UNIVERSITY OF TARTU

Faculty of Social Sciences

School of Economics and Business Administration

Aditya Sanjay Gadkari

CREDIT RATINGS OF LISTED CORPORATE BONDS OF LISTED FINANCIAL
INSTITUTIONS

Supervisor: Junior lecturer Mark Kantšukov

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I have written this Bachelor thesis independently. Any ideas or data taken from other authors or other sources have been fully referenced.

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Introduction

Businesses in a changing economy are continuously faced with the need to acquire additional capital to meet current and future goals. The sources of capital acquisition by businesses have long been a major area of inquiry and concern in economic practice. The financial market, and more broadly, the financial system, are critical for generating cash for all businesses. In today's environment, establishing and maintaining competitive positions is almost impossible without external financing; corporate bond issuance is one such source. As a result, maintaining enough financial resources is critical at all stages of a business's life cycle. Corporate bonds have grown in popularity over the last several decades due to their diversification and improved investor dependability when compared to other debt securities. (Vasylieva, 2021)

Even though academic interest in analyzing the area of financial instruments and financial markets is high, the majority of research concentrates in more equity and sovereign bond segments, the corporate bond segment gets low attention in the academic research. (Tocelovska et al., 2018) This is also true in the context of Baltic capital markets. Even though there is significant amount of research being done on equity capital market, there is little to no attention given to Baltic corporate debt market. Additionally, none of them have researched about credit ratings in any greater depth. (Bengtsson et al., n.d.; Putkuri, 2004; Ong & Iorgova, 2008; Putkuri, 2004; Rupeika-Apoga, 2014)

This paper aims to assign credit ratings to the corporate bonds of financial services firms listed on the Nasdaq Baltic exchange. For assigning credit ratings, the author of this paper will develop a methodology and consider all the publicly available information of the listed securities.

The author would complete the following research tasks to achieve the set objective of the research paper:

- Define and briefly explain analysis-related concepts like credit ratings, credit risk, and credit rating agencies.
- Review academic literature and understand what factors affect credit risk.
- Give overview of credit rating agencies.

- Develop a credit rating methodology for bonds based on academic literature and
  approaches used by credit rating agencies.

- Collect the data of corporate bonds of financial institutions listed on the Nasdaq Baltic
  exchange. Including annual reports, quarterly reports, analyst forecasts for listed issues
  and their issues; in addition, collect macroeconomic reports and forecast issued by central
  and commercial banks.

- Assign ratings to the selected corporate bonds and discuss their results.

The author of this paper has decided to only take financial firm's bonds for credit ratings.
Financial firms have very different structure than their non-financial counterparts. Hence, rating
methodology for financial firms is significantly different. The upcoming research paper consist
of two chapter.

Keywords: Credit rating agencies (CRA), Return on equity (ROE), Return on assets (ROE)

1. Credit rating as a metric of the company's credit risk - theoretical foundation

1.1. Objectives and commonly used instances of credit ratings

A credit rating is a method of determining the creditworthiness of individuals, groups, enterprises, non-profit organizations, governments, and even whole nations. Special credit rating agencies assess borrowers' financial risk to determine whether or not they will be able to repay loans on time. (*What Is Credit Rating: Importance, Range & How It Works?*, 2022) People sometimes also use credit rating and credit score interchangeably, but there is a distinction between them. A credit rating, given as a letter grade, reflects a company's or government's creditworthiness. A numerical credit score is provided for the credit score, representing the creditworthiness; it can be employed for individual customers or small enterprises. (Chip Stapleton, 2021) Individuals' credit scores are utilized by banks, credit card companies, and other lending organizations that serve them. (*Credit Rating - Overview, Types, and Users of Credit Ratings*, 2019). Now that we have understood the differences between credit score and credit rating, we can move on to more detailed literature about credit ratings and subsequently corporate credit ratings.

Onyiriuba (2016) explains that credit ratings represent the possibility of debt repayment for individuals and businesses operating in a business environment. In the case of banking, credit rating focuses on determining borrowers' capacity to repay debts. It is used to determine the issuers' ability to repay their securities on specific dates when trading securities. In all circumstances, the primary objective of credit rating is to minimize the borrower's or issuer's risk of default.

As there is an ample amount of literature advocating the use of credit ratings, on the other hand, we also have researchers who are skeptical about the use of credit ratings. Schroeter (2013) mentions, credit ratings are not objectively verifiable statements about a securities or its issuer, but are rather subjective, predicted judgments expressed by a private credit rating organization. While rating agencies typically take several objective elements into account during the rating process, the credit rating is ultimately determined by the subjective weighting of those factors. As such, it is only an opinion based mainly on human judgment and hence neither a fact capable of being established as true or wrong nor a guarantee of credit quality. Additionally, because credit ratings are forecast the chance that the rated security will fail (or will not default) in the

future, their content is fundamentally forward-looking. As with any prophecy, this renders them
subjective statements, as nobody can foretell the future objectively (i.e., with verifiable
certainty).

In the following arguments, we will consider the purposes of credit ratings and credit
rating agencies the same. There is a fragile line between the purposes of credit ratings and credit
rating agencies. Furthermore, academic literature on credit rating agencies is more decadent and
widely available.

Credit rating agencies have two widely accepted explanations: (1) credit rating agencies
reduce information asymmetry between issuers and investors, hence resolving the 'lemon'
dilemma, and (2) rating agencies lower the cost of regulation. (Rhee, 2015)

Rating agencies are said to correct a problem of information asymmetry between issuers
and investors (Boot et al., 2006; Listokin & Taibleson, 2010). Since borrowers better understand
their creditworthiness than creditors, the latter will boost rates to protect themselves against
lower-quality borrowers. As a result of the underlying dynamic, higher rates will push higher-
quality borrowers out of the market, leaving just 'lemon' borrowers in the credit market. Rating
agencies are believed to address this issue by serving as an information middleman, giving
impartial data on borrowers' creditworthiness. (Rhee, 2015)

Another significant reason for the existence of rating agencies is that governments
outsource certain aspects of regulation by granting rating agencies the NRSRO status
('Nationally Recognized Statistical Rating Organization'), which is a license to regulate financial
institutions' investment domains and capital structures (in the USA). The idea is that rating
agencies minimize net regulatory costs by relieving investors and regulators of the burden of
establishing an analytical infrastructure for bond investments. Rhee (2015) mentions credit rating
firms categorize information, promoting a larger, more liquid credit market and lower research
costs. Their function is clearly public and based on research resource efficiency. Promoting a
liquid credit market and good investing practices can be considered as a public role. (Rhee,
2015)

In their paper González et al. (2004) state, because of economies of scale, data collection
and analysis have become easy to do. Moreover, this has benefited creditors and investors in
conducting and monitoring rating opinions. It has made them cost-effective and easy to source.
In addition to making debt markets more accessible for borrowers, this has also helped develop

the financial markets by increasing the number of investors and reducing adverse selection due to
information asymmetries between investors and loan issuers. Apart from the above two primary
reasons, ratings also influence the market by setting up unwritten rules and norms for companies
to follow. Setting up these standards optimizes incentives for agents to perform effectively when
it is difficult to watch or directly control their behavior.

Credit rating importance has grown dramatically over time. Credit ratings, originally
intended to serve as guidance for inexperienced investors, have found various new applications.
Numerous mutual funds and pension funds have restrictions on the amount of money invested in
noninvestment-grade instruments. Debt issuers and investors regularly include ratings expressly
into the covenants of their financial contracts and consult with rating agencies to structure their
financial transactions. (Cantor & Packer, 1995) From the above arguments, we can conclude that
credit ratings play an important role in keeping financial markets efficient, and they also aid
regulators by holding the bond issuers in check.

When talking about credit ratings, we cannot forget to mention "credit risk." Both are
strongly intertwined. The rating process systematically processes information regarding an
enterprise's historical progress and prospects. The enterprise is rated using both qualitative ("soft
facts") and quantitative ("hard facts") criteria. Through financial-economic analysis, hard facts
are derived from the company's financial statements. The attained values of indicators are pooled
based on their relevance and then transferred to the internal rating scale. Then, this number is
utilized to indicate the enterprise's quantitative rating. (Weissova et al., 2015) In chapter 1.2 &
1.3, we are going to talk about credit risk and credit ratings agencies in more detail.

Now since we understand the purposes of credit ratings let's move on to the applications
of credit ratings.

The most common and widely used application of credit ratings is in debt securities.
Credit ratings provided to a single debt issue, such as corporate bonds, municipal bonds,
debentures, notes, or commercial paper, or debt-like assets, such as preferred stock, are more
prevalent than issuer ratings. They are based on an evaluation of the issuer's creditworthiness but
also consider other factors affecting the credit quality of the specific security, such as its terms
and conditions and legal structure, its relative seniority concerning the issuer's other debt
obligations, and the priority of repayment in the event of default, and the presence of external
support or credit enhancements (collateral, letters of credit, guarantees, insurance). As a result,

the credit rating of a debt security may differ from that of its issuer. Individual debt offerings are often graded prior to being made available to investors. Two factors contribute to the requirement of a suitable credit rating for the successful sale of debt securities to international investors, as well as for their domestic placement in specific domestic markets (particularly the United States, where nearly all publicly issued securities are rated): Many investors will not invest in debt that has a credit rating from a major rating agency, raising credit ratings to a market-driven placement condition. Additionally, regulatory regulations typically need a credit rating for securities to be admitted to regulated markets (stock exchanges), qualify for reduced disclosure requirements, or be eligible for investment by regulated institutional investors (banks, insurance companies, pension funds). (Schroeter, 2013)

One more popular application of credit rating is to be used in corporate ratings. Schroeter (2013) explains that a 'borrower rating,' 'corporate rating,' or 'issuer rating' evaluates an obligor's creditworthiness as an organization. It evaluates the borrower's unsecured/secured debts' relative chance of being repaid on schedule. Credit rating agencies often assess financial and nonfinancial aspects such as key performance indicators, economic, regulatory, and geopolitical influence, management and corporate governance traits, and competitive position to generate rating judgments regarding a corporate issuer. During the rating process, the borrowing entity's management often communicates sensitive information to the rating experts, which might affect the credit rating without being disclosed to the market or rivals.

Credit ratings are also utilized in structured finance instruments, including residential mortgage-backed securities (RMBS), asset-backed securities (ABS), and collateralized debt obligations (CDOs). The structuring process is marked by close collaboration between issuers and rating agencies. Issuers depend on rating agencies to certify the quality and to be able to sell to regulated investors. (Josephson and Shapiro, 2020) Credit rating agencies rate structured finance debt securities using a variety of methodologies but generally focus on the type of collateral underlying the security (e.g., mortgages, RMBSs, commercial real estate loans, credit card receivables, and corporate loans) and the issuer trust's proposed capital structure. The rating process begins with gathering information from the sponsor on the collateral pool and planned structure for the trust that will issue the securities. This is distinct from the rating procedure for corporate issuers in that the credit rating agency relies heavily on information contained in public filings or other investor disclosures. In the mid-1970s, credit rating agencies began rating

mortgage-backed securities. They expanded their ratings to include asset-backed securities collateralized by credit card receivables, auto loans, student loans, and equipment leases. They began evaluating cash collateralized debt obligations (CDOs) in the late 1990s and synthetic CDOs in the early 2000s. (OICU- IOSCU, 2008)

Credit ratings are also used in analyzing sovereigns and sovereign debt. Sovereign ratings analyze a sovereign's capacity and willingness to entirely and timely satisfy its financial obligations. Sovereign ratings are an evaluation of a sovereign's creditworthiness as a debtor, not of the nation as a whole, in which the business climate and risks associated with providing cash to a debtor inside that country are measured. Additionally, credit rating organizations provide ratings to particular bonds or financial liabilities issued by sovereigns in domestic or foreign currency. Government bonds are frequently used to represent a sovereign's senior unsecured claims. Thus, ratings at the issuer and issue-level will rarely differ. (Neuss, 2016)

All of the abovementioned financial products intrinsically consist of varieties of risks. Hence, for accurate pricing of these securities, one needs to understand their composite risk factor. Since most investors do not have enough time or technical expertise to quantify the composite risk, the credit rating agency's opinion comes in handy. Now let us move to the next chapter, where we will discuss credit risk.

1.2. Factors affecting credit risk – overview of previous studies

Credit risk is the possibility of losing money due to a borrower not paying the loan partially or entirely. More precisely, it is the risk that a lender's cash flows would be disrupted if a borrower fails to pay principal or interest. Credit risk is believed to be more significant when the borrower lacks sufficient cash flows to repay the creditor or lacks liquid assets to repay the creditor. If the lender perceives a greater danger of nonpayment, he or she is more likely to seek compensation in the form of a higher interest rate. Credit is often offered in a loan or an account receivable. Credit risk can result in the loss of both interest and unpaid principal on an overdue loan, although there is no loss of interest on an outstanding account receivable. In both circumstances, the creditor may suffer additional collection expenses. Additionally, the party owing payment may experience some interruption in its cash flows, which may need the use of expensive debt or equity to cover. (*Credit Risk Definition*, 2022)

Default risk is the possibility that debtors will default and fail to fulfill their debt payment commitments. A default may result in a complete or partial loss of all funds lent to the counterparty. Bank for International Settlements defines *default* as "that any assets past due more than 90 days are classified as in default, i.e. the 90 days only function as a backstop" ("QIS 3 FAQ," 2002). There are several default occurrences, including missed payments, debt restructuring owing to a significant deterioration in the borrower's credit standing, and bankruptcies. Simple delinquencies, or payment delays, do not result in outright defaults, with lenders permanently unable to meet debt commitments. When a borrower cannot meet payment commitments unless its debt structure changes, restructuring is highly near default. Simple defaults suggest that the failure to pay will be permanent. Bankruptcies, company liquidation, or the purchase of a troubled company are all possible results. Defaults are conceptually seen as an "absorbing state," that is, an occurrence in which the likelihood of exiting the default state is zero. In the United States and other countries, bankruptcy legislation is meant to optimize a firm's chance of survival following a default and requires developing a business plan, sometimes in collaboration with other firms, that has a possibility of success. As a result, the default state may be temporary. Rules and conventions determine the default value. The current regulatory standard requires that nonpayment last at least 90 days. This is not an exhaustive list. For

instance, rating agencies or organizations that offer ratings to investors regard default to begin on the first day of an issue's payment obligation being breached. (Joël Bessis, 2010)

Credit risk does not always occur on its own. Market and credit concerns can both be triggered by a risk event. A rise in interest rates, for example, can erode the bond issuer's creditworthiness, increasing the credit risk to an institution holding those bonds. At the same time, the decline in the bond's value increases the institution's market risk. (Monetary Authority of Singapore, 2013) This paper does not focus on the vanilla definition of credit risk, but we take a more holistic view of credit risk. For the purpose of simplification, let us divide the credit risk into internal and external credit risks.

Sinkey and Greenwalt (1991) have suggested that both internal and external variables explain the loan-loss rate (defined as net loan charge offs plus non-performing loans divided by total loans plus net charge offs) of big commercial banks in the United States. According to these authors, internal variables such as high-interest rates, excessive lending, and unpredictable finances have a substantial positive link to loan-loss rates.

Now since we have a little bit of background on the credit risk, we can proceed further with factors affecting credit risk. After reading numerous academic literature, the author of this paper has decided to take the following most common factors affecting credit risk; leverage, liquidity, profitability, macroeconomy, and management.

Leverage arises when a business utilizes borrowed funds to fund investments that grow the firm's asset base and generate returns on risk capital. Leverage is a term that refers to the practice of using debt to fund an investment or business venture. As a result, the project's overall gains are magnified. Simultaneously, leverage raises the danger of failure of the venture. When a firm, property, or investment is described as "highly leveraged," it has a higher debt to equity ratio. (Hayes, 2019)

In their study, Blumberg and Letterie (2008) discovered that leverage is a good measure of the firm's financial risk. Significant debt levels also suggest a high risk of default. Businesses must create more revenue to fulfill their obligations and repay their loans. Yang (2016) investigated 417 bank data from 2008 to 2012 and discovered that leverage ratio regulation predicts bank failure with heterogeneity compared to capital adequacy ratio regulation, which is more effective for big banks.

Liquidity risk occurs when an individual investor, organization, or financial institution cannot meet its short-term borrowing commitments. If a business confronts an abnormally high liquidity risk, it must sell assets, raise revenue, or devise another method to reduce the gap between available cash and loan commitments. (Kenton, 2019)

Diamond and Rajan (2005) found a link between liquidity and credit risks. They explain that if too many economic activities are funded with loans, the bank would be unable to fulfill depositor demand. As a result, if the value of these assets declines, these depositors will be able to get their money back. This means that both liquidity and credit risks are increasing simultaneously.

Profitability and business activity are also considered significant factors influencing credit risk. According to Heyman et al. (2007), poor cash flow, increased costs, and low profitability are the earliest indicators of potential solvency concerns. Additionally, the Altman states that a rise in costs at a constant level of revenue may indicate financial difficulties and a lack of professional competence in making judgments of the management. This component evaluates the management's capacity to deal with competitive conditions. (Altman, 1968)

Berger and DeYoung (1997) emphasize the connections between bank-specific features, efficiency metrics, and problem loans. Berger and Young provided several methods for connecting efficiency and capital adequacy, including "poor luck," "bad management," "skimping," and "moral hazard." They put the hypotheses to the test in a sample of US commercial banks from 1985 to 1994, concluding that declines in assessed cost-efficiency lead to an increase in future problem loans.

Banks do not operate in an isolated environment. Hence, it is necessary to understand the effects of macroeconomic factors on a bank's risk. The link between the gross domestic product and default risk can be positive or negative, although the latter is more widespread and dominating. The term "gross national product" refers to the market value of all products and services generated in a given year (Akhigbe et al., 2007). When the economy is in recession, demand for different mediation activities and investments decreases. As a result, demand for leases and loans will decline. Existing loan defaults will grow. Thus, it is projected that there would be a negative correlation between GDP and default. Also, GDP's cyclical component has a positive leading associated with the credit default cycle. The analysis done by Bonfim (2009) shows that a rise frequently follows periods of rapid economic development in new credit that is

overdue. This finding is especially significant because it supports the theory that there may be a

trend toward excessive risk-taking during periods of economic expansion, which manifests as an

increase in credit overdue only when the economy enters a downturn. In summary, during

periods of rapid economic expansion, imbalances may accumulate. The findings indicate that

these imbalances gradually manifest in new credit overdue. Then, when new credit becomes

delinquent, the pool of non-performing loans gradually increases.

Table 1

Factors affecting credit risk

Leverage ↑	Liquidity ↓	Profitability ↓	Macro factors ↓	Efficiency ↓
(Hayes, 2019)	(Kenton, 2019)	(Altman, 1968)	(Bonfim, 2009)	(Berger and DeYoung, 1997)
(Blumberg and Letterie, 2008)	(Diamond and Rajan, 2005)	(Heyman et al., 2007)	(Akhigbe et al., 2007)	
(Yang, 2016)				

Source: Compiled by author

*Not*e: Upward facing arrow indicates a higher credit risk.

High leverage increases the risk of the financial institution. Therefore, we can say that

higher leverage negatively affects the credit rating. Having inadequate liquidity causes a firm's

risk to increase; consequently, lowering the credit rating. Higher profitability numbers are

negatively related to credit risk. The macro factors used in this analysis include GDP per capita

and macroeconomic stability. Since both reduce the risk, they are negatively correlated to credit

risk. Higher efficiency leads to higher profits; thus, it is inversely related to credit risk.

1.3. Overview of credit rating agencies and their methodology

Credit rating organizations provide public reports on the financial health of businesses, institutions, countries, and financial assets. The rating agencies make use of publicly and privately available data about businesses to determine their long-term creditworthiness. The agencies' conclusions are mostly based on these facts, but they claim to have included additional qualitative information using a methodology that is only partially disclosed. (Caridad et al., 2020)

In 1909, John Moody issued the first publicly available bond ratings (mostly for railroad bonds). Poor's Publishing Company followed Moody's in 1916, Standard Statistics Company in 1922, and Fitch Publishing Company in 1924. In hefty rating manuals, these organizations marketed their credit ratings to bond investors. Their "business model," in the parlance of current corporate strategy, was "investor pays." When the Office of the Comptroller of the Currency prohibited banks from investing in "speculative investment instruments" as defined by "known rating manuals" (i.e., Moody's, Poor's, Standard, and Fitch), the relationship between rating agencies and the US bond markets transformed. "Speculative" securities were bonds that were not "investment grade," forcing banks to invest only in bonds that were highly rated (e.g., BBB or better on the S&P scale) by these four agencies. Insurance authorities and subsequently pension fund regulators followed suit in the following decades, forcing their regulated financial institutions to accept the opinions of a few credit rating companies. (White, 2009)

Fitch is one of the top three credit rating companies in the world. It has offices in New York and London and grades companies based on their debt and their susceptibility to fluctuations in interest rates. When it comes to sovereign debt, governments ask Fitch and other rating firms to assess their financial status as well as their political and economic environments. Fitch's investment grade ratings range from AAA to BBB. These letter ratings imply a minimal to no risk of debt default. Non-investment grade grades range from BB to D, with D indicating a default. (*Fitch Rating Definitions*, 2022)

Moody's gives letter ratings to nations and companies in a somewhat different method. Investment grade debt ranges from Aaa—the highest possible rating—to Baa3, indicating that the debtor is capable of repaying short-term debt. Speculative grade debt, sometimes known as

high-yield or junk debt, is below investment grade. These ratings range from Ba1 to C, with a
lower letter grade indicating a lower possibility of repayment. (Moodys, 2022)

S&P can issue 17 different ratings to business and government debt. Anything having a
rating of AAA to BBB- is called investment grade, which means it can seamlessly repay loans.
Debt with a rating of BB+ to D is deemed speculative and has a grim outlook. The lower the
rating, the greater the risk of default; a D-grade is the worst. (S&P Global, 2022)

Standard & Poor's, Moody's Investor Service, and Fitch Ratings are the big three credit
rating agencies. Moody's and Standard & Poor's each control over 40% of the market. Fitch
Ratings, which is rated third and has a roughly 14% market share. Additionally, the US
Securities and Exchange Commission certified three Nationally Recognized Statistical Rating
Organizations (NRSROs) in 1975. (Sharma, 2015)

Even in Baltic bond market, the securities that have received credit rating, have it from
S&P, Moody's, or Fitch. There is no presence of domestic credit rating agency in Baltic counties.
Although, we should not forget many financial institutions have their own credit rating systems.

All the credit agencies have somewhat similar rating process. Boot et al.(2006) explains,
after the issuer and the credit rating agency have made contact, the rating procedure begins. First,
the issuer attends meetings with the credit rating agency to learn about the procedure. If the
issuer wants to proceed, a contract is signed. Second, credit rating agency analysts examine the
issuer's creditworthiness. The analysts and senior executives of the firm gather to discuss the
company's operations, performance, and market development. For this analysis, the data comes
from the issuer or publicly available sources. Third, the credit rating agency convenes a rating
committee, which reviews the findings and makes recommendations. Fourth, the issuer is
supplied with the credit rating, which it can choose to disclose or keep secret. After this process
ends, the issuer will thereafter be under the credit rating agency's scrutiny. This implies the credit
rating agency can adjust the rating based on changes in the issuer or market. This means the
credit ratings are flexible and will be adjusted for any positive or negative event.

Considering this paper is primarily focused on the credit ratings of financial institutions.
We will concentrate on the credit rating methodologies used by prominent credit rating agencies
for the financial institutions.

S&P global has disclosed their methodologies for different sectors on a general level, but
methodology disclosures of Moody's and Fitch are not publicly available. The documents that

are disclosed are still behind the paywall. Hence, the author of this paper was not able to access it. S&P has disclosed some documents so, we are going to talk about the S&P methodology briefly.

It starts with Banking Industry Country Risk Assessment (BICRA). This assessment includes the whole financial system of the country, taking into consideration the effect of institutions other than banks. It also examines the operating conditions of rated and unrated entities. The BICRA criteria are divided into two categories: economic risk and industrial risk. The study is then subdivided into six categories (each representing many subfactors) that result in a risk score for each country's economy and sector. (*S&P Global Ratings FI*, 2021)

Once an anchor is formed on the bases on BICRA S&P employs financial institution-related factors to determine a stand-alone credit profile (SACP). Business position, capital and earnings, risk position, funding and liquidity, and a prospective similar ratings analysis adjustment are all factors unique to the FI, and they are utilized to calculate the SACP. The long-term ICR is then determined by taking into account the possibility of extraordinary external support (such as from a parent, a sovereign government, or investors in enhanced loss-absorbing capacity instruments). S&P mentions that the criteria for evaluating the creditworthiness of financial institutions are both forward-looking and based on previous experience. Financial measurements, as well as qualitative data and expectations, are used in their study. (*S&P Global Ratings FI*, 2021)

Since the bulk of methodology is not publicly disclosed, a comparison of methodology is difficult. Although, many researchers have tried to find quantifiable differences between their ratings. Ghosh (2013) in their analysis found, comparison to S&P, Moody's showed a constant tilt toward lower ratings. This tendency is magnified in a few industry areas, such as Consumer Goods and Industrials. This effect was further confirmed by Caridad et al. (2020), who found Moody's ratings are often lower than S&P's in numerous sectors. Still, they are nearly the same for consumers and energy companies. In a recent study by Jiang (2021), the author found out Fitch's ratings were more favorable than those of Moody's and Standard & Poor's. The discrepancy was primarily caused by companies' endogenous shopping for ratings.

2. Derivation of credit ratings for listed corporate bonds of Baltic financial institutions

2.1. Description of data and methodology

All the Baltic markets are interlinked with one Nasdaq Baltic market. It consolidates three stock exchanges – Estonia, Latvia, and Lithuania – and the Nasdaq CSD under one roof in the Baltics, providing capital market infrastructure across the entire value chain – from listing, trading, and market data to clearing and settlement, as well as securities safekeeping. (Nasdaq Baltic, 2022) The author of this paper will use his own methodology to assign credit ratings to the respective issuers. The data of bonds will be taken from NASDAQ Baltic corporate bond page.

As mentioned in the aim of this paper, the author will take bonds of the financial services companies for the analysis. As of 31st January 2022, there are 36 issues listed on Nasdaq Baltic. Out of them, 24 are unique issues, and 10 are financial services companies. (see appendix A). The author of this paper will gather the latest annual reports, quarterly filings, analyst forecasts, and economic outlooks from central banks and then analyze all the collected data to assign rating issuer. The analysis will be done on following three bonds: LHV Group 10Y 6.00%, Citadele banka 5% 5Y, and Siauliu bankas 1.047%.

Table 2

Bonds of financial institutions listed on NASDAQ Baltic

Name	Region	Sector	Issuer	Rating
Admirals Group 8.00% subord.bond	Estonia	Financial services	No rating issued	-
Inbank 5.5% subord. bond	Estonia	Financial services	No rating issued	-
IuteCredit Finance 5Y bond	Estonia	Financial services	No rating issued	-
Coop Pank 5% bond	Estonia	Financial services	No rating issued	
LHV Group 10Y 6.00% sub. bond	Estonia	Financial services	Moody's	Baa1
AgroCredit Latvia 7% bond	Latvia	Financial services	No rating issued	-
Altum 0.443% 5Y bond	Latvia	Financial Services	Moody's	Baa1
Citadele banka 5% 10Y bond	Latvia	Financial services	Moody's	Baa3
mogo 3Y 11% bond	Latvia	Financial services	No rating issued	-
Medicinos bankas 7% 7Y subord.b.	Lithuania	Financial services	No rating issued	-
Siauliu bankas 1.047% bond	Lithuania	Financial services	Moody's	Baa2

Source: Compiled by author

The credit rating model consists of three parts, i.e., country risk factor, financial, and non-financial factors. Subsequently, these three factors are divided into multiple sub-factors.

The country risk factor includes factors such as Macroeconomic stability, Political risk Geo-political risk, Private sector debt of the country, and Banking regulation & supervision.

While variations across banks account for the majority of the variation in credit risk and profitability, macroeconomic conditions are shown to have a significant impact on each bank's risk and profitability. The share of interest payments in corporate and family income, as well as actual credit growth and property values, are all highly connected with bank risk and profitability. (Gizycki et al., 2001) Faster real interest rates and, to a lesser extent, higher increase in real per capita GDP are related with stronger bank profitability, according to (Demirgüç-Kunt & Huizinga, 1999) in their cross-country analysis of bank profitability. Hence, the author has taken GDP per capita and Economic outlook as proxies for macroeconomic stability.

Conflicts and political unrest have been linked to a higher likelihood of a systemic financial catastrophe. Conflicts may lead to financial crises in a variety of ways. Lower economic growth, increased non-performing bank loans, decreased bank deposits and liquidity, and fiscal channels are among them. Conflicts, according to Rother et al. (2016), affected the financial sector's performance and harmed banks' capacity to maintain financial intermediation and payment systems. Political instability reduces bank balances, obligations, and assets, according to Huang (2019). Beim (2005) listed a number of instances of systemic banking crises that happened during periods of conflict and political unrest. For abovementioned reasons, the author has taken Political and Geo-political risk factors into consideration. Quantification of these two factors will be done author after reading expert reviews and economic outlooks by major research institutions.

Randveer and Uusküla (2011) emphasizes that both theoretical and empirical evidence predicts that nations with high debt levels and/or credit booms previous to the recession will experience more severe recessions. Several empirical studies also imply that excessive debt and debt increase prior to recessions are associated with a more severe crisis. They also discovered that excessive credit growth is linked to longer and deeper recessions. Hence, the author has taken private sector debt per capita as proxy for private sector debt of the country.

Financial system stability plays a vital role in a country's economy because it is a condition in which the economic mechanism in determining prices, allocating funds and managing risk functions well, and supports economic growth. If the financial system is unstable and does not function efficiently, the allocation of funds will not work well, which can hamper economic growth in the country. (Asian Development Bank Institute et al., 2015) Hence, author has taken banking regulation and supervision factor in this methodology. Because prudent banking regulation will lead to greater financial stability.

Financial factors are divided into four different assessment criteria, i.e., Business activity assessment, Earnings assessment, Credit risk assessment, Funding assessment.

Figure 1

Credit rating model
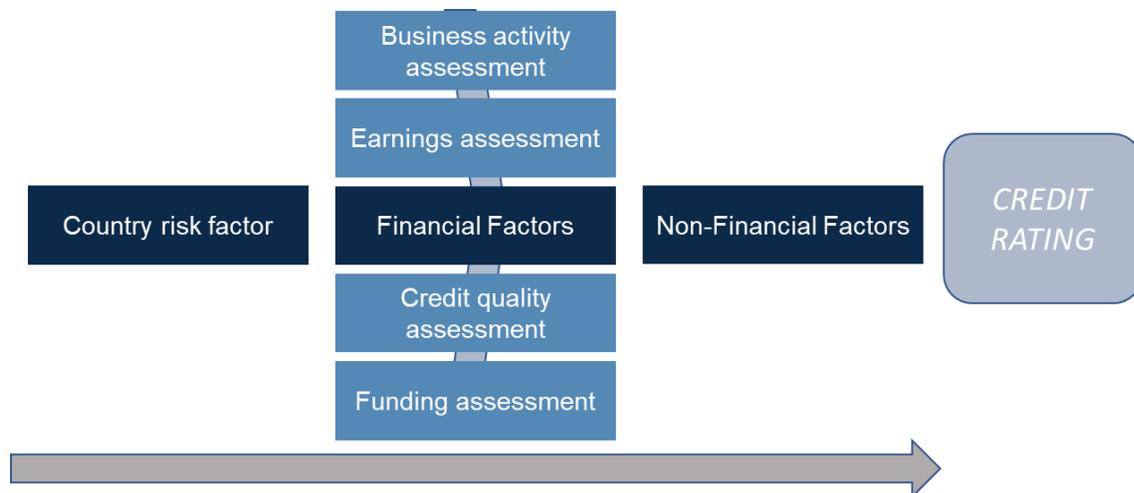
Source: Compiled by author

In the first subfactor of business activity we are going to understand how and FI deals with managing it business. Employee efficiency is defined as the fulfillment of employees' responsibilities in such a way that the firm is free of all liabilities. It is a measure of a company's employees' ability to convert inputs into usable outputs in a set amount of time (Davidson & Maguire 2003). It might be claimed that when people are inefficient in the workplace, productivity suffers, resulting in lower turnover and returns. As a result, in order to improve

performance, such hazards that can limit employees' efficiency and production must be minimized. (Orshi, 2018)

The relationship between loan growth and bank profitability has been investigated in recent research papers (See; Rossi et al., 2019, Dang, 2019, Negara & Sujana, 2014, Gul et al.,2011 and Antoni & Nasri, 2015) and they have concluded that there is empirical evidence showing positive relationship between credit and return on investment (ROI).

For business activity sub-factor, the author of this paper will take indicators such as Loans growth rate, Market share, Employee efficiency, Customer retention & growth.

In the next subfactor we are going to analyze financial institutions' earnings quality. Returns on asset (ROA) and return on equity (ROE) are the most commonly used performance indicators for banks (ROE). Felix and Claudine (2008) discovered a negative link between bank performance (measured by ROA and ROE) and credit risk (measured by non-performing loan). A rise in non-performing loans, for example, will result in a drop in the bank's profitability. A higher return on assets is a healthy indicator of profitability so banks strive to attain it. "As a general view, particularly in banking sector, ROA is known as good profitability multiplier for the reason that equity multiplier does not influence it" (Grier, 2007).

Return on Equity is a ratio which measures net income over shareholder's equity. "The net income comprised of all types of earnings like preferred stock income, surpluses, undivided profits and capital reserves. The difference between net assets and liabilities is termed as shareholder's equity on the other hand. The most common measure to determine the effectiveness of banks of generating revenue based on every element of shareholder's equity." (Saeed & Zahid, 2016)

For the earnings sub-factor, the author of this paper will take indicators such Cost-to-Income ratio, Return on equity, Return on assets, Net interest income growth, Net commission income growth, and All other income growth.

In our next sub-factor, we are going to focus on the credit quality assessment of a financial institution. In banks, credit quality has an impact on credit decisions. That is, the higher the quality of credit issued or available for distribution, the lower the danger of credit issues (Kasmir, 2014). It is widely known that the amount or proportion of non-performing loans (NPLs) is frequently linked to bank collapses and financial crises (Khemraj & Pasha, 2009). A Non-Performing Loan (NPL) ratio is used to assess credit quality. Non-performing loans are

those that have flaws or fail to fulfill the bank's quality criteria. Non-performing loans result in bank losses, i.e., losses resulting from the non-receipt of funds channeled, as well as interest revenue that is not received. That is, the bank foregoes the potential to earn interest, resulting in a reduction in total income. (Ismail, 2010).

For the credit quality sub-factor, the author of this paper will take indicators as Forbearance growth, Stage 3 loans % of gross loans, and Net loss or credit impairments.

Li (2020) mentions the commercial banks are supervised and managed jointly through leverage ratio and capital adequacy ratio oversight. Leverage ratio regulation, in theory, can limit commercial banks' credit expansion while also improving bank stability. However, it is also possible to enhance commercial banks' risk preferences and the share of high-risk assets. It has the potential to cause problems with adverse selection and enhance the credit risk of commercial banks. Song, Q., and Zheng, Z. L (2011) examined the four primary regulatory tools and discovered that implementing the leverage ratio, capital adequacy ratio, liquidity ratio, and loan provision ratio is beneficial to minimizing the likelihood of bank bankruptcy and increasing bank operating performance.

For the funding assessment sub-factor, the author of this paper will take indicators as Common equity tier 1 (CET1), Liquidity coverage ratio (LCR), Tangible common equity, Loss handling capacity, Net debt / EBITDA, Debt service coverage ratio, and Debt Schedule.

Non-Financial Factors include Management and Governance, AML, Diversification, Extraordinary government support, and Accounting and auditing standards.

Permatasari (2020) emphasis that the financial institution's corporate governance policies will become more important as the risks they confront become more complicated. Good corporate governance is essential to improve the bank's efficiency, strengthen compliance, and defend stakeholders' interests with rules and ethical standards related to the banking business. In regard to corporate governance, banks should have a system of rules, procedures, and regulations to ensure that agency costs, or costs of minimizing the agency problem and, consequently, moral hazard, are as low as possible, as a way to maintain and increase shareholder value. If proper corporate governance systems are in place, they help to reduce the risk of future crises.

The ability of banks to diversify their portfolios can be also linked to the quality of their loans. Diversification reduces credit risk, hence Louzis et al. (2012) postulated that there is a negative relationship between diversification and NPLs. Some academics consider the size of the

bank as a proxy for diversification options. Salas and Saurina (2002) discover a negative
relationship between bank size and NPLs in this line of study, arguing that a larger bank offers
for greater diversification options.

Money laundering is one of the most significant risks in banking institutions. Banking
companies are paying significant fines for failing to adequately assess money laundering risk,
such as London-based HSBC Bank, which was fined over USD$2 billion by the US regulator for
failing to prevent Mexican drug traffickers from exploiting its banking system to launder money.
(Mclaughlin & Pavelka, 2013). Lapses in anti-money-laundering and financial-crimes controls
are more likely to affect a banks' credit rating than almost any other nonfinancial factor,
according to Fitch Group Inc (Broughton, 2019).

Tan (2018) explains that accounting policies are established to guarantee that financial
statements provide relevant and truthful information. The financial statements include
information for a variety of users, including shareholders, bondholders, creditors, customers,
underwriters, and other interested parties. Financial statement users require an explanation of
accounting procedures chosen as part of the information required to make an evaluation and
investment choice. They cannot make a reliable judgement if the financial statements do not
clearly indicate accounting policies used in the preparation of the financial statements. The use
of conservative accounting policies indicates higher-quality financial reporting.

Florou et al. (2016) discovered that IFRS financial statements capture accounting
information better than domestic financial statements. In baseline tests, they discovered that the
explanatory power of the credit rating model increases by a modest 2.5 percentage points in the
post-IFRS adoption period.

In S&P's credit ratings methodology for financial institutions they enable ratings
upliftment based on the expectation of this extraordinary government. If governments believe
them to be systemically significant financial institutions, and regulators have publicly said that
they are, then they are. Then, depending on their systemic importance, we assess sovereigns'
capacity and willingness to help failing banks during a crisis, categorizing them into three
groups: extremely supportive, supportive, and unsure.

Table 2

Ratings scale for corporate bonds

No.	Fitch	S&P	Moody's	Author's Score	Information
1	AAA	AAA	Aaa	100	Extraordinary
2	AA+	AA+	Aa1	99	Very good
3	AA	AA	Aa2	95	Good
4	AA-	AA-	Aa3	90	Pretty good
5	A+	A+	A1	85	Moderate
6	A	A	A2	80	Medium Enough
7	A-	A-	A3	75	Very average
8	BBB+	BBB+	Baa1	70	Ordinary
9	BBB	BBB	Baa2	60	Common
10	BBB-	BBB-	Baa3	50	Very common

Source: Compiled by author

The derived methodology analyses financial institutions' on a surface level, and no firm-specific systems are developed to accurately analyze a firm's credit risk. Also, analysis done by credit rating agencies includes information that is not publicly disclosed; hence, they have a better understanding of the company.

2.2. Analysis and results

We will first analyze the corporate bond of LHV Group. It is listed on the Nasdaq Tallinn market and started trading on October 2015.

We start with the analysis of country risk factors. For the "Macroeconomic stability" indicator, the author of this paper will provide guidance issued by (OECD, 2021). OECD expects GDP growth in Estonia to be 4.5% in 2022 before slowing to 3.8% in 2023. As per (Eurostat, 2022), real GDP per capita 2021 was EUR 16,260, which is still below the EU 27 average of EUR 27,810. After taking the above data into account, the author of this paper decided to give the "Macroeconomic stability" indicator a score of 12 out of 15. For the Political risk indicator, we will use (Coface, 2022) assessment of Estonia. It gives Estonia an A2 rating (second highest) for its country risk assessment and an A1 rating (highest) for its business climate indicator. Hence, based on the above data, the author of this paper has decided to give Estonia 20 out of 20 for "Political risk" indicator. For "Geopolitical risk" indicator, the author of this paper has determined to give Estonia 15 of 20 points. The geopolitical risk indicator was primarily influenced by the Russian invasion of Ukraine and Estonia's proximity to Russia (Pommereau, 2022). For the "Private sector debt of the country" indicator, the author of this paper will use (Eurostat, 2022b) data on consolidated private sector debt percent of GDP. As per Eurostat, Estonia has a private-sector debt of 104.40 % of GDP, well below the recommended level of 133% (LEHMANN, 2016). For the above reasons, the author of this paper has chosen to give 18 out of 20 points to the country indicator's private sector debt. Estonia follows the EU's banking regulation and supervision(*Estonian Financial Supervision and Resolution Authority | FSA*, n.d.). Hence, the author of this paper has determined to give 20 out of 20 points to "Banking regulation and supervision" indicator.

Proceeding to Financial factors. All of the data has been taken from the annual reports of the LHV group. This analysis contains data from the years 2019, 2020, and 2021. The primary aim is to look at changes during the last two years and take them as a proxy for current and future concerns.

Net loan portfolio growth for LHV bank in 2021 was 21%. It shows that the bank had moderate growth in the loan portfolio. Hence, the author of this paper has selected to give a 4 out of 5 scores to the "Loans growth rate" indicator. LHV bank has a 14.17% market share in

Estonia, and it is the fourth largest bank in Estonia (*AS LHV Pank (Estonia) - Market Share*,
2022). Because of its significant position in Estonia, the author of this paper has chosen to give a
3 out of 5 score for "Market share" indicator. The employee efficiency indicator for LHV bank is
92,171, which is more than three times the European average. Hence, the author of this paper
chose to give 5 out of 5 for the "Employee efficiency" indicator. In 2021, LHV bank showed
21% growth in the total customer base, which shows a solid capacity to attract new customers.
For this reason, the author decided to give 5 out of 5 points to the "Customer retention and
growth" indicator.

Cost to income ratio for LHV bank in 2021 was 46.4%, which is well below the
European average (Bank, 2021). Hence, the author has given a 3 out of 5 score for the "cost-to-
income ratio" indicator. Return on equity of LHV bank in 2022 was 21.1% and 17.3% in 2019.
This shows considerable progress in enhancing the ROI, and the bank's ROI is well above the
European average (Bank, 2021). The author of this paper has selected to give 8 out of 10 points
to "Return on equity" indicator. Return on assets of LHV bank in 2022 was 1.0 and 1.0 in 2019.
ROA is slightly above the European average. Hence, The author of this paper decided to give 4
out of 5 points to the "Return on assets" indicator. Net interest income growth figures of LHV
bank in 2021 and 2020 were 42% and 44.8%, respectively. The author decided to give 8 out of
10 points to the "Net interest income growth" indicator for these very high growth figures. Net
commission income growth figures of LHV bank in 2021 and 2020 were 27.9% and 29.5%,
respectively. Hence, The author decided to give 4 out of 5 points to the "Net commission income
growth" indicator. All other income growth for LHV bank, including trading income, was
negative (0.90) in 2021, and even in 2021, growth was merely 1.6%. Accordingly, the author
gave 0 out of 5 points for the "All other income growth" indicator.

Forbearance growth consists of growth in Stage 2 loans. For the LHV group, it
was 14.9% in 2021. Hence, the author selected to give 3 out of 5 points to "Forbearance growth"
indicator. Stage 3 loans indicator, which is calculated as Stage 3 loans % of gross loans for LHV
bank in 2021, For the LHV, was 0.005, which is relatively insignificant compared to the
European average (3.25%) (Bank, 2021). Therefore, the author gave 10 out of 10 points for the
"Stage 3 loans % of gross loans" indicator. LHV Bank in 2021 had losses totaling €0.8 Million.
Because of this reason, the author chose to give 5 out of 5 points to the "Net loss or credit
impairments" indicator.

The common equity tier 1 (CET1) of LHV bank was 13.32% in 2021, which is above the mandated regulatory requirement but still below the European average (Bank, 2021). Because of this reason, the author chose to give 7 out of 10 points to the "Common equity tier 1 (CET1)" indicator. The liquidity coverage ratio (LCR) of LHV bank was 142.7% in 2021, which is above the mandated regulatory requirement, but still below the European average (Bank, 2021). Because of this reasoning, the author gave 5 out of 10 points to the "Liquidity coverage ratio (LCR)" indicator.

Now to Non-Financial Factors. This section of the analysis is more subjective than the previous ones. For Management and governance indictor, the author has read the annual and quarterly reports of LHV bank and has decided to give a score of 20 out of 20. For the anti-money laundering indicator, the author checked previous AML records of LHV bank and decided to give a score of 19 out of 20 for the "AML" indicator. For the "Diversification" indicator, the author of this paper has chosen to give 15 out of 20 points. For the extraordinary government support indicator, the author could not find any information indicating any official/unofficial support from the Estonian government. Hence, the score of 0 out of 20. The author found that LHV bank follows IFRS reporting standards for accounting and auditing. For this reason, the author gave 20 out of 20 points to the "Accounting and auditing standards" indicator.

The composite score for LHV bank is **77.1**, which puts the bonds on the level with **Moody's A- rating**.

Table 3

LHV Group

Macroeconomic stability	12	Management and governance	20
Political risk	20	AML	19
Geo-political risk	15	Diversification	18
Private sector debt of the country	18	Extraordinary government support	0
Banking regulation and supervision	20	Accounting and auditing standards	20
Preliminary Anchor score	**85**	**Non-Financial score**	**77**
Business activity assessment	16		
Earnings assessment	27	*Composite Score*	*77.1*
Credit quality assessment	19		
Funding assessment	12		
Financial score	**74**		

Source: author's calculation

Now let us analyze the corporate bond of Šiaulių bankas. It is listed on the Nasdaq Vilnius market and started trading on 27th September 2021.

We start with the analysis of country risk factors. For the "Macroeconomic stability" indicator, the author will use guidance issued by OECD (2021b). The OECD expects GDP growth in Lithuania to be 3.7% in 2022 and identical in 2023. As per Eurostat (2022), real GDP per capita in 2021 was EUR 14,690, which is below the EU 27 average of EUR 27,810. After taking the above data into account, the author decided to give the "Macroeconomic stability" indicator 11 out of 15. For the Political risk indicator, we will use (Coface, 2022b) assessment of Lithuania. It gives Lithuania an A3 rating (third highest) for its country risk assessment and an A1 rating (highest) for its business climate indicator. Hence, based on the above data, the author decided to give Lithuania 18 out of 20 for the "Political risk" indicator. For the "Geopolitical risk" indicator, the author gave Lithuania 15 of 20 points. The geopolitical risk indictor was primarily influenced by the Russian invasion of Ukraine and (Sytas, 2022) Lithuania's proximity to Russia (Sytas 2022). For the "Private sector debt of the country" indicator, the author will use (Eurostat, 2022b) data on consolidated private sector debt percent of GDP. As per Eurostat, Lithuania has a private-sector debt of 54.70 % of GDP, well below the recommended level of 133% (LEHMANN, 2016). For the above reasons, the author determined to give 20 out of 20 points to the country indicator's private sector debt. Lithuania also follows the EU's banking regulation and supervision (Financial and Capital Market Commission, n.d.). Hence, the author gave 20 out of 20 points for the "Banking regulation and supervision" indicator.   Now let's move on to Financial factors. All of the data has been taken from annual reports of Šiaulių bankas. This analysis contains date from year 2019, 2020 and 2021. The primary aim is to look changes that occurred during last two years and take them as a proxy as current and future situation.

Net loan portfolio growth for Šiaulių bankas in 2021 was 18%. This shows that the bank has moderate growth in its loan portfolio. For the "Loans growth rate" indicator author decided to give a score of 4 out of 5. Šiaulių bankas has an 11.7% market share in Estonia, and it is the third-largest bank in Lithuania (*AB Šiaulių Bankas (Lithuania) - Market Share*, 2022). Because of its significant position in Lithuania, the author gave a 3 out of 5 score for the "Market share"

indicator. The employee efficiency indicator for Šiaulių bankas is 69,991, more than two times the European average. Hence, the author selected to give four out of 5 for the "Employee efficiency" indicator. In 2021, Šiaulių bankas showed a 7% growth in total customer base, which offers a moderate capacity to attract new customers. Accordingly, the author gave 4 out of 5 points to the "Customer retention and growth" indicator.

Cost to income ratio for Šiaulių bankas in 2021 was 44.1, which is well below the European average (Bank, 2021). Hence, the author has given a 3 out of 5 score for the "cost-to-income ratio" indicator. Return on equity of Šiaulių bankas in 2022 was 14.3 and 12.7 in 2019. This shows that the bank has made considerable progress in improving its ROI, which is well above the European average (Bank, 2021). The author decided to give 6 out of 10 points to the "Return on equity" indicator. Return on assets of Šiaulių bankas in 2022 was 1.6 and 1.5 in 2019. ROA is above the European average. Hence, The author gave 4 out of 5 points for the "Return on assets" indicator. Net interest income growth figures of Šiaulių bankas in 2021 and 2020 were 6.8% and 4.3%, respectively. Therefore, The author determined to give 4 out of 10 points to the "Net interest income growth" indicator. Net commission income growth figures of Šiaulių bankas in 2021 and 2020 were 6.9% (4.1%), respectively. Accordingly, the author gave 2 out of 5 points to the "Net commission income growth" indicator. All other income growth for Šiaulių bankas, including trading income, was 2.29 % in 2021, and in 2020 it was negative (22.8%). Hence, the author selected to give 2 out of 5 points to the "All other income growth" indicator.

Forbearance growth, consisting of growth in Stage 2 loans, was (16%) in 2021 for Šiaulių bankas. Therefore, the author decided to give 5 out of 5 points to the "Forbearance growth" indicator. Stage 3 loans indicator, which is calculated as Stage 3 loans % of gross loans for Šiaulių bankas in 2021 was 1.83% which is low compared to the European average (3.25%) (Bank, 2021). Thus, the author gave 8 out of 10 points for the "Stage 3 loans % of gross loans" indicator. Šiaulių bankas in 2021 had losses totaling 9.1 Million. Because of this reason, the author gave 3 out of 5 points to the "Net loss or credit impairments" indicator.

The common equity tier 1 (CET1) requirement does not apply to Šiaulių bankas. Consequently, the author gave 10 out of 10 points to the "Common equity tier 1 (CET1)" indicator. The liquidity coverage ratio (LCR) of Šiaulių bankas was 242% in 2021, which is above the mandated regulatory requirement and above the European average (Bank, 2021). Therefore, the author gave 9 out of 10 points to the "Liquidity coverage ratio (LCR)" indicator.

Now to Non-Financial Factors. This section of the analysis is more subjective than the previous ones. For management and governance indictor, the author has read the annual and quarterly reports of Šiaulių bankas and has decided to give a score of 10 out of 20. For the anti-money laundering indicator, the author has checked previous AML records of Šiaulių bankas and has determined to give a score of 19 out of 20 for the "AML" indicator. For the "Diversification" indicator, the author gave 10 out of 20 points. For the extraordinary government support indicator, the author could not find any information that indicated that there is official/unofficial support from the Lithuanian government. Hence, the score of this indicator is 0 out of 20. Šiaulių bankas follow IFRS reporting standards for accounting and auditing standards, and because of this, the author gave a score of 20 out of 20.

The composite score for Šiaulių bankas is **76.5**, which puts the bonds on the level with **Moody's A- rating**.

Table 3

Šiaulių bankas

Macroeconomic stability	12	Management and governance	20
Political risk	20	AML	19
Geo-political risk	15	Diversification	18
Private sector debt of the country	18	Extraordinary government support	0
Banking regulation and supervision	20	Accounting and auditing standards	20
Preliminary Anchor score	**85**	**Non-Financial score**	**77**
Business activity assessment	16		
Earnings assessment	27	***Composite Score***	***77.1***
Credit quality assessment	19		
Funding assessment	12		
Financial score	**74**		

Source: author's calculation

The exact process was carried out for the corporate bond of Citadele Group. The composite score for Citadele Group is **70.3**, placing the bonds on the level with **Moody's BBB+ rating**.

2.3. Discussion of results

All three Baltic states have a similar business environment and a stable political environment. However, business services in Estonia are much more tech-focused than its other Baltic counterparts. Estonian economy has also seen much higher growth than its Baltic counterparts.

The LHV group had the most comprehensive management report. Its sustainability report was also very informative and consisted detailed overview of its carbon footprint. LHV group has been reporting solid growth figures in interest income, customer growth, and fee income. LHV group also puts a lot of emphasis on their IT services, and their results are visible in their services. LHV group has also shown considerable growth in pension management services. The net losses for last year are also very low, showing the bank has sound credit risk modeling systems. The funding ratios for the LHV group are a bit lower than average. Still, since the bank is very profitable and has an outstanding loan portfolio, it can afford to trim some excess liquidity. LHV group, in the last three years, has not faced any AML-related issues, and the current AML systems are working very well. LHV group is also diversifying its revenue by expanding its banking services in United Kingdom.

Šiaulių Bankas is not a conventional retail bank and is more focused on the lending business. The management report of Šiaulių Bankas is inadequate, and it seems management lacks a long-term perspective. ESG disclosure lacks detailed information, and the author believes the report should have been organized in a better format. Loans growth was splendid in 2021, but we see a mild increase in customer growth. Maybe to achieve customer growth Šiaulių Bankas should expand to other Baltic states. Low growth in net interest income points out the competitive pressure that the bank is facing. The bank should take constructive steps to improve its market share. Šiaulių Bankas has given a detailed disclosure of its loan portfolio and who are their clients. Šiaulių Bankas has a good loan portfolio, and its credit quality is much more promising than the average European bank. Šiaulių Bankas has enough liquidity, and its liquidity reserves are well above the European averages. Šiaulių Bankas hasn't faced any AML-related issues in the last three years. Šiaulių Bankas diversification initiatives look a bit sub-par. The bank should make significant steps to diversify its revenue.

Citadele Group's management report seemed adequate, and enough forward-looking information was disclosed. Although, the report contains zero information regarding its ESG disclosure. Citadele group does have a sustainability report, but not much information is disclosed in that report. Citadele group saw a whopping 75% rise in loan growth in 2021. Its market share is also considerable in Latvia. Although, the Citadele group has a lower employee efficiency ratio than its other Baltic counterparts. This issue is also represented in the group's cost to income ratio, which is considerably higher than its Baltic counterparts. ROI and growth in interest income have also been very unstable in the last three years. Instability in profitability measures increases the firm's risk, consequently lowering the credit rating. The group's credit quality is satisfactory and on par with the average European bank. The funding measures of Citadele Bank are excellent and well above the European averages. Citadele group did have some AML issues, and the regulator fined the bank in 2019. The group is present in all Baltic states hence diversifying its revenues better than its Latvian counterparts.

Conclusion

Giving credit ratings to companies is not a new concept, and credit modeling is a significant part of any graduate finance course. However, not many researchers have tried rating corporate bonds in Baltics. The limited scientific literature that attempts to rate bonds primarily concentrates on North American firms. As mentioned in the literature part, considering the size of Baltic economies, high debt capital market activity is not anticipated. However, methods from this research paper can also be used in other smaller eastern European states such as Slovakia, Slovenia, and Bulgaria.

The author's analysis results were very similar to the credit ratings issued by Moody. The analyzed financial institutions have a straightforward organizational structure and limited geographical exposure. However, it would be interesting to analyze the remaining bonds listed on NASDAQ Baltic and see if the author's credit rating methodology holds up. The author discovered that, the one of the critical metrics in credit rating for financial institutions is net income growth and net fee growth. Additionally, having excess liquidity does not always equal to better credit rating. So, just increasing liquidity will not reduce company's risk.

The analyzed three financial institutions do not exercise aggressive lending. The banking environment in the Baltics also seems to be conservative in risk-taking. The author could not find any compliance issues for the three companies. Although, we should not ignore that some banks in the Baltics are under heavy scrutiny because of their dodgy compliance practices.

The author also found that the Baltic financial institutions seem to be performing better than the average European bank. In almost all the profitability measures, they are better than their European counterparts.

In short, the assumptions made in the theoretical overview were correct, and the author has successfully carried out the process of giving ratings to the chosen companies.

Credit risk factors include numerous variables, and no study can ever incorporate them all. As seen in 2020, a pandemic factor was on no one's credit model. However, any helpful information does help investors in making rational decisions, confirming the theory of efficient market hypothesis. Since most of the methodology of the big three credit rating firms is undisclosed, it is good to come up with an analysis that may be closer to their methodology.

Additional scrutiny and competition will improve credit rating agencies and aid every investor participating in capital markets.

The future recommendations for this topic would be, exploring credit rating approaches for non-financial companies in the Baltics. More importantly, using this methodology in other Eastern European countries where there is also a lack of widespread use of credit ratings.

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APPENDICES

APPENDIX A

LHV Group

	Country risk factor	Max Score	Financial Factors	Max Score
1	Country risk factor	Max Score	Financial Factors	Max Scor
2				
3	*Economic resilience of the home market and Industry risk*		*Business activity assessment*	
4	Macroeconomic stability	12	Loans growth rate	4
5	Political risk	20	Market share	3
			Employee efficiency (revenue per employee/	
6	Geo-political risk	15	cost per employee)	5
7	Private sector debt of the country	18	Customer retention and growth	4
8	Banking regulation and supervision	20		16
9			*Earnings assessment*	
10			Cost-to-Income ratio	3
11	**Preliminary Anchor score**	85	Return on equity	8
12	Weight	20%	Return on assets	4
13			Net interest income growth	8
14			Net commission income growth	4
15			All other income growth	0
16				27
17				
18			*Credit quality assessment*	
19			Forbearance growth	4
20			Stage 3 loans % of gross loans	10
21			Net loss or credit impairments	5
22				19
23				
24			*Funding assessment*	
25			Common equity tier 1 (CET1)	7
26			Liquidity coverage ratio (LCR)	5
27				12
28				
29			**Financial score**	74
30			Weight	50%
31				
32				

Non-Financial Factors	Max Score
Manegment and governance	20
AML	19
Diversification	18
Extraordinary government support	0
Accounting and auditing standards	20
Non-Financial score	77
Weight	30%

| **Composite Score** | 77.1 |

APPENDIX B

Šiaulių bankas

	Country risk factor	Max Score	Financial Factors	Max Score
1	Country risk factor	Max Score	Financial Factors	Max Score
2				
3	*Economic resilience of the home market and Industry risk*		*Business activity assessment*	
4	Macroeconomic stability	11	Loans growth rate	4
5	Political risk	18	Market share	3
6	Geo-political risk	15	Employee efficiency (revenue per employee/ cost per employee)	4
7	Private sector debt of the country	20	Customer retention and growth	4
8	Banking regulation and supervision	20		15
9			*Earnings assessment*	
10			Cost-to-Income ratio	3
11	**Preliminary Anchor score**	84	Return on equity	6
12	Weight	20%	Return on assets	8
13			Net interest income growth	4
14			Net commission income growth	2
15			All other income growth	2
16				25
17				
18			*Credit quality assessment*	
19			Forbearance growth	5
20			Stage 3 loans % of gross loans	8
21			Net loss or credit impairments	3
22				16
23				
24			*Funding assessment*	
25			Common equity tier 1 (CET1)	10
26			Liquidity coverage ratio (LCR)	9
27				19
28				
29			**Financial score**	75
30			Weight	50%
31				
32				

Non-Financial Factors	Max Score
Manegment and governance	20
AML	19
Diversification	15
Extraordinary government support	0
Accounting and auditing standards	20
Non-Financial score	74
Weight	30%

Composite Score	76.5

APPENDIX C

Citadele Bank

	Country risk factor	Max Score	Financial Factors	Max Score
1	Country risk factor	Max Score	Financial Factors	Max Score
2				
3	*Economic resilience of the home market and Industry risk*		*Business activity assessment*	
4	Macroeconomic stability	11	Loans growth rate	4
5	Political risk	20	Market share	4
6	Geo-political risk	15	Employee efficiency (revenue per employee/ cost per employee)	4
7	Private sector debt of the country	18	Customer retention and growth	4
8	Banking regulation and supervision	20		16
9			*Earnings assessment*	
10			Cost-to-Income ratio	3
11	**Preliminary Anchor score**	84	Return on equity	5
12	Weight	20%	Return on assets	4
13			Net interest income growth	7
14			Net commission income growth	3
15			All other income growth	3
16				25
17				
18			*Credit quality assessment*	
19			Forbearance growth	3
20			Stage 3 loans % of gross loans	7
21			Net loss or credit impairments	4
22				14
23				
24			*Funding assessment*	
25			Common equity tier 1 (CET1)	10
26			Liquidity coverage ratio (LCR)	9
27				19
28				
29			**Financial score**	74
30			Weight	50%
31				
32				

Non-Financial Factors	Max Score
Manegment and governance	10
AML	15
Diversification	10
Extraordinary government support	0
Accounting and auditing standards	20
Non-Financial score	55
Weight	30%

Composite Score	70.3

APPENDIX D

S&P Financial Institutions Rating Methodology

Financial Institutions Ratings Framework
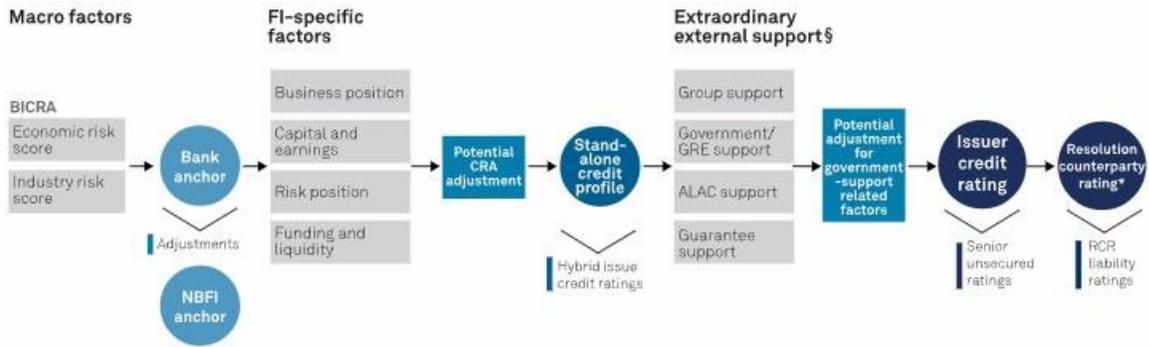
Resümee

AVALIKE FINANTSINSTITUTSIOONIDE VÕLAKIRJADE KREDIIDIREITINGUD

Aditya Sanjay Gadkari

Ettevõtete krediidireitingute andmine ei ole uus kontseptsioon ja krediidimodelleerimine on oluline osa igast kõrghariduse omandanud finantskursusest. Siiski ei ole paljud teadlased proovinud ettevõtete võlakirjade reitingut Balti riikides. Piiratud teaduskirjandus, milles üritatakse võlakirju hinnata, keskendub peamiselt Põhja-Ameerika ettevõtetele.

Autori analüüsi tulemused olid väga sarnased Moody poolt antud krediidireitingutega. Analüüsitud finantseerimisasutuste organisatsiooniline struktuur on lihtne ja geograafiliselt piiratud. Siiski oleks huvitav analüüsida ülejäänud NASDAQ Balticu börsil noteeritud võlakirju ja näha, kas autori krediidireitingute andmise metoodika peab paika.

Kolm uuritud finantsasutust ei tegele agressiivse laenutegevusega. Ka Baltimaade finantskliima näib olevat riskikartlik. Autor ei avastanud kolme ettevõtte puhul raskusi nõuete täitmisega. Siiski ei tohiks tähelepanuta jätta asjaolu, et mitmete Balti pankade suhtes on käimas uurimine küsitavate nõuetele vastavuse meetodite tõttu. Samuti avastas autor, et Balti finantsasutused näivad olevat paremad kui tüüpilised Euroopa pangad. Praktiliselt iga kasumlikkuse näitaja poolest on nad oma Euroopa konkurentidest paremad.

Krediidiriski mõjutavad mitmed elemendid ja ükski uuring ei suuda neid kõiki hõlmata. Pandeemiategur, nagu 2020. aastal nähtud, ei olnud kellegi krediidimudelis. Mis tahes kasulik teave seevastu aitab investoritel ratsionaalseid otsuseid teha, mis kinnitab tõhusa turu hüpoteesi eeldust. Kuna suurem osa kolme suurima reitinguagentuuri metoodikast on teadmata, on kasulik teha nende tehnikaga sarnane analüüs. Tulevased ettepanekud selles küsimuses hõlmavad ka krediidireitingute andmise meetodite uurimist Balti riikide mittefinantsettevõtete puhul. Veelgi olulisem on selle tehnika rakendamine teistes Ida-Euroopa riikides, kus krediidireitinguid ei kasutata laialdaselt.

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