless markets. The allowance of the retention possibility makes the payout policy matters as it is in a real world (DeAngelo & DeAngelo, 2006, p. 313).

The existence of the imperfections in financial markets makes the Miller & Modigliani proposition of dividend irrelevance impossible. The researchers of dividends’ relevance have studied different aspects of these imperfections. They include different tax rates on capital gains and dividends, agency costs, information asymmetry, legal framework of the country of company’s origin, catering incentives as well as the life-cycle effect (Onali, 2014, p. 4). One of the most common known and easy to understand is different tax rate on dividends and capital gains. According to Black (1976 cited in DeAngelo & DeAngelo, 2006, p. 295), if capital gains are taxed more heavily than the dividends, it is more beneficial for taxable individual investors to invest in corporations that do not pay dividends rather than in those that does. This feature will increase the value of stocks that have no dividends. As a result, corporations may decide to eliminate dividends or to substitute some shares with bonds. On the other hand, Allen et al. (2000, p. 2531) explain why some corporations may prefer to pay dividends because of the taxes. According to their view, institutional investors have tax advantage in comparison to individual investors and as a result the corporations that prefer to have more sophisticated investors and show their worth decide to pay dividends rather than distribute wealth using other means.

The agency cost problem theory as a financial market imperfection implies that if dividends are not paid to the shareholders the profits can be used for personal needs of managers and other inside stakeholders. This is a reason why the shareholders prefer dividends instead of the retained earnings (La Porta et al., 2000, p. 2). The preference of the dividends can also be explained by the catering incentives. Baker & Wurgler (2004, p. 277) state that managers may prefer to pay higher dividends when investors put a premium on dividend payers (or the demand of the dividends is high) and do not pay dividends if investors put a discount on dividend payers.

The different legal frameworks in different countries are also a source of the financial markets imperfection and as a result the different dividend payout policies. The research
that has been conducted by La Porta et al. (2000, p. 2) provides evidence that if the countries differ in the legal framework it results in the different level of dividends for companies that originate from these countries. In particular, companies that operate in countries with the common law where the investors protection is commonly better pay higher dividends. It is consistent with the agency cost problem theory that has been described above. This is the reason why the origin of the bank is taken into account when the analysis of the data is performed.

The dividends are also affected by the stage of the life-cycle of a firm. The researchers state that mature and established companies are more likely to pay dividends than the young high-growth companies (DeAngelo et al., 2006, p. 228). The logic behind this statement is that companies on the early stage of the life-cycle tend to have more possibilities for development and investment and less free cash to distribute. On the other hand, mature companies have fewer attractive alternatives to invest money and therefore pay dividends. DeAngelo et al. (2006, p. 253) prove this theory using the proportion of retained earnings to total equity as a proxy for life-cycle stage.

Information asymmetry between insiders and outsiders is also the financial markets’ imperfections that does not allow for dividends’ irrelevance. It is closely related to the signaling effect that the dividends have. It has been stated that one of the assumption of Miller & Modigliani proposition is that there is a full and free access to all information regardless of the stakeholders’ origin. However in real world there is information asymmetry between insiders and outsiders. According to Miller & Rock (1985, p. 1031-1032) in the world of rational expectations the information asymmetry still does not mean the violation of Miller & Modigliani proposition. The dividends however send a signal regarding the future earnings (Miller & Rock, 1985, p. 1031-1032). These findings are consistent with the model constructed by Bhattacharya (1979, p. 269) that implies that dividends are a signal of future cash flows and thus profitability. The reason for developing the signaling effect of dividends is to explain why companies choose to pay dividends even though in a lot of cases capital gains are taxed less heavily. The constructed models reveal that companies provide private information about company profitability by paying dividends. However it is not clear whether managers of companies use dividends as a signal intentionally or the effect arises from other reasons (Bernhardt et al., 2005, p. 78). Additionally, the researchers do not agree on the significance of the information asymmetry on dividend policy nor sign on the relationship (Dionne & Ouederni, 2011, p. 188). In light of risk management the relationship between information asymmetry and dividend policy is investigated by Dionne & Ouederni (2011) that argue that corporate risk management policy can soften the effect of information asymmetry. They are the first researchers to my knowledge that incorporate hedging as a possible measure of information asymmetry when the study of determinant of dividends is conducted. As a result of their research, the negative relationship between the information content of dividends and hedging ratio has been found (Dionne & Ouederni, 2011, p. 193). It means that if management applies risk management policy in companies the sensitivity of dividends to future earnings reduces. It may in fact explain the insignificant relationship between dividends and risks if it is found in during the analysis of the research.

It is clear from the discussion that the dividend policy is relevant for valuation and this relevance can be explained by several different imperfections on the financial markets. Therefore, there can be made an assumption that dividends are also relevant to the risks
because of the close relationship between value of companies and their risks. However, it is necessary to note that there has been little research within the banking industry regarding the dividend policy and its effect on the banks value.

3.3 Risks

The second part of the relationship that is under study in this project is banking risks. The full understanding of their meaning, applicable regulations and possible ways for their management will help in the later hypotheses creation. First of all it is necessary to classify all risks that banks face. After that it will be possible to justify the choice of the risks under investigation in this project and provide their subsequent description and issues that are associated with them.

3.3.1 Banking risks classification

There are a number of risks that banks face during their operations. Vyas & Singh (2010) provide a good classification that simplified version looks as follows:

![Risk categories diagram](image)

Figure 2. Banking risk classification. Source: Vyas & Singh, 2010, p. 16

The simplification of this classification has been made for the purpose of highlighting the different risks and doesn’t include the sources for these risks. Nevertheless it should be noted that the sources of these risks must be considered when the risk management of banks is developed. As it is possible to see there are five major risks that banks usually face (interest rate risk is included in market risk). Traditionally, credit risk is the greatest risk that banks face (Hull, 2012, p. 37). Considering the increasing banks involvement in trading activities market risk is becoming more and more important. Operational risk arises from external causes or internal system failures (Hull, 2012, p. 37). The recognition of operational risk as an important part of risk management policy is obvious nowadays both to regulators and to bank managers. The importance of liquidity risk has become apparent during the recent financial crisis that has revealed that banks’ problems have been a result of the liquidity risk taken by banks (Hull, 2012, p. 292). Finally, the interconnection of banks across the world and the effect of failure of several banks on other ones have spurred the attention to the systemic risk and its management (Hull, 2012, p. 258). This project attempts to investigate the relationship between dividends and four major risks (market, credit, liquidity and operational) that banks face except for the systemic risk. The reason for excluding the systemic risk from the analysis is the difficulty of its measurement and that it heavily depends on the stake of other financial institutions risk management policy.
3.3.2 Market risk

According to Vyas & Singh (2010, p. 16), market risk is “the risk to earnings arise from changes in interest rates or exchange rates, or from fluctuations in bond, equity or commodity prices”. Very similar definition is applied in research paper by Savvides & Savvidou (2012, p. 381): market risk is “the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices” (Ernst & Young, 2008, p. 24 cited in Savvides & Savvidou, 2012, p. 381). Taking into account the bank activities this type of risk can arise both from the balance sheet activities and trading operations.

The definition of market risk implies that there are several causes of the risk existence. Vyas & Singh (2010, p. 16) and Savvides & Savvidou (2012, p. 381) distinguish four factors:

- **Interest rate risk** arises from the changes in interest rates.
- **Foreign exchange risk** results from the variations in exchange rates. It concerns banks that are engaged in international activities.
- **Equity risk** derives from the possibility of stock price changes.
- **Commodity risk** occurs in case of unfavorable price changes on commodities.

In addition to this division, interest rate risk has four further different types: basis risk (arises in case if the yields on assets and cost of liabilities have different bases); yield curve risk (arises from the shift between short-term and long-term rates); reprising risk (results from the presence of assets and liabilities that reprise at different rates and times); and option risk (arises from the existing optionality that presents in some assets and liabilities) (Vyas & Singh, 2010, p. 16). It is possible to see that market risk summarizes in itself quite different aspects.

However, there is a common measure that is used to assess and manage market risk. It is known as Value-at-Risk (VaR). VaR is “a loss that will not be exceeded at some specified confidence level” (Hull, 2012, p. 612). Interestingly enough the VaR implementation and widespread use comes from JPMorgan & Co. rather than from the regulators (Bask, 2010, p. 108). Dennis Weatherstone (the former chairman) was interested in the market risk that could be presented every day in a simple manner and as a result VaR was developed (Bask, 2010, p. 108). Shortly after the introduction of VaR it became to be used as a measure of market risk by regulators. According to the 1996 Amendment to Basel I (BCBS, 1996, p. 44) for the first time banks were required to have capital for market risk. This capital must have been based on a 10-day 99% VaR measure (BCBS, 1996, p. 44). The sample period for the calculation must have been at least one year. This is where the problem appeared and the changes of the requirements occurred. Because of the previous stable periods VaR remained low even in the crisis period. As a result the stressed VaR measure was introduced (BCBS, 2011a, p. 26). The stressed VaR is calculated based on one year observation period of significant losses (BCBS, 2011a, p. 1). As a result, banks are required to present two measures of VaR: usual and stressed (BCBS, 2011a, p. 1).

VaR can be calculated using different methods. The most common one that is used by banks around the world is historical simulation. The second most used method for VaR calculation is Monte-Carlo simulation. (Pérignon & Smith, 2010, p.367)
Despite the widespread use of VaR as an indication of market risk, it does not completely fulfill the criteria of a coherent measure of risk (Rosenberg & Schuermann, 2006, p. 574). The risk measure is coherent if it satisfies all four following measures:

- **Translation invariance**: if the A amount of cash is added to the portfolio, the risk measure should decrease by A (Artzner et al., 1999, p. 209).
- **Subadditivity**: the risk measure of the sum of two portfolios should be equal or less than the sum of risk measure of each portfolio (Artzner et al., 1999, p. 209).
- **Positive homogeneity**: if the size of the portfolio is multiplied by L then the risk measure should also change by L (Artzner et al., 1999, p. 209).
- **Monotonicity**: if one portfolio has worse results than another one, the risk measure of first portfolio should be higher (Artzner et al., 1999, p. 210).

The VaR does not meet the subadditivity criterion that means that VaR does not account for the diversification effect and as a result may overstate the risk level. Nevertheless, VaR gives in general good and simple indication of the amount of risk and would be a good proxy of market risk. However, the banks are not always disclosing the VaR and therefore it might lead to a limitation in the analysis.

Therefore, it has been decided to use the capital requirements for market risk. The capital requirement for market risk is established by the Basel committee and is the minimum capital that the banks should have to be able to face the consequences of the realized market risk. The described above VaR constitutes part of the capital requirement for the market risk. The detailed calculation of the capital requirement for market risk is provided in the practical method chapter.

### 3.3.3 Credit Risk

As it has been stated previously, credit risk is traditionally the most substantial risk that banks experience. It is the risk of loss of principal or other financial reward due to debtor’s non-payment (Switzer & Wang, 2013, p. 91). According to Horcher (2012, p. 104), credit risk can be divided into several types:

- Default risk is the traditional credit risk that arises from the default on payment (Horcher, 2012, p. 104);
- Counterparty pre-settlement risk is the risk that counterparty may default on its obligations before the settlement of the contract (Medova & Smith, 2005, p.114);
- Counterparty settlement risk is the risk that counterparty may default on its obligations while a bank on its obligations on settlement (Medova & Smith, 2005, p.114);
- Legal risk arises in banks are not able legally perform or enter into transactions (Horcher, 2012, p. 107);
- Sovereign or country risk means the risks that arise from political, legal or regulatory exposures in international transactions (Horcher, 2012, p. 107);
- Concentration risk is the risk of loss as a result of too high loan concentration in the particular borrower (Lefcaditis, 2013, p. 72).

From the very beginning of bank regulations, credit risk took the central place of regulators’ attention. Since the first introduction of Basel regulations, the capital requirements that are expected to control the level of credit risk are one of the main topics of all three reductions of Basel framework. As a result of the financial crisis
2007, Basel III framework was introduced. It aims to fill in the gap of risk management that was uncovered by the crisis.

It is possible to see that credit risk covers quite different areas. For the aim of this project, it has been decided to concentrate on default risk and that will be assessed using two different measures: Z-score and loan loss provision to total assets respectively. The choice of these two measures is based on the reference to the previous research papers that have been performed within the chosen area (Onaly, 2009, 2014). The precise calculation of these measures will be presented and discussed in the following chapter.

3.3.4 Liquidity risk

The liquidity risk definition arises from the definition of the liquidity. Liquidity refers to banks’ “monetary obligation on demand, in the form of deposits and in current accounts and credit lines” (Baldan et al., 2012, p. 29). Consequently, liquidity risk is the risk of not being able to meet monetary obligations as they become due (Hull, 2012, p. 447). The main source of this risk is the tendency of banks to finance long-term needs with the short-term funds. During the crisis it became obvious that the role of liquidity risk was undermined by regulators and banks itself and as a result the failures of such banks and Lehman Brothers and Northern Rock occurred (Hull, 2012, p. 292). However, according to Ferrari & Ruozzi (2009 cited in Baldan et al., 2012, p. 29) the liquidity crisis was the consequence of the financial crisis rather than its cause.

Nevertheless, the achieved understanding of the liquidity role in the stability of banks and economy as a whole initiated the introduction of new regulatory requirements associated with liquidity risk. These requirements are liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) (Baldan et al., 2012, p. 34). LCR requirement of 100% aims to ensure that banks will have enough liquid assets to meet its liquidity needs for a 30 days period (BCBS, 2013, p. 4). NSFR requirement of 100% aims to establish the “resilience over a longer period of time by creating additional incentives for a bank to fund its activities with more stable sources of funding on an ongoing structural basis” (BCBS, 2011a, p. 8-9). The analysts predict that these new regulations will result in the change of banks activities. La Ganza & Trevisan (2010, p. 16) state that these regulations will reinforce the new strategy implementation that involves the focus on the bank traditional activities. Additionally, these requirements will increase opportunity costs, competition and decrease interest margin and profitability (La Ganza & Trevisan, 2010, p. 16, McKinsey & Company, 2010 cited in Baldan et al., 2012, p. 30). These two ratios are still waiting for the mandatory implementation however majority of banks presents them in advance in countries where Basel III accord exists and will become in force. Thus, it has been decided to use LCR as an indication of liquidity risk in this project. The exact calculation and meaning will be discussed in the next chapter.

3.3.5 Operational risk

According to Basel Committee, operational risk is “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events” (BCBS, 2011b, p. 3). It is stated that operational risk does not include strategic nor reputation risk but include legal risk. It is necessary to highlight that unlike within credit risk classification here legal risk refers to exposure to penalties, fines, or punitive damages resulting from either supervisory actions or private settlements (Jarrow, 2008, p. 870). Furthermore, operational risk can be realized as a result of one of the following events:
- **internal fraud** occurs when at least one internal party is involved to an act “of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity/discrimination events” (BCBS, 2006, p. 305);
- **external fraud** occurs when a third party is responsible for the “acts of a type intended to defraud, misappropriate property or circumvent the law” (BCBS, 2006, p. 305);
- **employment practices and workplace safety** events occur in case of losses due to acts that are inconsistent with employment, safety or health “laws or agreements, from payment of personal injury claims, or from diversity/discrimination events” (BCBS, 2006, p. 305);
- **clients, products, and business practices** events occur in case when banks are not able to meet obligations to specific clients unintentionally or negligently or due to losses from the products’ nature or design (BCBS, 2006, p. 306);
- **damage to physical assets** from natural disasters or other events (BCBS, 2006, p. 306);
- **business disruption and system failures**;
- **execution, delivery, and process management** events arise as a result of failed transactions processing and process management or in case of losses from relations with counterparties and vendors (BCBS, 2006, p. 306). (Wang & Hsu, 2013, p. 2042)

From this list and definitions it is obvious that operational risk is one of the most difficult to identify and measure precisely because it can come from so many sources and it is challenging to establish whether operational risk will be realized. Therefore, it is not evident what level of capital should be saved by banks to cover the events of operational risk. Nevertheless, the regulators provide some guidelines that may help banks to do that.

Prior the introduction of Basel II, most banks paid little attention to operational risk and its management. Basel Committee established three methods for operational risk capital charges calculation: the basic indicator approach, the standardized approach, and advanced measurement approaches (BCBS, 2006, p. 144). These approaches differ in the level of sophistication and risk sensitivity and once a bank is approved to use more sophisticated method it is not allowed to use a simpler approach (BCBS, 2006, p. 144).

### 3.4 Relationship between dividends and risks
The most significant part of the theoretical framework of this research is composed theories that are related to the relationship between dividends and risks because the core goal of this project is to investigate these relationships. This part of the theoretical framework will start with the description of research papers that investigate dividend-risk relationships in nonfinancial firms and then followed by the bank-oriented research papers.

Rozeff (1982) investigates the determinants of dividend payout ratio. These determinants are the past and expected future revenue growth of companies, the fraction of equity held by insiders and the company’s beta coefficient (Rozeff, 1982, p. 249). To find the optimal dividend payout Rozeff (1982, p. 251) constructs a model that includes two opposite influences on dividend payout: the dividend payout increase results in agency cost decline and transactions costs of financing increase with the dividend payout increase. These transactions costs are directly associated with company’s risk:
the dependence of external financing is increasing with the financial and operational leverage. Dividends are in fact the substitutes of fixed charges that are produced by leverage. For highly leverage companies these fixed charges depend on costly external financing and therefore the opportunity costs of dividends are higher than for low leverage companies. Thus, other things equal, the highly leverage companies (riskier companies) prefer to pay lower dividends. (Rozeff, 1982, p. 251-252)

Figure 3. Optimal dividend payout model. CT (Pay)=total of agency and transactions costs, CA (Pay)=agency costs associated with outside equity, CB (Pay)=transactions costs associated with external financing; CT (Pay*)=minimum total costs as optimal payout ratio. Source: Rozeff, 1982, p. 252

Graphically, the model looks like on the Figure 3 and an increment to the transaction costs curve is the transactions cost effect of external financing for riskier companies. This model is proved by the empirical results that include a sample of 1000 companies as well as the proposition regarding the tendency of higher risky companies to have lower dividends payout is consistent with the results (Rozeff, 1982, p.249, 253).

Grullon et al. (2002) investigate the relation between dividends changes and the subsequent change of systematic risk. They base their research on a sample of 7,642 dividends change announcements that include 6,248 dividend increases and 1,358 dividends decreases and all of the companies are listed on New York or American Stock Exchanges (Grullon et al., 2002, p. 391). The research questions that are under consideration among others in this paper are: “Do firms that increase dividends become less risky?” and “do firms that decrease dividends become more risky?” (Grullon et al., 2002, p. 402). As a result of their analysis using three-factor Fama and French model, they find that dividend-increasing companies have a market beta that is slightly above one and dividend-decreasing companies have a market beta that is slightly below one (Grullon et al., 2002, p. 405). Furthermore, authors calculate risk premium in order to verify and measure the economic significance of the decline in risk when the dividends are increased. They find that the decline in risk premium for dividend-increasing companies is around 1% per annum. (Grullon et al., 2002, p. 408) Even though Grullon et al. (2002) investigate a different aspect of dividend-risk relations their results are
consistent with Rozeff (1982) findings: the systematic risk of dividend-increasing companies significantly declines around the dividend-increase decision (Grullon et al., 2002, p. 421).

Charitou et al. (2011) similar to Grullon et al. (2002) investigate the influence of dividend increase on risk. However, they concentrate on default risk dimension rather than on systematic risk. The sample of this research paper is presented by 7,805 observations that include either increased or commenced cash dividend payments (Charitou et al., 2011, p. 1522). With the connection to information content of dividends Charitou et al. propose that the positive market reaction on dividend increase and change in subsequent returns can be explained by the reduction of company’s default risk (Charitou et al., 2011, p. 1524). The authors motivate their proposition based on two features: managers only increase dividends when they are sure that the increase in earnings in permanent and this permanent increase actually means the decrease of default risk; according to life-cycle theory of dividends companies with increasing dividends face diminishing investment opportunities and higher retained earnings that means the decrease on default risk (Charitou et al., 2011, p. 1524). As a result of their research and in line with their proposition, Charitou et al. (2011, p. 1540) find that the decision to increase dividends can be explained by the reduction of default risk during the previous year. Thus, it is possible to see from the presented research papers that risk, both systematic and default, should reduce dividends payment for nonfinancial companies.

Considering the substantial differences between banks and other companies, it can be said that the research results of nonfinancial companies can be different from the one that have been done within banking industry. Even though there are not so many research papers on dividend-risk relations in banks they provide a good foundation for the hypotheses formulation. Dickens et al. (2002) investigate the explanatory factors of dividend policy in banks. They adapt the Barclays, Smith, and Watts model that includes investment opportunity, signaling, size, and regulation as explanatory factors of dividends. The authors keep first three factors, modify regulation factor and add ownership, dividend history, and risk factors (Dickens et al., 2002, p. 4). As a risk factor Dickens et al. (2002, p. 7) use earnings volatility based on past five years’ net income. The empirical results are in line with the research papers’ results for nonfinancial companies: banks with high risks should pay lower dividends (Dickens et al., 2002, p. 11).

Haq & Heaney (2012) approach the problem from the other side. They investigate factors that determine risk in European banks. The sample of the research consists of 117 listed banks and also includes banks from Nordic Region (Haq & Heaney, 2012 p. 703). The authors use bank capital, off-balance sheet activities, charter value, size, and dividend-payout ratio as determinants of bank equity risk and credit risk (Haq & Heaney, 2012 p. 698). Haq & Heaney (2012, p. 703) use systematic risk, idiosyncratic risk, interest rate risk and total risk as bank equity measures. The authors use equity market beta as a proxy for systematic risk, interest rate beta as a proxy for interest rate risk and standard deviation of bank equity return as a proxy for total risk (Haq & Heaney, 2012 p. 704-705). Additionally, Haq & Heaney (2012 p. 705) define bank credit risk as a loan loss provision to total assets. As concerns the dividends level, the authors choose to use dividend payout ratio that is calculated as ratio of cash dividends paid to net earnings (Haq & Heaney, 2012 p.705). Haq & Heaney (2012) construct a
model that helps them to test their hypotheses and as a result they conclude that there is a negative relationship between dividend payout ratio and bank equity risk that is in line with their prediction. Haq & Healey (2012, p. 701) explain the negative relationship through the hypothesis that dividends send the signal of banks solvency and thus banks pay higher dividends when they are confident in the future. However, the relationship between dividend payout ratio and credit risk and interest rate risk are not statistically significant. (Haq & Heaney, 2012 p. 709) It is possible to see that Haq & Heaney (2012) conclusion about the negative risk-dividend relationship is consistent with Dickens et al. (2002) research and research papers for nonfinancial companies.

Even though, now it seems obvious that there is a negative relationship between risks and dividends in both banks and nonfinancial firms Onali (2009, 2014) provide evidence that dividend payout ratio and default risk in banks are positively related. In his earlier working paper (Onali, 2009), he investigates the relation between dividends and risk based on a sample of 335 banks for the period from 2000 to 2007. Onali (2009, p.4) creates a hypothesis that states that “bank default risk and credit risk are positively related to dividends”. It is interesting to see that Onali comes to conclusion of positive relations before data analysis. The logic of this statement is based on the existence of deposit insurance regulation that actually stimulates risk taking in banking (Onali, 2009, p. 4 and Onali, 2014, p. 4). According to Onali (2009, p. 4) “a large dividend payout ratio is likely to lead to high default risk” and default risk has a positive impact on the value of deposit insurance and thus encourages further risk taking. Additionally, higher dividends could potentially reduce the value of assets below the value of debt and thus increase the default risk as the higher dividends are usually achieved through the sale of the safest assets (Acharya et al., 2011, p. 8-9). The dividends also act as a risk-shifting mechanism as the higher dividends result in the transfer of wealth to the banks owners while default risk is transferred to banks creditors (Haq & Heaney, 2012, p. 701). The author uses Z-score as a default risk measure because it allows including unlisted banks in sample in contrary to the use of beta or the standard deviation of stock returns (Onali, 2009, p. 4). There are two measures of dividend payout ratio are included in the research: dividends to earnings and dividends to equity (Onali, 2009, p. 6). As a result of relations analysis using Tobil model, Onali (2009, p. 6, 11) find economic significant association between dividend payout ratios and default risk. The author uses the ratio of loan loss provision to total loans as a proxy for credit risk and similar to Haq & Heaney (2012) finds no relation between credit risk and dividends (Onali, 2009, p. 7, 11). In his later research paper, Onali (2014) also investigates among other things the relation between dividend payout ratio and default risk. There are some differences such as the proxy for default risk is logarithm of Z-score and the sample size is increased to 741 banks (Onali, 2014, p. 7, 10). Nevertheless, the results still support the idea that higher payout ratios are related to the banks that are closer to default (Onali, 2014, p. 20). Therefore, it is possible to see that the results of this project are not obvious and actually can contribute to the discussion whether the dividend-risk relations in banks are distinctly different from the nonfinancial companies.

3.5 Theoretical model

To make it clear for the readers how these theories are employed in this project the theoretical model is provided in Figure 4. The foundation for the model is the theories of dividends and risks. These theories are combined in the theory that uncovers the relations between them. The dimension of banks specificity brings new perspective on
dividend-risk theory that is the top of the theoretical model pyramid and the core of this project.

Figure 4. Theoretical model. Source: Created by the author
Chapter 4. Practical Method

Before the analysis is conducted, some practical points and issues have to be discussed. In particular this chapter covers the population and the choice of sampling to be covered in the analysis. Further, the steps of data collection are described. The hypotheses that are going to be tested are formulated and the variables used for the analysis are defined. Finally, the statistical method that is going to be used is described along with the practical issues that arise from the use of the chosen method.

4.1. Population and sample

This section of the paper covers the population that is analyzed and the sample chosen. It is very important for the research to define the population and make a choice whether the sampling is used or the analysis covers the whole population. It has been mentioned previously that the population of this research consists of the Nordic banks. There is no intention to generalize the results of the research onto larger geographical territory. For this paper, Nordic region is defined as consisted of Norway, Denmark, Sweden and Finland.

To make the research accomplishable, it has been decided to use the banks listed on NASDAQ Nordic. The listed banks should be more concerned with the signals that dividends give as the signals will affect their share value. The NASDAQ stock exchange has been chosen as Nordic banks are mostly represented there. As all the banks are represented on the same stock exchange the population should be homogenous. The banks would attract the investors that operate on the same stock exchange and thus should consider similar factors when determining the level of dividends. Furthermore, all banks in the population are from the Nordic countries that have similar economy situation are believed to be more stable than other countries in terms of the economy. In addition, a lot of the banks from the population have Nordic countries as their target market and operate throughout the Nordic region. This all contributes to the argument of the homogeneous population.

It has been decided to include the whole population in the analysis because the number of listed Nordic banks is quite low and the analysis of all the banks will make the research more precise.

4.2. Data collection

As it has been mentioned previously, the timeframe of the research covers only post-crisis period. Therefore, the period for the data starts from 2010 and ends in 2014.

The starting point of the data collection is the NASDAQ Nordic web-site. As a result of the filtering to make sure that only banks are present in the list, 39 banks form the population for the analysis. It has been noticed that some of the shares belong to the same banks but are presented separately on the stock exchange due to the different characteristics of the shares. Consequently, the number of the banks is reduced to 32. Further, only banks with the annual reports published in English are considered. As a result, the number of the population is reduced to 19 banks (Please refer to Appendix 1 for the list of banks in the population). Therefore, the total number of observations in the sample is: 19 banks over 5 years is equal to 95 observations. During the data collection, it has become evident that not all banks disclose their LCR every year. This issue is discussed later in the section 5.1.5. Thus, the sample consists only of 46 observations have been included in the regression analysis and has been reduced to 45 observations due to the negative earnings for 1 sample that is discussed in section 5.1.1 below.
The data of the dividends paid and risks measures are collected from the annual reports that are downloaded from the banks’ web-sites manually. The data are found using the search tool by entering the key words: dividends, market risk, operation risk, liquidity risk, total assets, total liabilities, total earnings, loan loss provisions, bad debt provisions, working capital, current assets, current liabilities, retained earnings, earnings before interest and tax, market capitalization, LCR, liquidity coverage ratio, economic capital, capital requirement.

All collected data is transferred to the Excel spreadsheet manually. After the data is collected, the statistical analysis is applied to test hypotheses and thus investigate the relationship between dividends and different types of risks.

4.3. Hypotheses

Hypotheses for further statistical analysis are formulated in the section. The theoretical framework, the deductive approach and the research model are the foundation of the hypotheses.

**Hypothesis 1:**

$H_0: \beta_{\text{market}} = 0$

$H_1: \beta_{\text{market}} \neq 0$

where $\beta_{\text{market}}$ is the regression coefficient that determines the slope of the market risk on the dividends. $H_0$ hypothesis represents that the regression coefficient is zero and thus the dividends are independent of the market risk. The alternative hypothesis takes place where the regression coefficient is different from zero and thus there is a relationship between the dividends and the market risk. It is not possible to reject $H_0$ otherwise.

**Hypothesis 2:**

$H_0: \beta_{\text{credit}} = 0$

$H_1: \beta_{\text{credit}} \neq 0$

where $\beta_{\text{credit}}$ is the regression coefficient that determines the slope of the credit risk on the dividends. $H_0$ hypothesis represents that the regression coefficient is zero and thus the dividends are independent of the credit risk. The alternative hypothesis takes place where the regression coefficient is different from zero and thus there is a relationship between the dividends and the credit risk. It is not possible to reject $H_0$ otherwise.

**Hypothesis 3:**

$H_0: \beta_{\text{default}} = 0$

$H_1: \beta_{\text{default}} \neq 0$

where $\beta_{\text{default}}$ is the regression coefficient that determines the slope of the default risk on the dividends. $H_0$ hypothesis represents that the regression coefficient is zero and thus the dividends are independent of the default risk. The alternative hypothesis takes place where the regression coefficient is different from zero and thus there is a relationship between the dividends and the default risk. It is not possible to reject $H_0$ otherwise.

**Hypothesis 4:**
\[ H_0: \beta_{\text{liquidity}} = 0 \]
\[ H_1: \beta_{\text{liquidity}} \neq 0 \]

, where \( \beta_{\text{liquidity}} \) is the regression coefficient that determines the slope of the liquidity risk on the dividends. \( H_0 \) hypothesis represents that the regression coefficient is zero and thus the dividends are independent of the liquidity risk. The alternative hypothesis takes place where the regression coefficient is different from zero and thus there is a relationship between the dividends and the liquidity risk. It is not possible to reject \( H_0 \) otherwise.

**Hypothesis 5:**
\[ H_0: \beta_{\text{operational}} = 0 \]
\[ H_1: \beta_{\text{operational}} \neq 0 \]

, where \( \beta_{\text{operational}} \) is the regression coefficient that determines the slope of the operational risk on the dividends. \( H_0 \) hypothesis represents that the regression coefficient is zero and thus the dividends are independent of the operational risk. The alternative hypothesis takes place where the regression coefficient is different from zero and thus there is a relationship between the dividends and the operational risk. It is not possible to reject \( H_0 \) otherwise.

### 4.4. Variables and assumptions

Before the statistical analysis takes place, it is necessary to establish the proxies for independent and dependent variables. Their choice is based on the theoretical framework and previous research papers that have similar research questions.

#### 4.4.1 Calculation of dividends

First of all, it is necessary to establish the proxy that is going to be used for the dividends measure. It is clear that it is possible to use the monetary measures of dividends (total dividends paid or dividends per share) because these measures cannot be compared across the banks (due to different currencies and sizes of the banks). Haq & Heaney (2012) and Onali (2009) use the dividends payout ratio as a proxy for dividends. The dividend payout ratio is the fraction and thus can be compared across the banks and be used in the statistical analysis. Thus, the following dividend proxy is decided to use in the analysis:

\[ \text{dividend payout ratio} = \frac{\text{cash dividends paid}}{\text{total earnings during the year}} \]

#### 4.4.2 Calculation of market risk

The first independent variable that is determined is the market risk. As it has been mentioned before during the discussion of the theoretical framework, the market risk is usually measured by the VaR however due to the limitation of the data availability it has been decided to capital requirement for the market risk as a proxy for the market risk measure.

The minimum capital requirement has been introduced by the Basel committee and is calculated as the sum of:

- “higher of (1) previous day’s value-at-risk number (VaR\(_{t-1}\)) and (2) average of daily value-at-risk measures on each of preceding sixty business days (VaR\(_{\text{avg}}\)), multiplied by multiplication factor (m\(_c\)), plus
• higher of (1) latest available stressed-value-at-risk number above \((sVaR_{t-1})\) and (2) an average of stressed value-at-risk numbers over the preceding sixty business days \((sVaR_{avg})\), multiplied by multiplication factor \((m_s)\)’’ (BCBS, 2011, p.15)

The supervisory authorities set up the multiplication factors mentioned above based on the quality of the bank’s risk management system. The minimum value for each of the factors is 3 (BCBS, 2011, p. 15).

Based on the description provided above, the formula for the capital requirement looks as follows:

\[
c = \max\{VaR_{t-1}; m_c * VaR_{avg}\} + \max\{sVaR_{t-1}; m_s * sVaR_{avg}\}
\]

It should be highlighted that due to the different sizes of banks, it is not evident to use the absolute values of capital requirement for market risk and therefore the relationship to total assets ratio is used as a proxy for the market risk.

The expected relationship between the dividends and the market risk is negative. The rationale of this assumption is as follows: the banks with the high market risk might be reluctant to pay dividends as they will need available cash to cover the possible decrease in the cash flows because of the realized market risk. Considering that the proxy chosen for the market risk is positively related to the market risk, the proxies for market risk and dividends are expected to be positively related.

4.4.3 Calculation of credit risk

The next independent variable that is necessary to determine for the analysis is the measure of credit risk. The previous research papers that cover similar research questions have included the credit risk relationship between the dividends and the credit risk. One of the analyses has been performed by Onali (2009, 2014) and two proxies have been used for the credit risk are Z-score and the loan loss provision to total assets.

Z-score measures the specific type of the credit risk: default risk. Z-score model has firstly been introduced by Altman (1968, p. 593). It has initially included 5 ratios the combination of which has been able to predict the bankruptcy of companies. During the development of the research within the predictability of bankruptcy and Z-score in particular, one of the ratios (sales/total assets) has been dropped for the non-manufacturing companies. As a result, new Z"-Score model looks as follows:

\[
Z" = 6.56 * X_1 + 3.26 * X_2 + 6.72 * X_3 + 1.05 * X_4
\]

Where:

- \(X_1\) - working capital/total assets,
- \(X_2\) - retained earnings/total assets,
- \(X_3\) - earnings before interest and taxes/total assets,
- \(X_4\) - market value equity/book value of total liabilities (Altman, 2000).

It should be noted that along with the Altman’s Z-score, other models have been developed as a prediction of the default risks. Particularly, Andersen (2008, p. 36) has developed the failure prediction logit model that calculates the risk index using the established coefficients and the following data as the independent variables: capital adequacy ratio, ratio of residential mortgages to gross lending, the expected loss measure, the concentration risk measure, the return on assets and Norges Bank’s
liquidity indicator. The model, however, has been based on the total number of banks that did fail (Andersen, 2008, p. 14) and has not taken into the account the possible differences between private and public banks. The public companies in general and banks in particular are watched more closely rather than private companies as the failure on the public banks has stronger effect on society. The adjusted Altman’s Z-score, on the other hand, has been developed to predict the risk failure of public nonmanufacturing companies.

Espahbodi (1991, p. 53) has also developed and tested logit and discriminant models using 13 different variables that should predict banks. This paper follows the research completed by Martin (1977 cited in Espahbodi, 1991, p. 54) with the addition of models’ validation. As a result of Espahbodi research, he establishes that only four variables (total loan revenue over total operating income, interest income on state and local government obligations over total operating income, interest paid on deposits over total operating income and total time and savings deposit over total demand deposit) should remain in the models and help to predict banks failures (Espahbodi, 1991, p. 70). It should be noted that the developed models do not fully predict bank failures but in comparison made to the other developed models of banks failures have one of the best performance ratios (77-83% of the predicted failures occurred) (Espahbodi, 1991, p. 69).

As it is possible to see, the use and accuracy of the Altman’s Z-score have been tested throughout the years by different researchers as well as the possible improvements have been suggested and new models such as described above have been developed. Furthermore, recent research papers provide the evidence that the Altman’s model has become less accurate within the years (Samkin et al., 2012; Alareeni & Branson, 2013). Nevertheless, this model for the failure prediction is the most known and commonly used. Furthermore, studying this model in theory during the Financial Management course has increased my interest to apply it in practice as a prediction of the failure risk and thus has been decided to use it for a default risk proxy.

The default risk is expected to be positively correlated to the dividends in line with Onali (2009) expectation and according to his assumption described in the theoretical framework. Considering that Z-score is negatively correlated to the default risk, the proxies of default risk and dividends are expected to be negatively correlated.

The second measure that is commonly used as a proxy for the credit risk and that is going to be used for the analysis in this paper is the ratio of the loan loss provision to total assets. Loan loss provision shows the allowances that have been made for the bad debt. Therefore, the ratio of the loan loss provision to total assets shows how much of the total assets won’t be recovered if all bad debts taken into account will not be returned.

In line with Haq & Heaney (2012) expectations it is assumed that the dividends are negatively related to the credit risk, i.e. the higher the credit risk, the lower the dividends are. The proxy for the credit risk is positively correlated to the credit risk and therefore the expectation is as follows: the proxies for the credit risk and dividends are negatively related.
4.4.4 Calculation of liquidity risk

As it has been established during the discussion in the theoretical framework, liquidity coverage ratio (LCR) will be used as a proxy for the liquidity risk. To remind ourselves, the aim of LCR is to ensure that banks will have enough liquid assets to meet its liquidity needs for a 30 days period (BCBS, 2013, p. 4).

LQR is calculated as follows based on the standard from BCBS (2013, p.7):

\[
LQR = \frac{\text{Stock of High Quality Liquid Assets}}{\text{Total net cash outflow over the next 30 calendar days}}
\]

The banks calculate the ratio themselves as part of the requirements so no calculation is required for this ratio.

It should be noted however that to be able for banks to account assets for High-Quality Liquid Assets, the assets need to be liquid in markets during the time of stress and should ideally be central bank eligible (Baldan et al., 2012, p. 34).

The total net cash outflow over the next 30 calendar days is defined as total expected cash outflows less total expected cash inflows in the specified stress scenario for the subsequent 30 calendar days (Baldan et al., 2012, p. 34).

It is possible to see that even though BCBS tries to make it as clear as possible, some judgment is involved in the assessment of the assets and therefore the results of the analysis performed for the liquidity risk should be interpreted with caution.

No previous research that has been found that would investigate the relationship between the liquidity risk and dividends. However, based on the understanding that the high liquidity risk indicates possible cash problems, banks might not be willing to pay out the dividends if they have cash problems. As a result, it is possible to conclude that there is a negative relationship between the liquidity risk and dividends. Considering that there is a negative correlation between the level of liquidity risk and its proxy, the proxies of the liquidity risk and dividends are expected to be positively related.

4.4.5 Calculation of operational risk

As it has been discussed in the theoretical framework, operational risk is the most difficult to calculate. Nevertheless, the regulators come up with the estimate of the operational risk which is economic capital.

The economic capital is an estimate of the amount of equity capital a bank needs in the course of its business to absorb unexpected losses arising from the bank’s current exposures (Berg-Yuen & Medova, 2005, p. 355-356).

There are three types of the calculation of the economic capital: the basic indicator approach, the standardized approach, and advanced measurement approaches (BCBS, 2006, p. 144). It is clear that with the increase of the sophistication level of calculations, the level of precision increases as well. To make the results comparable across the population, it has been decided to use the ratio of economic capital for operational risk to total assets. The outcome of the analysis should be interpreted carefully taken into the account that the economic capital for operational risk is just the best estimate of the operational risk.
The expectation of the relationship between the operational risk and dividends is the most difficult to define based on the fact that it is challenging to define the operational risk itself. It consists of several dimensions that might lead the management decision in regards to dividends in different direction. Nevertheless, considering that operational risk includes factors the affect the perception of banks (fraud, safety, business practices, IT systems), it is expected that the dividends are positively related to the operational risk. Banks with high operational risk might want to attract the investors through high dividends if their reputation might hurt as a result of realized operational risk. Considering that the proxy for the operational risk is positively correlated to the operational risk, there is expected positive relationship between the proxies for dividends and operational risk.

4.5. Statistical tests
This part of the paper covers the statistical tests that are going to be used for the investigation of the relationship between dividends and different types of risk.

4.5.1 Dependent and independent variables
To investigate whether one variable depends on other variables, the concept of dependent and independent variables has to be addressed (Agresti & Finlay, 2009, p. 55-56). The purpose of this research is to investigate the relationship between the dividends and credit, market, liquidity and operational risks. As a consequence of this goal, the dependent variable in this case is the proxy for dividends that has been introduced above: the ratio of dividends/total earnings. The independent variables are also known as explanatory variables (Agresti & Finlay, 2009, p. 55-56) and are presented by the risk measures in this research. It is very important to note that the purpose of this paper is to investigate whether there is a relationship between the dividends and the risks and how strong it is. This research does not aim to establish how the independent variables affect dependent variable.

4.5.2 Multiple regression analysis
According to Watsham & Parramore (1997, p. 202), the movement of one dependent variable is usually explained by the combination of several independent variables rather than just one independent variable. The multiple regression analysis is designed to analyze the effect of two or more independent variables on the dependent variable (Zikmund et al., 2013, p. 586) and thus is suitable for the use in this paper.

The multiple regression model equation that is used for the analysis in this paper looks as follows:

\[ Y_i = \beta_0 + \beta_{market} * X_{market} + \beta_{credit} * X_{credit} + \beta_{default} * X_{default} + \beta_{liquidity} * X_{liquidity} + \beta_{operational} * X_{op} + \epsilon_i, \]

Where \( Y_i \) is the dependent variable that is the proxy for the dividends, \( \beta_0 \) is the intercept, \( X_{market} \) is the independent variable that represents market risk, \( X_{credit} \) is the independent variable that represents credit risk, \( X_{default} \) is the independent variable that represents default risk, \( X_{liquidity} \) is the independent variable that represents liquidity risk, \( X_{op} \) is the independent variable that represents operational risk, and \( \epsilon_i \) is the error.
In order to understand the equation and how it works fully, it is necessary to provide an explanation for all variables that constitute the equation. The first variable is $\beta_0$ that is described above as the intercept, it is also known as the constant. The intercept has the complex nature and thus it is difficult to explain its role in a multiple regression (Watsham & Parramore, 1997, p. 202). When the constant variables included in a multiple regression are determined by the independent variables that are excluded from the analysis, these constant variables might give the indication that important independent variables that have explanatory power for the dependent variables are excluded from the multiple regression (Watsham & Parramore, 1997, p. 202).

The coefficients $\beta_{\text{market}}, \beta_{\text{credit}}, \beta_{\text{default}}, \beta_{\text{liquidity}}, \beta_{\text{operational}}$ are the regression coefficients that determine the slope of respective independent variable on the independent variable. They also show the existence of a negative or positive relationship between Y and X (Watsham & Parramore, 1997, p. 188). It should be noted that if two independent variables are dependent on each other, the slope that are shown by the regression coefficients might be influenced by each other. That is why is very important to investigate the existence of correlation between the independent variables that are used in the multiple regression analysis.

Finally, $\varepsilon_i$ is known as the error or disturbance term and is used to represent the fact that there are other common influences that are affecting dividends (dependent variable in the model) (Watsham & Parramore, 1997, p. 188).

### 4.6.1 Ordinary Least Squares Regression

According to Watsham & Parramore (1997, p. 190), Ordinary Least Squares Regression gives one of the best unbiased linear estimations of the relationship because it constructs the line that minimizes the sum of squared error. There are assumptions of the data that have to be fulfilled in order for the ordinary least squares regression to be valid (Watsham & Parramore, 1997, p. 191).

The assumptions for the data can be checked through the data tests. These tests are test for multicollinearity, heteroscedasticity and autocorrelation. As a result, these issues have to be discussed and the data has to be analyzed in order to confirm that the data fulfill the assumptions. If one of the tests is failed then a different statistical model has to be used for the analysis of the data.

### 4.6 Practical issues

Before running the statistical analysis, it is necessary to highlight and investigate possible practical issues that might arise and their consequences on the analysis.

#### 4.6.1 Multicollinearity

Multicollinearity arises when the correlation between independent variables that are used in the analysis is not zero. According to Farrar & Glauber (1967, p. 93), when the problem of multicollinearity exists and is not addressed it affects the results of the analysis and make the outcome misguiding. However, some researchers argue that multicollinearity always exists and test for multicollinearity can only show the degree of collinearity (Mason & Perreault, 1991, p. 269). In addition, the test for multicollinearity should help researchers to understand the significance of the multicollinearity and its
effect on the relationship under investigation and thus is a useful statistical tool (Mason & Perreault, 1991, p. 269).

In order to understand whether the multicollinearity problem arises in the model constructed, the correlation matrix showing the correlation between the independent variables will be presented before the regression analysis is conducted. If the results will indicate that the multicollinearity might arise, then the additional collinearity will be conducted. The question of the multicollinearity is one of the main issues that might arise during the research as the different types of risks should correlate to each other in general. As a result, it is vitally important to investigate and resolve if necessary the issues that might arise.

4.6.2 Heteroscedasticity
To be able to conduct and properly evaluate the results using the ordinary least squares regression, it is necessary to evaluate the data for heteroscedasticity. This term implies that the dispersions of errors in the model are not constant. To be able to use ordinary least squares regression analysis, the data must be homoscedastic, i.e. the variance of errors is the same. The easiest way to check the data for existence of heteroscedasticity is the graphical representation that will show the pattern that might be evident for heteroscedasticity (Brooks, 2008, p. 133).

Another common method for establishing heteroscedasticity is white test. According to White (1980, p. 823), the idea of the White test is as follows: the null hypothesis assumes homoscedasticity and thus if there are sufficient evidence to reject it, then the heteroscedasticity exists and it is necessary to take this into account.

4.6.3 Autocorrelation
Considering that the data that has been collected and is going to be used for the analysis covers a period of time of five years the issue of the autocorrelation might arise. According to Studenmund (2011, p. 305), the autocorrelation is the correlation that takes place among observations over time. In other words, autocorrelation arises when independent variables affect dependent variables over the time lag and certain patterns repeat over time. If the autocorrelation exists, then the results for the ordinary least square regression analysis will be affected and the reliable conclusion cannot be made (Studenmund, 2011, p. 312-314). However, based on that fact that the data for the analysis is in fact a combination of the historical data and data across the banks, the issue of the autocorrelation should be insignificant.
**Chapter 5. Empirical Findings**

This chapter of the project contains the results of statistical analysis. It first covers the descriptive statistics for both independent and dependent variables in order to get the broader picture on the collected data. The issues that might arise during the performance regression analysis are discussed and resolved. Finally, the regression analyses are performed and the results are presented.

### 5.1 Descriptive statistics

The regression model has been presented in the previous chapter based on the formulated hypotheses. In order to fully understand the results of the statistical tests which are going to be presented later, the descriptive statistics of the data will be provided. It should help the reader to recall the different elements of the collected data and its characteristics.

Initially, the list of banks that have been chosen for the analysis contained 31 banks, however due to the lack of the annual reports in English the number of the analyzed banks has reduced to 19 and unavailability of LCR reduced the number to 14 and total number of observations to 46.

The analyzed banks are listed on the Nordic NASDAQ and are distributed among the countries as follows:

![Figure 5. Banks listing locations](image)

As it is possible to see the majority (60%) of banks is listed in Denmark that is followed by 27% of the banks listed in Sweden and the rest is listed in Norway and Finland. The question of the country bias might arise. However, the population has been established as homogeneous in the Practical Method chapter based on the following factors: the banks are listed on the same stock exchange and they operate in the region that has similar economy situation across the countries.

#### 5.1.1 Dividends

The dependent variable that is used for the analysis is the dividends paid. To make numbers comparable across the banks and years it has been decided to use the ratios of dividends paid to total earnings. As it has been discussed before, the application of ratio
to the analysis will prevent the concern with different currencies that banks use for financial statements.

<table>
<thead>
<tr>
<th>dividends/earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
<tr>
<td>Median</td>
</tr>
<tr>
<td>Mode</td>
</tr>
<tr>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Sample Variance</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
<tr>
<td>Maximum</td>
</tr>
</tbody>
</table>

Table 3. Descriptive statistics for dividends/earnings ratio

From the Table 3 it is possible to see that the dividends/earnings ratio varies from 0 to 1.615385 with the range of 1.770423. The mean of the ratio across the population is equal to 0.34844. It should be noted that similar to Onali (2009 p. 9, 2014 p. 7) one observation (BankNordik for 2014) has been excluded from the analysis as the dividends have been paid even though the earnings have been negative. It means that the dividends to earnings ratio is actually very high than very low.

It should be noted that in 13 of 45 observations no dividends have been paid out at all. In particular, 1 bank have not paid any dividends throughout the whole period of observation (Vestjysk Bank).

The data is collected over the five year period and it should be useful to see how the average ratio of dividends to earnings is distributed over the years:

![Figure 6. Average of dividends/earnings ratio](image)
It is possible to see that the average ratio over the population is increasing throughout all five years.

### 5.1.2 Risks as independent variables

The dependent variables that are used in the model are presented by proxies for risks. To recall from the Practical Methodology chapter the proxies for the risks are as follows: Market risk – capital requirements for market risks/total assets, Credit risk – loan loss provision/total assets, Default risk – Z-score, Liquidity risk – Liquidity Coverage ratio, Operational risk – economic capital (capital requirement for operational risk)/total assets.

The ratios have been used instead of absolute numbers based on the same rationale as dividends, i.e. in order to avoid the issue with comparison of values in different currencies and to make comparable banks that have different size.

<table>
<thead>
<tr>
<th></th>
<th>Market Risk</th>
<th>Credit Risk</th>
<th>Default Risk</th>
<th>Liquidity Risk</th>
<th>Operational Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td>0.003866</td>
<td>0.105884</td>
<td>1.842486</td>
<td>1.501867</td>
<td>0.00325</td>
</tr>
<tr>
<td><strong>Standard Error</strong></td>
<td>0.00051</td>
<td>0.033562</td>
<td>0.164608</td>
<td>0.069731</td>
<td>0.000278</td>
</tr>
<tr>
<td><strong>Median</strong></td>
<td>0.002286</td>
<td>0.002181</td>
<td>1.738186</td>
<td>1.36</td>
<td>0.00269</td>
</tr>
<tr>
<td><strong>Standard Deviation</strong></td>
<td>0.003422</td>
<td>0.225141</td>
<td>1.104222</td>
<td>0.467771</td>
<td>0.001867</td>
</tr>
<tr>
<td><strong>Sample Variance</strong></td>
<td>1.17E-05</td>
<td>0.050688</td>
<td>1.219307</td>
<td>0.21881</td>
<td>3.49E-06</td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>0.009031</td>
<td>0.623018</td>
<td>3.510466</td>
<td>2.319</td>
<td>0.007508</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>0.000309</td>
<td>3.91E-06</td>
<td>0.366118</td>
<td>0.61</td>
<td>0.001031</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>0.00934</td>
<td>0.623022</td>
<td>3.876583</td>
<td>2.929</td>
<td>0.008539</td>
</tr>
</tbody>
</table>

Table 4. Descriptive statistics for different types of risks

It is possible to see from the table above that the capital requirements for the market risk represents around 0.3866% of the total assets among the whole population. In addition, the maximum capital requirement for the market risk is 0.934% of total assets. It should be noted that the higher the capital requirement for the risk, the higher market risk itself.

Credit risk is represented by the ratio of loan loss provisions to total assets and it is possible to see that on average 10.5884% of total assets might be lost as a result of the bad debt. In addition, one of the banks has a very high ratio of 62.3% which means that its strategy is very risky and it might lose most of its assets in case debt fails.

The average of Z-score that reflects the default risk is around 1.84. It is quite interesting to see this value of Z-score lies into so-called Gray zone and therefore it is hard to predict a chance of default. The minimum value of Z-score is around 0.366 which indicates that the chance of bankruptcy is high. On the other hand, the maximum Z-score across the population is more than 3 that indicates a bank is unlikely to default.

The liquidity coverage ratio indicates the level of liquidity risk in banks for this paper. The higher the LCR is, the lower the liquidity risk is. It is possible to see that the average of LCR is around 150% that is higher than the requirement established by the authorities: 100%. However, some of the banks do not fulfill the requirement that is indicated by the minimum value in the population: 61%.
Finally, the ratio of economic capital (capital requirement for operational risk)/total assets is used for the operational risk proxy. The ratio and operational risk are positively correlated: the higher the ratio, the higher the operational risk. It is possible to see that the average of the ratio is around 0.325% that is higher than the similar market risk ration, indicating that the operational risk is in general higher than market risk for the banks. However, the range for the operational risk proxy is lower and is equal to 0.007508.

5.1.3 Market risk
Similar to the dividends it is interesting to see whether there is any trend throughout the years for the market risk proxy:

![Figure 7. Average of Market Risk proxy](image)

It is possible to see from the figure above that the market risk proxy that is positively correlated with the market risk has decreased from 2010 to 2012. It means that the market risk has decreased throughout this period. For 2013 the market risk proxy has increased and has been dropped to almost to the level of 2012 in 2014. It means that some parts of the market risk (i.e. interest rate, foreign exchange, equity and commodity risks) have decreased for the banks in Nordic countries in general throughout the period under investigation.

5.1.4 Credit risk
It is beneficial to see at the trend of the credit risk to get deeper understanding of the data collected for the analysis.
It is clear from the Figure 8 that there is no clear trend associated with the credit risk. The proxy used for the credit risk is the ratio of the loan loss provision to total assets and therefore positively correlates to the credit risk. There is no

5.1.4.1 Default Risk
Default risk that is represented by the Z-score has the following movements throughout the period that is covered in the analysis:

Figure 9 indicates that there is no particular trend that average of Z-score follows during the period under investigation. The correlation between Z-score and default risk is negative, i.e. for the years where Z-score raises the default risk reduces. It should be noted that the value of average Z-scores lies within the Gray zone (from 1.1 to 2.6) and therefore it is hard to predict the chance of bankruptcy.

5.1.5 Liquidity risk
Liquidity risk is represented by the LCR that has been described in the previous parts of the project. LCR and liquidity risk are negatively correlated based on the gained
knowledge and obtained understanding. LCR has been introduced in 2011 by Basel Committee but the requirements do not have to be fulfilled before 2015. As a result, there are several things that are quite interesting to see to be the full picture on the proxy for the liquidity risk.

First of all, it is beneficial to see what percentage of banks from the original sample of 95 observations disclose the information about the LCR either in the current annual reports and retrospectively split into the years:

![Figure 10. Percentage of banks that disclosed LCR](image)

It is possible to see that around one fifth of the banks disclosed the information retrospectively for 2010. Figure 10 shows the clear trend of increasing disclosure of the ratio. There are several reasons for this trend: the increasing awareness of necessity to disclose and the importance of liquidity risk for stakeholders, issuance of clear and more detailed guidance for ratio calculation, and the positive increase in the ratio values that allows banks to be more open.

In line with the other risks that have been discussed previously, it is beneficial to see the movement of average LCR throughout the period of analysis for the banks:

![Figure 11. Average of Liquidity Coverage Ratio](image)
Figure 11 indicates that LCR is increasing on average for the Nordic banks under consideration, i.e. liquidity risk decreases. It is also necessary to highlight that on average banks’ LCR is higher than the requirement introduced by the regulator. On the other hand, banks should bear in mind that the increase in the LCR indicates that they might be missing out on the opportunities to increase their profit as in 2010 where the LCR is the highest which can be explained by the stricter lending policy after the financial crisis.

5.1.6 Operational risk
Finally, the trend for operational risk proxy looks as follows:

![Figure 12. Average operational risk proxy](image)

The operational risk is positively correlated to its proxy and as a result it is possible to see that banks’ operational risk decreases on average throughout the five year period. It might indicate that banks become more aware of the operational risks sources and thus reduce them as a result.

5.2 Results
Before construction of the multiple regression model using the ordinary least square regression it is necessary to confirm all assumptions required for the model that have been discussed in the previous chapter have been addressed.

5.2.1 Multicollinearity
As it has been mentioned previously, the correlation between the independent variables should show existence or absence of multicollinearity in the constructed model.

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Market</th>
<th>Credit</th>
<th>Default</th>
<th>Liquidity</th>
<th>Operational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Credit</td>
<td>0.476794</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td>0.136463</td>
<td>0.027909</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquidity</td>
<td>0.288892</td>
<td>-0.29085</td>
<td>-0.01221</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Operational</td>
<td>0.314068</td>
<td>-0.22469</td>
<td>-0.37323</td>
<td>0.415922</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 1. Correlation between independent variables
It is known that the zero indicates no correlation between variables and one indicates the perfect correlation. However, these results rarely happen in a real life with the use of real data. Thus, to be able to evaluate the numbers some scale has to be used to evaluate the degree of correlation between the variables. It has been decided to use the scale provided by Salkind (2010, p. 219) for the analysis of the above parameters:

<table>
<thead>
<tr>
<th>Size of correlation</th>
<th>Coefficient general interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 0.2</td>
<td>Weak or no relationship</td>
</tr>
<tr>
<td>0.2 to 0.4</td>
<td>Weak relationship</td>
</tr>
<tr>
<td>0.4 to 0.6</td>
<td>Moderate relationship</td>
</tr>
<tr>
<td>0.6 to 0.8</td>
<td>Strong relationship</td>
</tr>
<tr>
<td>0.8 to 1</td>
<td>Very strong relationship</td>
</tr>
</tbody>
</table>

Table 2. Correlation coefficients. Source: Salkind, 2010, p. 219

Based on the results from the table 1, Market and Credit risks, Operational and Liquidity risks have moderate relationship with the rest of the coefficients indicating weak or no relationship among risks. The results of the correlation analysis are judgmental as they do not show the strong or very strong correlation between the independent variables. However, to make the analysis valid and be able to proceed with analysis without violation of the assumptions for the ordinary least squares regression, it has been decided to perform single regression analysis for the variables that show signs of multicollinearity. This decision should also increase the reliability of the results of the analysis because the single regression analysis will be a double confirmation of the results conducted using multiple regression analysis.

5.2.2 Heteroscedasticity test

Based on the previous discussion, the heteroscedasticity is initially checked by the graphical representation. Figure 13 represents the plot of predicted dividends/total earnings ratio and squared residuals for the multiple regression that includes all independent variables (market, credit, default, liquidity and operational risks):

![Figure 13. Dividends/total earnings ratio](image)
According to Bryman & Cramer (2005, p. 238), the data is homoscedastic if the scatterplot shows no clear pattern. Based on the graph it is not clear indication whether any pattern exists.

Therefore, it has been decided to conduct the White test that should show whether it’s possible to reject null hypothesis which assumes that the data are homoscedastic:

<table>
<thead>
<tr>
<th>White test:</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM (Observed value)</td>
</tr>
<tr>
<td>LM (Critical value)</td>
</tr>
<tr>
<td>DF</td>
</tr>
<tr>
<td>p-value (Two-tailed)</td>
</tr>
<tr>
<td>alpha</td>
</tr>
</tbody>
</table>

Table 3. White test

The results of the White test show that the p-value (0.212) is greater than the significance level alpha=0.05 so it is not possible to reject the null hypothesis H₀ that assumes homoscedasticity as it has been described in the previous chapter. As a result of the tests performed, it is possible to conclude that there is no issue of heteroscedasticity.

5.2.3 Regression analysis

It has been mentioned in the part of the project that covers multicollinearity; the simple regression analysis will be performed for the independent variables that have the highest correlation.

As a result, it has been decided to perform simple regression analysis for the operational and market risks. It leaves the credit, default and liquidity risks for the multiple regression analysis. In addition, it has been decided to perform multiple regression analysis for all types of risks and see whether there is any significant difference in the regression analysis results.

5.2.3.1 Simple regression analysis for the market risk

The regression statistics for the performed analysis looks as follows:

<table>
<thead>
<tr>
<th>Regression Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
</tr>
<tr>
<td>R Square</td>
</tr>
<tr>
<td>Adjusted R Square</td>
</tr>
<tr>
<td>Standard Error</td>
</tr>
</tbody>
</table>

Table 4. Regression statistics of the simple regression analysis for market risk

Based on results and in particular on the R Square and adjusted R Square values, it is possible to say that the model predicts only 5.53%.

Moreover, the ANOVA (analysis of variance) indicates that the model is not significant. P-value (0.1198) is clearly greater than 0.05 and therefore null hypothesis cannot be rejected:
### 5.2.3.2 Simple regression analysis for the operational risk

The same model has been constructed for the operational risk. Consequently, the following results have been obtained:

**Regression Statistics**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.4617</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R Square</td>
<td>0.2131</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted R Square</td>
<td>0.1948</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Error</td>
<td>0.3362</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Regression statistics of the simple regression analysis for operational risk

It is evident from the regression statistics that the model predicts around 21% of the movements of the dividends. Moreover, the P-value is significantly lower 0.05 that can be seen from the ANOVA and results of the analysis. Therefore it is possible to reject null hypothesis that indicates that there is no relationship between the operational risk and dividends.

### ANOVA

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Significance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1</td>
<td>1.3169</td>
<td>1.3169</td>
<td>11.6476</td>
<td>0.0014</td>
</tr>
<tr>
<td>Residual</td>
<td>43</td>
<td>4.8616</td>
<td>0.1131</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>6.1785</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7. AVOVA of the simple regression analysis for operational risk

Furthermore, it is possible to see from the Table 8 that the coefficient associated with the operational risk has a negative sign. This in turn indicates that the proxy for the dividends and operational risks are negatively related.

### Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>P-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.6496</td>
<td>0.1015</td>
<td>6.4010</td>
<td>0.0000</td>
<td>0.4449</td>
<td>0.8542</td>
</tr>
<tr>
<td>Operational Risk</td>
<td>-92.6528</td>
<td>27.1482</td>
<td>-3.4129</td>
<td>0.0014</td>
<td>-147.4024</td>
<td>-37.9032</td>
</tr>
</tbody>
</table>

Table 8. Results of the simple regression analysis for operational risk

### 5.2.3.3 Multiple regression analysis for the credit, default and liquidity risk

The remaining risks have been used in the multiple regression analysis based on the fact that there is no question of the multicollinearity in place for these risks.

The following results have been obtained as a result of multiple regression analysis:
The constructed model explains around 13% of the movements which is quite low in comparison to the model in the previous section. In addition, the Significance F (0.1258) as well as the individual p-values for different types of risks are all higher than 0.05 and thus the null hypotheses cannot be rejected.

<table>
<thead>
<tr>
<th>ANOVA</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Significance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1</td>
<td>0.7963</td>
<td>0.2654</td>
<td>2.0220</td>
<td>0.1258</td>
</tr>
<tr>
<td>Residual</td>
<td>43</td>
<td>5.3822</td>
<td>0.1313</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>6.1785</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10. AVOVA of the multiple regression analysis

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>p-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.2836</td>
<td>0.2130</td>
<td>1.3316</td>
<td>-0.1465</td>
<td>0.7138</td>
</tr>
<tr>
<td>Credit Risk</td>
<td>0.3575</td>
<td>0.2578</td>
<td>1.3868</td>
<td>-0.1631</td>
<td>0.8780</td>
</tr>
<tr>
<td>Default Risk</td>
<td>0.0687</td>
<td>0.0519</td>
<td>1.3228</td>
<td>-0.0362</td>
<td>0.1735</td>
</tr>
<tr>
<td>Liquidity Risk</td>
<td>-0.0663</td>
<td>0.1186</td>
<td>-0.5591</td>
<td>-0.3058</td>
<td>0.1732</td>
</tr>
</tbody>
</table>

Table 11. Results of the multiple regression analysis

**5.2.3.4 Multiple regression analysis for all types of risks under consideration**

Finally, taking into the account that the results of the multicollinearity testing have not been definite, the multiple regression analysis is constructed for all types of risks. This is done in order to see whether any of the results from the previous parts are changed or whether they are consistent.

The results of the regression analysis are as follows:

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th>df</th>
<th>Multiple R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0.5497</td>
<td>0.3021</td>
<td>0.2127</td>
<td>0.3325</td>
</tr>
</tbody>
</table>

Table 12. Regression statistics of the full multiple regression analysis

According to the regression statistics the model predicts 30% of the movements which is the highest among the all presented models.
Furthermore, the significance $F$ that can be seen in Table 13 is only 1.25% that indicates that there is only 1.25% chance that the results have been obtained by chance. This is significantly lower the confidence level of 5%.

### ANOVA

<table>
<thead>
<tr>
<th></th>
<th>$df$</th>
<th>SS</th>
<th>MS</th>
<th>$F$</th>
<th>Significance $F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>5</td>
<td>1.8667</td>
<td>0.3733</td>
<td>3.3769</td>
<td>0.0125</td>
</tr>
<tr>
<td>Residual</td>
<td>39</td>
<td>4.3118</td>
<td>0.1106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>6.1785</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 13. AVOVA of the full multiple regression analysis

### Coefficients

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standard Error</th>
<th>$t$ Stat</th>
<th>P-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.5446</td>
<td>2.5511</td>
<td>0.0148</td>
<td>0.1128</td>
<td>0.9765</td>
</tr>
<tr>
<td>Market Risk</td>
<td>-24.2925</td>
<td>-1.5783</td>
<td>0.1226</td>
<td>-55.4251</td>
<td>6.8401</td>
</tr>
<tr>
<td>Credit Risk</td>
<td>0.3202</td>
<td>1.3488</td>
<td>0.1852</td>
<td>-0.1600</td>
<td>0.8003</td>
</tr>
<tr>
<td>Default Risk</td>
<td>0.0164</td>
<td>0.3252</td>
<td>0.7468</td>
<td>0.0858</td>
<td>0.1187</td>
</tr>
<tr>
<td>Liquidity Risk</td>
<td>0.0705</td>
<td>0.5968</td>
<td>0.5541</td>
<td>-0.1684</td>
<td>0.3093</td>
</tr>
<tr>
<td>Operational Risk</td>
<td>-83.7838</td>
<td>-2.7823</td>
<td>0.0083</td>
<td>-144.6944</td>
<td>-22.8732</td>
</tr>
</tbody>
</table>

Table 14. Results of the full multiple regression analysis

Finally, the p-values for individual risks that can be found in Table 14 above are in line with the models constructed above: only operational risk has a p-value that is lower than 5%. As a result, the operational risk is the one only risk in the model for which the null hypothesis of no relationship between the risk and the dividends can be rejected.
Chapter 6. Analysis and quality criteria
This chapter concentrates on the analysis of the results described in the previous chapter. The results of the regression analysis are going to be discussed based on the formulated hypotheses and the conclusion of accepting or rejecting the hypotheses will be drawn. As a final part of this chapter the research is going to be assessed based on the quality criteria of reliability, validity and replicability.

6.1 Analysis of the results
In order to proceed with the analysis of the empirical findings and get the clear picture of this analysis it is beneficial to recall the purpose of the research which is to determine whether there is a relationship between the bank dividends and different types of risks. In addition, if the relationship has been determined, then its type is aimed to be established. As it has been discussed previously, this project is based on the similar research papers that investigated similar problem with some adjustments.

Haq & Heaney (2012) investigated whether there is a relationship between the interest rate risk that is part of the market risk and the dividends and concluded that the results are not statistically significant.

There is no significant relationship has been found between dividends and credit risk by both Haq & Heaney (2012) and Onali (2009, 2014). They both concentrated on banks and used loan loss provision to total assets as a proxy for the credit risk.

Onali (2009, 2014) has conducted similar research in regards to default and credit risks and concluded that the dividends and default risk are positively related for banks which is contradictory to the conclusion of Charitou et al. (2011) that concluded that the decision to increase the dividends is explained by the reduction of default risk.

There are no previous research have been found in regards to the investigation of the relationship between the dividends and liquidity and operational risks so there is no benchmark for comparison of the analysis results.

6.1.1 Market risk - dividends relationship and Hypothesis 1
Hypothesis 1 has been formulated at follows:

\[ H_0: \beta_{market} = 0 \]
\[ H_1: \beta_{market} \neq 0 \]

where \( \beta_{market} \) is the regression coefficient that determines the slope of the market risk on the dividends.

Based on the simple regression analysis from 5.2.3.1 of the paper and the multiple regression analysis described in 5.2.3.4 it is possible to conclude that the null hypothesis which indicates that there is no relationship between the dividends and the market risk cannot be rejected. As a result, this relationship is not statistically significant.

It has been noted in the Theoretical Framework chapter that market risk can be divided into four types based on the causes for the risk exposure: interest rate, foreign exchange, equity and commodity risks (Vyas & Singh, 2010, p. 16; Savvides & Savvidou, 2012, p. 381). Taking into the account this fact, it is possible to say that the results of the
analysis obtained in this paper are in line with the results that have been obtained by the Haq & Heaney (2012) when they have investigated the relationship of interest risk and dividends payout ratio. Haq & Heaney (2012) have found dividend payout ratio is not influenced by the interest rate beta that has been used as proxy for the interest risk.

6.1.2 Credit/default risk - dividends relationship and Hypothesis 2 and 3

Based on the Practical Method chapter the hypothesis 2 has been formulated as follows:

\[ H_0: \beta_{credit} = 0 \]
\[ H_1: \beta_{credit} \neq 0 \]

, where \( \beta_{credit} \) is the regression coefficient that determines the slope of the credit risk on the dividends.

According to the two multiple regressions performed in parts 5.2.3.3 and 5.2.3.4 of the project, it is possible to conclude that the relationship between the credit risk and dividends is not statistically significant. As a result, there is not enough evidence to reject the null hypothesis that indicated that there is no relationship between the credit risk and dividends. These results are in line with the Haq & Heaney (2012) and Onali (2009, 2014) who has found no significant relationship between the dividends and credit risks in their papers.

The results might be caused by the choice of proxy for the credit risk. For this paper as well as for the research conducted by Haq & Heaney and Onali the ratio of loan loss provisions/total assets. This ratio mostly covers the risk of counterparty failure which is only part of the credit risk based on the classification by Horcher (2012, p, 104) and presented earlier in the Theoretical Framework chapter. However, it is also possible that credit risk is not significantly related to the dividends based on the fact that at least three research papers have investigated this relationship and have not receive significant results.

Horcher (2012) presented different types of credit risk in his paper. One of the types of the credit risk that has been discussed previously is the default risk. It has been separately investigated as an influencer of the paid dividends in this paper due to its distinctive nature. The hypothesis 3 has been formulated in relation to the default risk in Practical Method chapter and looks as follows:

Hypothesis 3:

\[ H_0: \beta_{default} = 0 \]
\[ H_1: \beta_{default} \neq 0 \]

, where \( \beta_{default} \) is the regression coefficient that determines the slope of the default risk on the dividends.

For the analysis of the data in regards to the possible relationship between the default risk and paid dividends, two multiple regression analysis have been conducted. As a result of the performed analyses it has been determined that there is no statistically significant relationship between the default risk and the paid dividends.

These results are in contradiction with the results that have been obtained during the research performed by Onali (2009, 2014). Based on the analysis performed using Tobit model, Onali (2009, 2014) has come to the conclusion that there is statistically
significant positive relationship between the default risk and dividends as a result of the risk-shifting mechanism in the dividends payout. Possible reason for the discrepancy in the results is the adaptation of different Z-scores as a proxy for the default risk. New version of Z-score for non-manufacturing companies that predicts the probability of default and has been introduced by Altman is used for the analysis in this paper. Onali (2009, 2014) uses the Z-score introduced by Boyd and Graham (1988 cited in Onali (2009, p. 20) that is calculated as “the ratio ROA of bank i plus the equity-total assets ratio bank i in year t divided by the standard deviation of the ROA of bank i” in his earlier paper and logarithm of the same Z-score in the later paper. In addition, Onali (2009, 2014) has used two proxies for the dividends. One of them has been adopted for this research, however the second one (dividends to equity) has not been in the analysis and thus it might be the reason for difference in the results.

6.1.3 Liquidity risk - dividends relationship and Hypothesis 4

The hypothesis 4 aims to help determining whether there is any relationship between the liquidity risk and dividends. It has been formulated as follows in the Practical Method chapter:

**Hypothesis 4:**

- $H_0: \beta_{liquidity} = 0$
- $H_1: \beta_{liquidity} \neq 0$

, where $\beta_{liquidity}$ is the regression coefficient that determines the slope of the liquidity risk on the dividends.

The results of the statistical analysis for the liquidity risk are presented in 5.2.3.3 and 5.2.3.4 parts of the paper. Both models constructed indicate that the relationship between the liquidity risk and dividends is not statistically significant. As a result, it is not possible to reject the null hypothesis that implies no relationship between the liquidity risk and dividends. The previous researchers concentrated on the default, systematic and credit risks and thus did not perform the analysis of potential dividends and liquidity risk relationship.

The results of the performed analysis is quite interesting to see because among all the risks the payment of dividends and liquidity risk are one of the most obvious choices to link based on the fact that both of them are related to the available cash in banks. Hull (2012, p.447) determines the liquidity risk as a risk that banks won’t be able to meet monetary obligation as they become due.

One of the possible reasons of the analysis is the fact that LCR is a new ratio that has been introduced by Basel Committee as part of Basel III (BCBS, 2011a). As a result of it, the calculation of the ratio and thus the result the accuracy of liquidity risk has not been proven in practice over the years. Moreover, LCR is concerned with the short-term liquidity (30 day period) that is based on the formula used for its calculation (BCBS, 2013, p.4). This might lead to the fact that even through the dividends are not influenced by short-term liquidity risk that is expressed by LCR they might be determined by the liquidity risk over the longer period.

6.1.4 Operational risk - dividends relationship and Hypothesis 5

The final risk under investigation as a possible explanatory variable of the dividends is the operational risk. Considering the results of the multicollinearity tests, the single
regression analysis has been conducted along with the multiple regression analysis. The outcome of both tests is consistent and indicates that the null hypothesis can be rejected.

The hypothesis 5 has been formulated as:

\[ H_0: \beta_{\text{operational}} = 0 \]
\[ H_1: \beta_{\text{operational}} \neq 0 \]

, where \( \beta_{\text{operational}} \) is the regression coefficient that determines the slope of the operational risk on the dividends.

Therefore, there is a statistically significant relationship between the dividends and the operational risk.

One of the objectives of this paper is to determine the kind of relationship between the risks and dividends if this relationship is found statistically significant. According to the test results, the coefficient that shows the type of the relationship between the proxies for operational risk and dividends is negative. This is contrary to the expectation that has been formulated in the Practical Method chapter. There is no additional baseline for the comparison as there have been no previous research found that would investigate this relationship.

According to the results of the statistical analysis, the higher the operational risk is, the lower dividends are paid. Therefore, the assumption that banks would want to attract investors using the dividends knowing that the operational risk is high cannot be proven. Even though the realization of the operational risk will influence the perception of banks and thus is closely related to the reputational risk, it has been noted by Jarrow (2008) that the operational risk includes legal risk but does not include the reputation risk. As a result, taking into consideration this statement, it is possible to formulate several potential reasons of the determined negative relationship.

The possible explanation of the significant negative relationship between operational risk and dividends might lie in the necessity for additional buffer in the form of cash needed in case of the realization of the operational risk. The realization of operational risk may occur as a result of the external/internal fraud, failure of business systems and so on (BCBS, 2006, p. 305-306). All of these events will require additional funds to deal with: either investments in the fixing problems or penalties that have to be paid as a result of the breach. Consequently, the management might decide to leave the funds in the bank and don’t distribute it as dividends.

Furthermore, the development of various new systems as well as expansion might increase operational risk. New systems are not tested in the real work environment and thus there is a higher chance that their implementation will lead to financial losses as a result of system failures that is part of the operational risk (BCBS, 2006, p. 306). The expansion through acquisition or development might lead to higher operational risk because the acquired entities or operations have unknown level of risk and have to be integrated in the existing systems (Wang & Hsu, 2013, p.2042). This all will lead to higher operational risk from one hand and additional funds needed from the other hand. As a result, management might make a decision to maintain available funds rather than pay dividends to shareholders.
6.2 Quality criteria
According to Bryman & Bell (2011, p.41-43), to ensure a high quality of the quantitative research should be evaluated against three quality criteria: reliability, replicability and validity.

6.2.1 Reliability
The first quality criterion is reliability of the research. It implies that methods and techniques that have been used in a research would lead to the similar results if the research is conducted by other researcher or on a different occasion. In other words, the consistency is concerned with the question of the consistency of the research (Bryman, 2012, p. 168). The reliability of the research is hard to achieve as the results might be influenced by the subjectivity of the researcher. There are three factors that should be present in order for the research to meet the reliability criterion: stability, internal reliability and inter-observer stability (Bryman, 2012, p. 170).

The first factor that this research is assessed against is the stability. The data for this research has been obtained using the publically available sources and is historical. Therefore, the data will not change for the future researches, subject to the adjustments to financial statements made by banks. Furthermore, the widespread statistical tests and the clear guidance of data interpretation have used in the analysis. These factors reduce the ability for the biased data interpretation. Thus, it is possible to conclude that the research meet the stability criterion.

The next factor to evaluate is the internal reliability. According to Bryman (2012, p.170), this factor is applicable for multiple-indicator measures that arises as a result of multiple questions. Considering that the data has been collected using the secondary source of information rather than an interview, this factor is not applicable to this research.

Finally, to ensure that the research meets the reliability criterion, it has to be evaluated against inter-observer consistency. Taking into account that the research and analysis has been conducted by one person, this criterion is not applicable and thus it is possible to conclude that the research is reliable.

6.2.2 Validity
Second quality criterion that the research has to meet is validity. The validity is concerned with the question whether the measures of concepts that have been used in the research actually reflects the concepts (Bryman & Bell, 2012, p. 170). According to Bryman & Bell (2011, p. 170), there are three types of the validity: internal, external and measurement validity. In order for the research to be valid, it has to fulfill the characteristics of all types of validity.

Internal validity questions the causality, i.e. whether there is a causal relationship between variables (Bryman & Bell, 2011, p. 170). In other words, the internal validity raises the question whether the independent variables of the research such as types of risks can explain the dependent variable: dividends. This research has been constructed with the reference to the research on a similar topic. Several authors have already attempted to explain the level of dividends as a result of different types of risks. Therefore, it is possible to say that this criterion is met for this research. However, it is
necessary to bear in mind that most likely dividends are dependent on many other variables and not only on the level of risks.

The external validity refers to the question whether the results of the research can be applied to the whole population (Bryman & Bell, 2011, p. 47). The analysis in this research is based on the whole population and not on the sample. It is necessary to highlight that some banks have been eliminated from the analysis based on the fact that they don’t publish the annual reports in English. However, considering that the choice of the elimination has been based only on this factor, the same results of the analysis should be obtained if the data for the elimination banks is included in the analysis.

Finally, the measurement validity refers to the question of whether the proxy of the concepts actually reflects the concepts (Bryman & Bell, 2011, p. 47). The choice of proxies has been made using the knowledge obtained through the investigation of the theories and previous researches and the best available measures of the risks and dividends. This should be enough to make sure that the measures are reliable. However, it should be noted that risks and their definition is an extremely complex area. The regulators try to provide the concepts and definitions that would cover all aspects of the risks. Nevertheless, the repeating financial crises prove that sometimes it is not possible to identify all parts of the risks. As a result, the proxies that are used in this paper might reflect only part of the risks rather than the whole.

6.2.3 Replicability
The last quality criterion that the research has to fulfill is the replicability. As it is evident from its name, it should be possible to replicate the research in order for it to fulfill this criterion. According to Bryman & Bell (2011, p. 43), in order for the research to be replicable, the data collection and analysis method has to be clearly described. Throughout the research, all choices, assumptions and procedures have been explained and clearly presented. In addition, this research contains the detailed explanation of the data collection methods as well as statistical tests used for the analysis in the Chapter 4 Practical Method. Therefore, it is possible to say that the research is replicable.
Chapter 7. Conclusions and Further Research

In this chapter the conclusion of the research is presented. The analysis presented in the chapter above is the foundation of this conclusion. The research question formulated at the beginning of the research is clearly answered in this part of the paper. The limitations of the research are presented and recommendations for further research are made. Moreover, the theoretical and practical contribution of the paper is discussed.

7.1 Conclusion

The purpose of this research was to investigate whether there is any relationship between the dividends and different types of risks: market, credit, liquidity and operational risks. Risks that banks face are increasingly important in the current environment considering the recent financial crisis and the newly introduced regulations from Basel committee. Therefore, it is also important for investors to pay attention not only to the value that they receive as dividends but also what it might mean in terms of risks that the banks face. One of the additional objectives that have been formulated at the beginning of the research is to investigate the type of the relationship between the dividends and risks if the relationship is found to be significant. In order to fulfill these objectives, several statistical tests have been conducted. Based on the results presented in Chapter 5 and the analysis presented in Chapter 6, it is now possible to answer the research question:

What is a relationship between dividend payout ratio and risks in Nordic banks?

The answer on this question is:

- there is a negative relationship between the dividend payout ratio and operational risk;
- there is no significant relationship between the dividend payout ratio and market, credit (including default) and liquidity risks.

This answer is given on the statistical analysis that has been performed using the proxies for the risks and dividend payout ratio.

7.2 Theoretical and practical contribution

This section of the conclusion covers the theoretical and practical contribution of the papers. This research concentrated specifically on the Nordic countries that are believed to be more stable in terms of economy and thus the results of the analysis might be specific to this region and different in other countries.

Furthermore, there is no previous research on the relationship between dividend and liquidity and operational risk. Considering that the relationship between the operational risk and dividends is found to be significant, this contribution of the research can be counted as the largest among the others. The underlying reasons for the existing relationship could be investigated that gives additional topics for the researchers to look at. The results for the liquidity risk are also useful in terms of the guidance and the baseline for other future researches in this field. As it has been discussed in the previous chapter, the used proxy for liquidity risk measures mostly the short-term liquidity risk and thus researchers might pay more attention to the other measures that would cover long-term liquidity risk.
Regarding the practical contribution, the results of the research findings might be helpful for the different types of banks’ stakeholders. As a result of the answer on the question, it is possible to do the recommendations to investors and other stakeholders and thus evaluate the practical contribution of the paper. There is a significant negative relationship between the operational risk and dividends. Therefore, the investors who are concerned with the reputation and the overall stability of banks should consider investments in banks that pay higher dividends. Other factors should be considered as well to be able to make an informative decision but the results of the research give the initial foundation of this decision.

Furthermore, the regulators might quickly indicate banks that they should pay attention to in regards of operational risks by looking at the banks that have a low dividend payout ratio. The results also should help auditors to indicate how effective controls are in the banks as the higher operational risk indicates that the controls are more likely to be deficient. The substantive analytical procedures on the dividends might help with the indication of the level of operational risk. The future and current employees might become more aware that if the banks pay more dividends then the work environment in terms of safety and reliability of the systems is good.

Finally, the customers who are concerned with the level of systems safety and possible internal and external breaches should look to invest their money with banks that have high dividend payout ratio.

7.3 Ethical and social concerns arising as a result of the research

The aim of this section is to discuss the ethical and social contribution that this research and its outcome bring. The banking area is one of the vital parts of the economy and thus the behaviors and decisions taken within this area affect the society both directly and indirectly.

Once the signaling theory of dividends has been introduced there is always a concern that the management might use the knowledge and findings of the research to manipulate the behavior of stakeholders in their own favor. As a result of this research paper, the investors become aware of the negative relationship between the dividends and operational risk. If the operational risk is determined as a major factor for the investment choice, banks might pay higher dividends to attract more investors.

Furthermore, the issue of information disclosure is the big concern for the banking industry. A lot of annual reports provide a lot of general information about the risks but do not specify any information beyond the requirements. It might help them to hide the problems with some types of risks. Considering that the research states that the most types of risks investigated do not influence the dividends, management might decide not to disclose further information as the investors who are only concerned with the return do not need it. This approach might lead to the dangerous situation where the banks with worrying high risk level manage not to disclose vital information to the investors.

However, the risk level of the banks and its disclosure is closely monitor by the regulators to ensure that banks are stable and not in danger of failing as it might affect the economy both on the country and the global level. As a result, the risk level of the banks should not rise beyond the determined bar. Nevertheless, the dividends will get
the different stakeholders initial understanding of the operational risk level across banks when the stakeholders want to compare banks.

### 7.4 Limitations and recommendations for further research

As a final part of the conclusion, the limitation of the research and recommendations for future researches are discussed. To be able to evaluate this research objectively, it is necessary highlight the limitations within the research. One of the biggest limitations is the limitation due to the language. Only banks that publish their annual reports in English have been selected. Considering that this paper focuses on Nordic banks this limitation has influenced the size of sample chosen for the analysis. Moreover, some of the information, such as liquidity coverage ratio has not been presented by the banks throughout the whole period under investigation. In addition, some of the information has not been available in the annual reports for most of the banks, i.e. Value-at-Risk, and as a result, the new proxy has had to be chosen for the measurement of the market risk. Finally, this research has concentrated on the banks of Nordic regions, i.e. Sweden, Denmark, Finland and Norway, listed on Nordic NASDAQ stock exchange.

Based on these limitations, it is possible to formulate the suggestions for further research. First of all, the future research might extend the data to other parts of the world. It will give the overall picture of the issue on a global perspective.

The research might be repeated in a several years to get the longer time horizon and see the fluctuations of the relationship throughout the years. This might be useful as the dividends might become an indicator of increasing bank risks and thus predict possible future financial crises before they happen. It would allow regulators and banks themselves to note and resolve the issues.

Furthermore, it would be interesting to see whether there are any changes if different proxies for different types of risks are used. For example, VaR might be used for the market risk, if this information becomes available for the researchers. Considering that Basel Committee constantly improves and provided more details of the risk measures, the study might be repeated in the future with the extended period of time. These results with more precise measures of risks might reveal that risks influence management’s decision to pay dividends more substantially that is anticipated. Different proxy could also be used for the measurement of the default risk. A lot of researchers (Andersen, 2008 and Espahbodi, 1991 among others) have created various models that aim predict banks failures and thus one or several of these models could be used to identify the proxy for the default risk in future research papers.

Additionally, the underlying reasons of the determined significant relationship between the operational risks could be investigated. The operational risk could be split into several types based on the cause of the risk and thus more precise results might be obtained.

In general, the chosen research topic is quite new and very few researches have been made in regards to finding the relationship between the dividends and different types of risks that the banks face. Considering the constant development and improvement of banking sector along with its growing importance, this topic will remain of current interest and the amount and variety of papers should grow in the future years.
Reference List


Brannick, T. & Coghlan, D. (2007); In Defense of Being "Native": The Case for Insider Academic Research, Organizational Research Methods, 10(1), 59-74


### Appendix 1: List of banks in the population

<table>
<thead>
<tr>
<th>Ref</th>
<th>Bank</th>
<th>Stock exchange</th>
<th>Report in English</th>
</tr>
</thead>
<tbody>
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<td>Aktia Bank A</td>
<td>NASDAQ OMX Helsinki</td>
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</tr>
<tr>
<td>2</td>
<td>Ålandsbanken Abp A</td>
<td>NASDAQ OMX Helsinki</td>
<td>Available</td>
</tr>
<tr>
<td>3</td>
<td>Avanza Bank Holding</td>
<td>NASDAQ OMX Stockholm</td>
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</tr>
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<td>BankNordik</td>
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<td>5</td>
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