Stock market performance in Sweden during Covid -19

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First and foremost, we would like to show our deepest gratitude to our thesis supervisor Jens Josephson. We could not have done it without your assistance, support, and valuable insights. We would also like to show our gratitude to our peers for their excellent reviews and constructive criticism which has paved the way during the thesis' different stages.
Abstract

This study investigates ESG ratings and financial flexibility impact on the companies included in the Stockholm OMXS30 stock index under the Covid-19 pandemic. In this study two time frames are investigated, Q1 and Q2. Q1 since it is when the market crashed due to Covid-19 and Q2 since it is when the market starts to recover from the crash. The method used in this study is a time series regression analysis with the Sharpe-Lintner single factor assets pricing model CAPM. Results are obtained using 4 portfolios; (1) High ESG-rating, (2) Low ESG rating, (3) High Financial Flexibility and finally (4) Low Financial Flexibility. It is shown that during the first quarter the firms with high ESG yield an insignificant positive abnormal risk-adjusted return, while in Q2 the low ESG rating significantly outperforms the high ESG rating. Moreover, high financial flexibility yields significant positive abnormal risk-adjusted returns compared to the market portfolio in Q2.

Keywords:

1.0 Introduction

1.1 Background

On March 11, 2020, a new virus by the name SARS-CoV-2, more commonly known as Covid-19 was declared a pandemic by the World Health Organization (WHO). The first cases started in the city of Wuhan, China in December 2019 (Cucinotta & Vanelli, 2020). This virus spread exponentially across the entire population affecting everybody. Consequently, this led many countries to enter into lockdowns to prevent this virus from spreading even further (Sandford, 2020).

Due to restrictions, industries such as the travel industry, hospitality, and retail have suffered the most, meanwhile, the pharmaceutical industry suffered the least (BBC, 2021). In 2020, the world economy declined by 4.4%, The International Monetary Fund (IMF) described it as “the worst since The Great Depression of 1930s” (BBC, 2021). Covid-19 made a tremendous impact on the world economy, such as increased unemployment, soaring volatility along with rising bond market, (Chowdhury et al, 2021) and the fear by investors have caused the global stock market to go down like in a bear market (Forbes, 2021).

In this study, we are going to investigate if ESG-ratings and financial flexibility have an impact on companies listed in the Swedish stock market index; Stockholm OMXS30 during the Covid-19 pandemic. The time frame for the studied period are Q1 and Q2, year 2020. This is because in Q1 the market crash started to occur and in Q2 when the market started to recover.

Figure 1. The historical closing prices of OMXS30 between 2020-01 and 2020-07.
1.2 Problem discussion

The stock market reaction to COVID-19 is investigated in many international studies. To the best of our knowledge, these studies do not cover the Swedish market specifically. In this paper, we will examine if, and how Swedish firms’ performance during the first six months of 2020 varies depending on their financial conditions and ESG ratings.

Regarding the relation between stock returns response to COVID-19 and ESG rating, both significant and insignificant results are presented for different countries (Ding et al., 2021; Lins et al., 2017; Demers et al., 2021; Fahlenbrach et al., 2021). The contradictory nature of the results provided makes it relevant to examine the impact of the ESG rating on the stock market response to COVID-19. Additionally, the effect of the various financial conditions, such as high liquidity and less leverage, on the stock market performance has been examined in many studies and for different countries. Thus, this thesis differentiates itself by investigating the effect of the corporate characteristics, financial conditions, and ESG score, on the Swedish stock returns in response to the pandemic.

Furthermore, the fact that Sweden implemented a different COVID-19 strategy compared to other countries and that the degree of the severity of the outbreak differs from country to country motivates why it is relevant to investigate the Swedish case.

More specifically, the following questions are investigated:

1. Does the performance of the Stockholm stock index during the market crash in Q1 and market recovery in Q2 depend on the firm's ESG-rating?

2. Does the performance of the Stockholm stock index during the market crash in Q1 and market recovery in Q2 depend on the firm's financial flexibility?

1.3 Aim and knowledge contribution

The aim of this study is to contribute to the research of the impact that COVID-19 had on the stock market during the first six months of 2020 and show whether the effect can be explained by firms’ ESG rating and financial conditions. Previous studies did not cover the Swedish market specifically and therefore there is a missing knowledge about the performance of the Swedish stock market during the pandemic. The purpose of this thesis is to find whether the financial conditions and ESG score had an effect on the behavior of the Swedish stock market during the first six months of 2020. Furthermore, the thesis will give insights on the least and the most volatile firms in the event of a pandemic which contributes to broadening the knowledge of investors and policymakers.
1.4 Results

The results of this study will introduce the Swedish index; Stockholm OMXS30 during the first half of 2020, split into Q1 when the market crashed and Q2 when the market starts to recover. The firms investigated in this study are ESG rated and with financial flexibility. Therefore, this study will show the impact ESG and financial flexibility have on firms in OMXS30 during these two time periods.

1.5 Limitations

The study is limited to the first half of the year 2020 split into two time frames Q1 and Q2 since it is when the market crashed and started to recover respectively. Moreover, a restriction was made, that we exclude stocks for 5 companies due to the availability of required data regarding their financial condition, which made the final sample consisting of stocks for 25 companies included in the OMXS30 stock index.

1.6 Outline

The thesis is organized in the following way:
Chapter 2 presents previous studies about the impact of ESG rating and financial flexibility on stock performance during the times of financial crisis.
Chapter 3 describes the aim and the contribution of this thesis. A description of the scientific perspective, the collected data, and the methodology used to answer the questions research is included. Moreover, this chapter provides an explanation of how the concepts of validity and reliability are held in these papers. Critical consideration and ethical reflection are also included.
Chapter 4 presents a summary of descriptive statistics and empirical results obtained from the regressions and hypothesis testing.
Chapter 5 discusses the results presented in chapter 4 and provides a critical reflection on them.
Chapter 6 concludes the thesis.
Chapter 7 addresses and discusses the limitations.
2.0 Literature review

2.1 Introduction

The stock price movements in many countries were affected by Covid-19. S&P 500 declined 34% during the first five months of 2020 (Ding et al., 2021). Moreover, the stock market in Hong Kong and Italy fell by 25% and 41% respectively. A large volatility of the stock return is considered among different firms and sectors (Ding et al., 2021). Ding et al. (2021) conduct a study on whether the response of the stock market to COVID-19 varies depending on different countries' characteristics. The study concludes that cases in Italy have a negative impact on the stock markets in other countries and moreover this effect is considered to be greater in countries located close to Italy.

Due to the severity of the outbreak and the differential of the global economic crisis induced by Covid-19, plenty of research has been conducted to study the stock market sensitivity to the pandemic (Ding et al., 2021). To the best of our knowledge, there is no research that specifically addresses the impact of COVID-19 on the stock returns in Sweden, considering firms with different ESG scores and different levels of debt and liquidity. Therefore, it is interesting to focus on investigating that and give insights on the various effects of corporate characteristics on stock market performance during the pandemic.

The problem addressed in this thesis is whether the ESG rating and financial conditions are associated with stock market performance. There are two time frames investigated in this study; (1) market crash due to the declaration of COVID-19 as a pandemic by WHO, from the 1st of January 2020 to the 31st of March 2020 (2) post-crash period when the market was recovering, from the 1st of April 2020 to the 30th of June 2020. Hence, the following questions are investigated in this thesis:

1. Does the performance of the Stockholm stock index during the market crash in Q1 and market recovery in Q2 depend on the firm's ESG-rating?

2. Does the performance of the Stockholm stock index during the market crash in Q1 and market recovery in Q2 depend on the firm's financial flexibility?
2.2 Literature survey

2.2.1 Previous research on the impact of ESG rating on firms' performance

Ding et al.'s (2021) study on how pre-2020 corporate characteristics shape the response of the stock market returns to the confirmed cases of COVID-19 includes data on more than 6700 firms. This study is conducted on 61 economies and analyzed over weekly stock returns from January 2020 to May 2020. Time-varying and time-invariant industry, as well as time-varying and time-invariant economy traits, are excluded. Therefore, the various responses of the stock return to the pandemic rely only on the differences in the corporate characteristics. However, the authors investigate the impact of pre-pandemic CSR activities on the stock returns during COVID-19, showing that firms with more CSR activities experience higher stock returns. The reason behind that lies in stakeholders' support for high CSR-firms in case of a crisis. Furthermore, the findings show that firms with better financial conditions prior to 2020, such as higher profit, less leverage, and more cash perform better in response to the pandemic.

Lins et al. (2017) examine the role of CSR activities, trust, and social capital during times of financial crisis. The authors state that CSR activities contribute to building up social capital and therefore trust. Similar to the results shown by Wenzhi et al. (2021), it is found that high-CSR activities firms tend to have better stock returns performance during the 2008-2009 financial crisis. The reason behind that lies in stakeholders' trust in firms with higher CSR. Low-CSR firms underperform high-CSR firms by four to seven percentage points during the financial crisis. The high- and low-CSR firms' stock returns perform similarly in the recovery period.

A complementary study by Buchanan et al. (2018) shows how corporate social responsibility (CSR) affects the value of a firm before and during a financial crisis through two methods known as difference-in-difference and triple difference. Buchanan et al. (2018) demonstrate that influential institutional ownership (IO) affects the firm value. It is shown that companies with a low monitoring IO have the advantage when it comes to implementing CSR than the high monitoring IO before a financial crisis, CSR firms are valued more in this case. During a crisis, the low monitoring IO of those companies that do not have CSR implemented has the advantage over those that have CSR. In this case, the CSR is damaging for the firm value. After the crisis, the IO does not have as much of an impact since overinvestment is no longer an issue. The authors explain overinvestment as something negative to the firm value in connection to CSR. During a crisis, it is not ideal to implement CSR since it is not helpful and lowers the value of a firm, as it is in need of monitoring and governance. The results that they obtain show that after a crisis the IO and the CSR have no impact on firm value. It is harder for firms that have a debt to handle the financial crisis and there is a possibility of not being able to afford CSR. But sales growth and high cash holdings will compensate for the loss.
Albuquerque et al. (2020) demonstrate in their study the ES (Environmental and Social) policies and the ESG activities which represent Environmental, Social, and Governance. It is mentioned in this study that companies with these ESG activities achieve better performance than companies without. It adds value to the companies and their investors as well. It is found that ESG stocks are much more resilient than other stocks and are valued much higher, meanwhile showing less volatility to the market. Customers prefer ES policies with eminence (customer loyalty) and investors are more secure with ES stocks than any other stock in the market during times of adversity since they perform better (investor segmentation).

Broadstock et al. (2021) conducts a related study on ESG performance in a place of financial crises caused by the Covid-19, with a focus on the Chinese market. It is stated that the Chinese stock market did not react negatively to the Covid-19 pandemic until the country introduced a lockdown and declared it as a pandemic in the month of March. The authors mean that companies with higher ESG scores do not experience volatility. The importance of the ESG is strengthened in crises and is viewed as a risk reducer. The higher the ESG the more resilient it is. Through their event study, they find that a higher score of both the E (environmental) and G (governance) impacts the event study in a positive way, while a high S (social) impacts it negatively.

A similar study by Demers et al. (2021) investigates whether ESG performance immunizes the stock prices against the financial crisis triggered by COVID-19. This study includes a sample of only US firms. Contrary to Albuquerque et al. (2020), the findings show “that ESG is not an “equity vaccine” against declining share prices in times of crisis”. However, firms with high ESG ratings do not perform better during the pandemic.

Bae et al. (2020) study the CSR effect on the stock return response to the pandemic. The sample used in this study includes 1750 US firms. Bae et al. (2020) analyze two time frames, the financial crisis induced by COVID-19 from February 18, 2020, to March 20, 2020, and post-crisis recovery from March 23, 2020, to June 5, 2020. The findings show that the CSR and stock returns are uncorrelated during the financial crisis, nor the post-crisis recovery. Therefore, companies with high CSR scores do not have a stock price resilience factor during financial crises induced by COVID-19. This is contrary to Demers et al. (2021) who find a significant positive association between CSR and stock market performance during the crisis.
2.2.2 Previous research on the impact of financial conditions on firms’ performance

Fahlenbrach et al. (2021) study the importance of financial flexibility in a time of Covid-19 and use regression for the period February 2 to March 23 in 2020 to see how affected the market is during this period which Covid-19 was in its prime time, along with the end of 2019. Fahlenbrach et al. (2021) mention that the more money a company has the less vulnerable it will be by the covid-19 pandemic, and that financial flexibility is seen as a key risk management tool for businesses. A company that is financially flexible would not have the same problem as a non-flexible one, since a non-flexible company would have to make a fund to regain the losses it had during a crisis. Nevertheless, a financially flexible company when it comes to crises is not as vulnerable as a non-flexible company. In their study, they compare the Lehman bankruptcy with the covid-19 and find that they are very similar regarding stock returns but not when it comes to the sectors that are affected. Those sectors where it is not possible to work from home suffer the most concerning stock returns, as well as employment. Further, comparisons between companies with debt and companies without debt are presented in this research. Companies that had debt dropped more in equity value than those that had no debt. The more leverage a company has the more unguarded it is. Thus a financially flexible company has more money, little to no debt, and less leverage. They even elaborate companies that behave better in their stock price are resilient to the demand for isolation.

Ramelli and Wagner (2020) conduct a study on whether the US. firms’ response to Covid-19 varies depending on the amount of cash and leverage a firm has. By using CAPM and regression model, the authors examine three periods which are “Incubation (Thursday, January 2 through Friday, January 17), Outbreak (Monday, January 20 through Friday, February 21), and Fever (Monday, February 24 through Friday, March 20)”. In line with the results found by Ding et al. (2021) and Albuquerque et al. 2020), Ramelli and Wagner (2020) show that firms with more cash overperform firms with low cash in the Fever period. Additionally, there is a negative correlation between leverage and stock returns in the same period. They also find that the importance of the leverage and cash effects become greater within industries with the most pandemic-induced stock return drop in. Additionally, significant evidence provided by the authors confirms that in case of a market crisis, firms with high liquidity are more resilient and firms with more leverage perform less, consistent with the results reported by Fahlenbrach et al. (2020).
2.3 Conclusion

In summary, various papers with different conclusions have investigated the impact of Covid-19 on the stock market, considering firms’ ESG score and financial conditions. For example, Ding et al. (2021) find that there is a positive relation between ESG score and stock market returns in case of a crisis. Similar results regarding the ESG rating and stock returns are found by Lins et al. (2017), Albuquerque et al (2020) and Broadstock et al (2021). Contrary results are shown by Demers et al.( 2021) and Bae et al. (2020) who provide evidence of no correlation between ESG score and stock market returns in response to the pandemic.

Ding et al. (2021) show that firms with better financial conditions overperform similar firms with worse financial conditions. Demers et al. (2021) find that firms with high liquidity, less leverage perform better in times of crisis, consistent with the results presented by Fahlenbrach et al. (2021).

Various periods and different methods have been taken into consideration to investigate the data. The fact that the findings show mixed results regarding the relation between the ESG ratings and stock performance. As well, how firms with different financial conditions, debt, and cash holdings, could shape the stock market response in times of crisis provide a base for the discussion of the results obtained.
3.0 Research design

In this section, we will describe and motivate the methodological approach used in this paper. Since we rely on a deductive and quantitative approach, we will describe and explain how the data is extracted, the sample construction, and the methods we used to investigate and answer the intended research questions. This will be conducted by restating the problem and the purpose of this study, further the scientific perspective, methods, and the choice of the variables will be discussed.

3.1 Problem, purpose, and contribution

The purpose of this study is to investigate the impacts of the outbreak of Covid-19 on the stock market in Sweden. Several studies have been conducted in this field, examining the effects of similar events such as crises and pandemics, and their impacts on the economy and financial markets. However, they did not cover the Swedish market specifically and therefore there is a missing knowledge about the performance of the Swedish stock market during the pandemic.

This paper will contribute in accordance with the previous studies, trying to explain and show if the Swedish stock market performance depends on the firms’ ESG-rating and firms’ financial flexibility during the pandemic. The aim of the study is to enable and provide a new insight to the academics and practitioners in this field. In addition, answering the research questions will broaden the knowledge of how the market reacts to crisis and uncertainty during the occurred event. Moreover, this study takes into account different factors such as firm characteristics that may explain this reaction in the stock market. Therefore, the following hypotheses are formulated and will be tested in order to answer the research questions.

Hypothesis 1

\[ H_0 : \text{A portfolio consisting of stocks with high financial flexibility does not yield abnormal risk-adjusted return.} \]

\[ H_A : \text{A portfolio consisting of stocks with high financial flexibility does yield abnormal risk-adjusted return.} \]
Hypothesis 2

\( H_o : \) A portfolio consisting of stocks with high financial flexibility does not yield abnormal risk-adjusted return, compared with a portfolio consisting of stocks with low financial flexibility.

\( H_A : \) A portfolio consisting of stocks with high financial flexibility does yield abnormal risk-adjusted return, compared with a portfolio consisting of stocks with low financial flexibility.

Hypothesis 3

\( H_o : \) A portfolio consisting of stocks with a high ESG-rating does not yield abnormal risk-adjusted return.

\( H_A : \) A portfolio consisting of stocks with a high ESG-rating does yield abnormal risk-adjusted return.

Hypothesis 4

\( H_o : \) A portfolio consisting of stocks with a high ESG-rating does not yield abnormal risk-adjusted return compared with a portfolio consisting of stocks with a low ESG-rating.

\( H_A : \) A portfolio consisting of stocks with a high ESG-rating does yield abnormal risk-adjusted return, compared with a portfolio consisting of stocks with a low ESG-rating.
3.2 Scientific perspective

Depending on the research questions, the research design is constructed. According to Reinhardt and Cook (1979), different approaches can be used when examining different research questions. The most popular methods are referred to as qualitative and quantitative research. Slevitch (2011) emphasizes the distinction between the two approaches, where the quantitative research method seeks explanation and prediction through theory testing, while the qualitative research method seeks understanding and discovery through theory building. Further, Steckler et al. (1992) describe the strength of quantitative methods stems from “that they produce factual, reliable outcome data that are usually generalizable to some larger population”.

Bell et al. (2018) indicate that quantitative research entails the collection of numerical data, a deductive relationship between theory and research. Subsequently, it means that the quantitative approach method is appropriate to conduct when there is a random sample with a large number of observations, where a guiding theory is available. Then, statistical analysis can be performed to support the generalizability of results and conclusions in line with the research questions.

However, as the researchers are tackling a well-defined research problem, which is based on a theoretical framework. This requires collection and analysis of numerical financial data and observations, to objectively analyze it and explain whether there is a negative or positive impact of a specific event on the stock market. Thus, in this case, the stock reaction in OMXS30 and the Covid-19 outbreaks. Therefore, we believe that the quantitative approach is the most suitable method for this research.

3.3 Method

The research question in this thesis is answered through a quantitative and deductive approach by constructing different portfolios, then conducting a time series regression analysis using the single-factor assets pricing model CAPM. The choice of the different variables and the construction of different models are discussed in more detail in the following corresponding chapters (3.3.1), (3.3.2), and (3.3.3).

3.3.1 Data and sampling

In this thesis, the financial data consist of closing daily data series for OMXS30 stocks prices index. The collection of the quantitative data is obtained by using the database Refintive Eikon provided by Thomas Reuters. Thereafter all data is imported into Microsoft Excel, where all calculations are performed.

Moreover, in this study, the financial data series will be aligned with respect to the timeframe, which consists of the first half of the year 2020, i.e. from the 1st of January 2020 to the 30th of
June 2020. Thereafter we conduct our study by comparing the first quarter of the year (Q1) from the 1st of January 2020 to the 31st of March 2020, which is assumed to be the period when the stock market crashed the most since the covid-19 was declared as pandemic to the second quarter (Q2) from the 1st of April 2020 to the 30th of June 2020, when the stock market begins to recover.

Due to the scope of our thesis, we choose to study the 30 large companies included in the Stockholm index known as OMXS30 as a proxy to the Swedish stock market. In addition, a restriction was made, where stocks for 5 firms were excluded, due to missing of required data regarding their financial condition (Nordea Bank, SEB Bank, Swed Bank, SHB Bank, and Autolive SDB), which made the final sample consisting of stocks for 25 firms.

OMXS30 index is a market-weighted price index that consists of the most 30 actively traded shares on the Stockholm stock exchange market. The Constituents of the index can be divided into eight main sectors: Basic Materials, Consumer goods, Consumer Services, Financials, Health care, Industrials, Technology, and Telecommunications. OMXS30 is considered as the Stockholm Stock Exchange’s leading shares since it is characterized by having excellent liquidity and high trading volume. In addition, membership in OMXS30 is revised on a twice-yearly basis, which ensures that the index thoroughly reflects the most actively traded stocks on the Swedish market, (Nasdaq, 2021).

We have limited our study to this set of stocks since we believe that any change or effect in the stock market will be reflected through this stock index. The decision of this limitation was based on the research by Annaert et al (2011), who conclude that it is possible to mimic the return on the overall stock market with a limited number of the largest stocks in the market.

**Portfolio formation**

In order to answer the research questions, we form four equally weighted portfolios. The constructions of the portfolios were based on the ESG-rating score and the firm's financial flexibility using the data available at the end of the fiscal year 2019. A ranking of the stocks for the ESG-rating is conducted using a Refinitive rating grade from D- to A+, where A+ is the highest score. For Financial flexibility, a combined score ranking using the three key ratios is created for the selection of stocks. We conduct the portfolios as follows, (1) portfolio HESG: High ESG-rating includes the top five ranked stocks with rating A+, A, and A-. (2) Portfolio LESG: Low ESG-rating includes the bottom five ranked stocks with rating C+, C, and C-. (3) Portfolio HFF: High fin-flexibility includes the top five ranked stocks. (4) Portfolio LFF: Low fin-flexibility includes the bottom five ranked stocks.

**3.3.2 Choice of variables**

Different variables are used in this study. The excess return as a dependent variable. Variables of interest when constructing the portfolios, such as financial flexibility with three key ratios (1) Cash over assets ratio, (2) Long-Term Debt Over Total Assets, (3) Short-Term Debt Over Total Assets, and the ESG-rating. However, all the variables and their formulas are described and presented separately below.
The excess return

Since the purpose of this paper is to investigate how the stock market in Sweden responds to the covid-19 outbreak. Therefore, the excess return is used as a dependent variable in the time series regression by using single-factor CAPM to answer the research question. First we determine the daily stock return by using the formula as follows:

\[ R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \] (1)

Where \( R_t \) is the return on stock for each firm \( i \) on each day \( t \), \( P_t \) is the stock closing price on day \( t \), and \( P_{t-1} \) is the stock closing price on \( t-1 \) day.

The excess returns for each portfolio are calculated by taking the average daily returns for all the stocks included in the portfolio then subtracting the risk-free rate. Thereafter, the excess returns are used as a dependent variable in the regression.

Table 1: Description of the excess returns for different portfolios used in the study.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHESGQ1</td>
<td>Excess return for portfolio with high ESG rating in the first quarter of 2020</td>
</tr>
<tr>
<td>ELESGQ1</td>
<td>Excess return for portfolio with low ESG rating in the first quarter of 2020</td>
</tr>
<tr>
<td>EHFFQ1</td>
<td>Excess return for portfolio with high financial flexibility in the first quarter of 2020</td>
</tr>
<tr>
<td>ELEFFQ1</td>
<td>Excess return for portfolio with low financial flexibility in the first quarter of 2020</td>
</tr>
<tr>
<td>EHESGQ2</td>
<td>Excess return for portfolio with high ESG rating in the second quarter of 2020</td>
</tr>
<tr>
<td>ELESGQ2</td>
<td>Excess return for portfolio with low ESG rating in the second quarter of 2020</td>
</tr>
<tr>
<td>EHFFQ2</td>
<td>Excess return for portfolio with high financial flexibility in the second quarter of 2020</td>
</tr>
<tr>
<td>ELEFFQ2</td>
<td>Excess return for portfolio with low financial flexibility in the second quarter of 2020</td>
</tr>
<tr>
<td>MRKPREM1</td>
<td>Market risk premium in the first quarter of 2020</td>
</tr>
<tr>
<td>MRKPREM2</td>
<td>Market risk premium in the second quarter of 2020</td>
</tr>
</tbody>
</table>

Variable of interest

These variables are used in order to form different portfolios in this study, to answer the research questions.

Financial flexibility and resiliency

The definition of financial flexibility in this paper follows the definition used by Fahlenbrach et al (2021) who consider a firm to be financially flexible when it can fund a cash flow shortfall. However, if the following criteria are satisfied, it means that the firm is financially flexible: More cash, less short-term debt, less long-term debt, which indicates high liquidity and less leverage.

In this paper and considering the event period (Covid-19), we chose to look at these aspects at the end of the fiscal year 2019. We derive different key ratios by using these characteristics, then the key ratios are used to form portfolios with high/low Financial flexibility.
**Cash over assets ratio;** this ratio demonstrates the portion of the firm cash in relation to its total assets. It is commonly used to analyze funds and investment trusts. Moreover, it measures the firm’s liquidity and ability to pay its short-term obligations (the obligation that matures within less than one year).

\[
\frac{\text{Cash}}{\text{Total Assets}}
\]

**LongTerm Debt Over Total Assets;** this ratio measures the portion of a firm’s capital that is financed with long-term debt.

\[
\frac{\text{Long-Term Debt}}{\text{Total Assets}}
\]

**ShortTerm Debt Over Total Assets;** demonstrates the portion of short-term obligations of a company in relation to its total assets. The short-term debt is usually the obligation a firm has, that matures within less than one year.

\[
\frac{\text{Short-Term Debt}}{\text{Total Assets}}
\]

See *(Appendix A)* for the Financial-Flexibility range order in terms of key ratios for companies included in OMXS30.

**ESG-rating**

ESG-rating is a combination of three pillars; these pillars are; *Environmental Pillar Score, Social Pillar Score, and Governance Pillar Score*, which is said to have an impact on firm performance, especially during crises. *The Environmental Pillar Score* (E) measures a company's environmental impact and seeks to create shareholder value in relation to its environmental policy. It reflects how well a company maintains long-term sustainability. *The Social Pillar Score* (S) measures the ability of companies to build trust and loyalty internally, in the form of employees, and externally, in the form of customers and society. The social score demonstrates the company's strategies to conduct a healthy business, so if the company is not socially responsible, this will create a risk that leads to an impact on the company’s profitability. *The Governance Pillar Score* (G) measures the work process and the systems used by the company, to ensure for the shareholder that the management and directors act in a way to
maintain their interests. The Governance score reflects the ability of companies to optimize their management in accordance with their rights and responsibilities (Refinitive, 2021).

However, we use the ESG-Rating in order to form different portfolios based on their ESG-score. Thus, when we use the ESG-Rating in portfolio formation we look at the ESG Combined Score at the end of the fiscal year 2019. According to Refinitiv, the ESG Combined Score is “an overall company score based on the reported information in the environmental, social and corporate governance pillars (ESG Score) with an ESG Controversies overlay”. The ESG-combined score is calculated in a way that guarantees maximum transparency and impartiality (Refinitive, 2021). Refinitive combined score is in percentage scale from (0 to 100), which is also converted to letter from D- to A+, where A+ is the highest score.

See (Appendix B) for ESG-Rating Score for companies included in OMXS30.

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0 &lt;= score &lt;= 0.083333</td>
<td>D-</td>
<td>“D” score indicates poor relative ESG performance and insufficient degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.083333 &lt; score &lt;= 0.166666</td>
<td>D</td>
<td>“C” score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.166666 &lt; score &lt;= 0.250000</td>
<td>D+</td>
<td>“C” score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.250000 &lt; score &lt;= 0.333333</td>
<td>C-</td>
<td>“C” score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.333333 &lt; score &lt;= 0.416666</td>
<td>C</td>
<td>“C” score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.416666 &lt; score &lt;= 0.500000</td>
<td>C+</td>
<td>“C” score indicates satisfactory relative ESG performance and moderate degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.500000 &lt; score &lt;= 0.583333</td>
<td>B-</td>
<td>“B” score indicates good relative ESG performance and aboveaverage degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.583333 &lt; score &lt;= 0.666666</td>
<td>B</td>
<td>“B” score indicates good relative ESG performance and aboveaverage degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.666666 &lt; score &lt;= 0.750000</td>
<td>B+</td>
<td>“B” score indicates good relative ESG performance and aboveaverage degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.750000 &lt; score &lt;= 0.833333</td>
<td>A-</td>
<td>“A” score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.833333 &lt; score &lt;= 0.916666</td>
<td>A</td>
<td>“A” score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.</td>
</tr>
<tr>
<td>0.916666 &lt; score &lt;= 1</td>
<td>A+</td>
<td>“A” score indicates excellent relative ESG performance and high degree of transparency in reporting material ESG data publicly.</td>
</tr>
</tbody>
</table>
3.3.3 Regression analysis

A time-series regression analysis using the single-factor assets pricing model CAPM is used to examine the response of daily stock returns in OMXS30 in the first half of the year 2020. To provide a statistical view, this view will be analyzed by the researchers at a later stage of this thesis. Further, in this thesis, the empirical approach is carried out in accordance with the methodology of Sharp (1964), Lintner (1965), and Jensen (1968).

Sharpe-Lintner single-factor CAPM

CAPM is an empirical method developed by Sharp (1964) and Lintner (1965). The model is widely used throughout finance in applications such as pricing an individual stock or portfolio and evaluating their performance. The model describes the relationship between systematic risks (market risk) and expected returns for stocks, which is expressed as the beta coefficient, (Fama and French, 2004). Further, the CAPM model states that systematic risk (market risk) is the only risk that cannot be diversified. Therefore, market risk is a very important factor that can determine the firm’s return based on this approach. Moreover, Jensen's Alpha is used in the model in order to capture the abnormal return of a stock or portfolio over the theoretical risk-adjusted expected return.

\[ R_i - r_f = \alpha_i + \beta_{im}(R_m - r_f) + e_{it} \]  

(2)

Thus

\[ E(R_{it}) = R_i - r_f \]

\[ \Rightarrow E(R_{it}) = \alpha_i + \beta_i E(R_{mt}) + e_{it} \]

(3)

Where \( r_f \) is the risk-free rate of return, \( E(R_{it}) \) is the excess return on stock for each portfolio on each day \( t \), \( \alpha_i \) is Jensen's Alpha for each portfolio of the regression equation, \( \beta_i \) is the slope for the risky stocks (beta) on each portfolio \( i \), \( R_{mt} \) is the return of the market portfolio at time \( t \), \( i = (1,2,3...N) \) portfolio, \( t \) is a given date in day including in the data set interval, and \( e_{it} \) is the error term.
3.4 Test statistics and decision rules

After obtaining the necessary parameters of our portfolios, we can set up a testing framework where the research questions can be answered. The alpha estimated in the model will measure how underperforming or outperforming the stock (portfolio) is, given the level of market risk. However, Four hypotheses are examined respectively.

\[ H_0: \alpha_i = 0 \ , \ H_A: \alpha_i \neq 0 \]

The constructed test statistics are based on the assumption that the return is independent and identically distributed (iid). Test statistics for alpha as follows

\[ t - statistic = \frac{\alpha_i - 0}{S_{\alpha_i}} \]

where \( \alpha_i \) is the intercept tested under the null hypothesis, and \( S_{\alpha_i} \) is the standard error for \( \alpha \).

Given the assumption that the test statistics follow the iid normal distribution, \( N(0, 1) \), the results of this test will demonstrate how significant the difference between the sample mean and the value under the null hypothesis \( H_0 \). The decision rule of the test is if the test statistic value lies in the rejection regions i.e. (the critical values of a given interval), we reject the null hypothesis at the chosen significance level \( \alpha \). Hence, \( \alpha = 5\% \) is a commonly significant level to consider.

\[ |t-statistic| > critical \ values \Rightarrow reject \ the \ null. \]

The choice of the significance level \( \alpha = 5\% \) is to reduce and minimize type I error (false positive i.e. rejection of the null hypothesis that is correct), and type II error (false negative i.e. a failure to reject a null hypothesis that is false).
3.5 Validity and reliability

Validity and reliability are two concepts, which are commonly used to measure the quality and credibility of studies. According to Bell et al (2018), validity concerns the integrity of the conclusion. There are different approaches that can measure the validity of the research. The most important one is measurement validity, which refers to how well the measures reflect and represent the concepts used in the research i.e. if these measures really capture what they intended to investigate. While reliability refers to the accuracy of these instruments. In other words, reliability concerns the question of whether the results of the research are repeatable and the measures are stable and consistent after all (Bell et al, 2018).

However, in this paper various models are used to answer the research questions, the choice of the models was based on well-known researchers and theories that are related to the subject of this study. Further, the authors of this paper have provided in detail the data collection choice of variables, models construction, and the motivation beyond that. To ensure for the readers, that the concepts reliability and validity in this paper are held to the greatest possible extent.

3.6 Source critical consideration

The authors of this paper have taken into account the credibility of various materials and sources used in this study. The theoretical sources in the literature review and method chapters are based on peer-reviewed academic journals. Moreover, all the historical data is retrieved from one source i.e. Refinitiv Eikon database. Refinitiv Eikon is a reliable source for financial data, used by professional practitioners and researchers. All this ensures the reliability and objectivity of this study.

3.7 Research ethical reflection

As this study follows a quantitative research approach, there is, therefore, no personal or sensitive information collected or disclosed. The data has been collected from open data sources, in accordance with the Swedish Research Council's principles.
4.0 Analysis and findings

4.1 Descriptive statistics

Tables 3 and 4 present the most important descriptive statistics of the dependent and independent variables in the regressions for Q1 and Q2 respectively. Mean is the average value of the daily excess return. Max is the maximum value of the daily excess return. Min is the minimum value of the daily excess return. Skew is the skewness. Kurt is the kurtosis. Std.DEV is the standard deviation. Range is the difference between the maximum value and the minimum value.

**Table 3: Descriptive summary Q1**

<table>
<thead>
<tr>
<th></th>
<th>EHESGQ1</th>
<th>ELESGQ1</th>
<th>Diff ESG r (H-L) Q1</th>
<th>MKTPREM1</th>
<th>EHFFQ1</th>
<th>ELFFQ1</th>
<th>Diff Fin-flex r (H-L) Q1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-0.257%</td>
<td>-0.139%</td>
<td>-0.118%</td>
<td>-0.279%</td>
<td>-0.294%</td>
<td>-0.036%</td>
<td>-0.258%</td>
</tr>
<tr>
<td>Max</td>
<td>8.142%</td>
<td>7.160%</td>
<td>4.574%</td>
<td>6.849%</td>
<td>7.123%</td>
<td>6.204%</td>
<td>4.446%</td>
</tr>
<tr>
<td>Min</td>
<td>-10.542%</td>
<td>-11.708%</td>
<td>-3.214%</td>
<td>-11.173%</td>
<td>-10.976%</td>
<td>-9.051%</td>
<td>-7.457%</td>
</tr>
<tr>
<td>skew</td>
<td>-0.676%</td>
<td>-1.308%</td>
<td>0.553</td>
<td>-1.149%</td>
<td>-0.981%</td>
<td>-1.059%</td>
<td>-0.862%</td>
</tr>
<tr>
<td>kurt</td>
<td>3.945</td>
<td>3.727</td>
<td>1.520</td>
<td>5.325</td>
<td>3.763</td>
<td>5.211</td>
<td>5.428</td>
</tr>
<tr>
<td>Std.DEV</td>
<td>0.027</td>
<td>0.029</td>
<td>0.014</td>
<td>0.025</td>
<td>0.027</td>
<td>0.021</td>
<td>0.017</td>
</tr>
<tr>
<td>Range</td>
<td>18.68%</td>
<td>18.87%</td>
<td>7.788%</td>
<td>18.02%</td>
<td>18.10%</td>
<td>15.26%</td>
<td>11.902%</td>
</tr>
</tbody>
</table>

The mean values of the daily excess returns for the portfolio with high ESG rating in Q1, EHESGQ1, and the portfolio with low ESG rating in the same period, ELESGQ1, are -0.257% and -0.139% respectively. The mean of the market excess return is -0.279%, and thus, both portfolios with high and low ESG score in Q1 outperform the market. The range of EHESGQ1 is from -10.542% to 8.142% which is narrower than the range of ELESGQ1 from -11.708% to 7.160%. The range of MKTPREM1 is from -11.173% to 6.849%. These range values show that the most volatile portfolio is the one with low ESG and the less volatile portfolios are the ones with high ESG and the market portfolio. The standard deviation values confirm the conclusion obtained from the range values. The standard deviations of MKTPREM1, EHESGQ1 and ELESGQ1 are 0.025, 0.027 and 0.029 respectively.

The mean of the excess return for the portfolio with high financial flexibility in Q1, -0.294%, is lower than the mean values of the market portfolio and the excess return for the portfolio with low financial flexibility, -0.279% and -0.036 respectively. These values indicate that the portfolio with low financial flexibility outperforms the market and portfolio with high financial flexibility. The range of EHFFQ1 is from -10.976 to 7.123% which is wider than the range of
ELFFQ1, from -9.051% to 6.204%, and the market portfolio. The range values show that the portfolio with high financial flexibility is more volatile than the one with low financial flexibility. The standard deviation values confirm the conclusion obtained from the range values.

The skewness values of EHESGQ1, ELESGQ1, MKTPREM1, EHFFQ1 and ELFFQ1 are negative which indicates that the risk is underestimated by the standard deviation. A normal distribution has a symmetric distribution, bell curve, and thus, a skewness of zero. A skewness with negative value means that the curve is shifted to the left and excess returns with negative values are more probable to be obtained than positive excess returns.

The kurtosis values of EHESGQ1, ELESGQ1, MKTPREM1, EHFFQ1 and ELFFQ1 are more than three, while the kurtosis of a normal distribution data is three. The Kurtosis with value more than three implies that the data has many extreme outliers than a normally distributed data.

Table 4: Descriptive summary Q2

<table>
<thead>
<tr>
<th></th>
<th>EHESGQ2</th>
<th>ELESGQ2</th>
<th>Diff ESG r (H-L) Q2</th>
<th>MKTPREM2</th>
<th>EHFFQ2</th>
<th>ELFFQ2</th>
<th>Diff Fin-flex r (H-L) Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.231%</td>
<td>0.586%</td>
<td>-0.355%</td>
<td>0.178%</td>
<td>0.407%</td>
<td>0.010%</td>
<td>0.397%</td>
</tr>
<tr>
<td>Max</td>
<td>5.003%</td>
<td>7.849%</td>
<td>2.661%</td>
<td>4.742%</td>
<td>5.656%</td>
<td>3.128%</td>
<td>4.562%</td>
</tr>
<tr>
<td>Min</td>
<td>-4.886%</td>
<td>-3.98%</td>
<td>-3.842%</td>
<td>-5.05%</td>
<td>-4.67%</td>
<td>-3.35%</td>
<td>-4.031%</td>
</tr>
<tr>
<td>skew</td>
<td>-0.329</td>
<td>0.184</td>
<td>-0.409</td>
<td>-0.412</td>
<td>-0.102</td>
<td>-0.031</td>
<td>-0.191</td>
</tr>
<tr>
<td>kurt</td>
<td>1.228</td>
<td>0.677</td>
<td>0.191</td>
<td>0.401</td>
<td>0.15</td>
<td>0.199</td>
<td>0.801</td>
</tr>
<tr>
<td>Std.DEV</td>
<td>0.019</td>
<td>0.022</td>
<td>0.013</td>
<td>0.02</td>
<td>0.023</td>
<td>0.014</td>
<td>0.016</td>
</tr>
<tr>
<td>Range</td>
<td>9.889%</td>
<td>11.83%</td>
<td>6.503%</td>
<td>9.79%</td>
<td>10.32%</td>
<td>6.48%</td>
<td>8.593%</td>
</tr>
</tbody>
</table>

The mean values of the excess return for portfolio with high ESG rating in Q2, EHESGQ2, and portfolio with low ESG rating, ELESGQ2 are 0.231% and 0.586% respectively. The excess return of the market portfolio in Q2, MKTPREM2, has a mean value of 0.178%. These results indicate both portfolios with high and low ESG ratings outperform the market in Q2. The range of EHESGQ2, from -4.886% to 5.003%, is narrower than the range of ELESGQ2, from -3.980% to 7.849%. The range of MKTPREM2 is from -5.045% to 4.742%. The range values show that the portfolio with high financial flexibility is less volatile than the one with low financial flexibility. This conclusion is confirmed by the standard deviation values which are 0.019, 0.022 and 0.020 for EHESGQ2, ELESGQ2 and MKRPREM2 respectively.

The mean values of the excess return for portfolio with high financial flexibility in Q2, EHFFQ2 and portfolio with low financial flexibility, ELFFQ2, are 0.407% and 0.010% respectively. The excess return of the market portfolio in Q2, MKTPREM2, has a mean value of 0.178%. These results indicate that the portfolio with high financial flexibility outperforms
the market, and the market portfolio outperforms the portfolio with low financial flexibility. The range of EHFFQ2, from -4.665% to 5.656%, is wider than the range of ELFFQ2, from -3.347% to 3.128%, and MRKPREM2 range. The range values show that the most volatile portfolio is the portfolio with high financial flexibility, and that the portfolio with low financial flexibility is the least volatile one. The standard deviation values of 0.023, 0.014 and 0.020 for EHFFQ2, ELFFQ2 and MRKPREM2 confirm the conclusion obtained from the range values.

The skewness values of EHESGQ2, MKTPREM2, EHFFQ2 and ELFFQ2 are negative, and the curve is shifted to the left. The skewness of ELESGQ2 is positive and the curve is shifted to the right. The kurtosis values of EHESGQ2, ELESGQ2, EHFFQ2, ELFFQ2 and MKTRPREM2 are less than three which indicates that the data has fewer extreme values than normally distributed data.
4.2 Empirical results

This segment represents the empirical results obtained from the Stockholm OMXS30 stock index at the first half of the year 2020, split into Q1 and Q2. Table 4.2. Panel A and Panel B below show the results obtained for portfolios based on firms ESG ratings (high ratings versus low ratings) and financial flexibility (high flexibility versus low flexibility). They also show the difference (high minus low) in ESG for Q1 and Q2 as well as the difference in financial flexibility in Q1 and Q2. This factor high minus low (HML) is used to express the volatility measure and compare the different results in Q1 and Q2. To begin, the estimates incorporated are; Alpha, Beta, Std Alpha, Std Beta, and finally T-Statistics for both Alpha and Beta. These are all divided into two groups Q1 and Q2.

Table 5: Panel A: Quarter 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>ALPHA</th>
<th>STD Alpha</th>
<th>t-stats Alpha</th>
<th>BETA</th>
<th>STD BETA</th>
<th>t-stats Beta</th>
<th>R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>HESG Q1</td>
<td>64</td>
<td>0.000</td>
<td>0.001</td>
<td>0.400</td>
<td>1.037</td>
<td>0.032</td>
<td>32.481</td>
<td>94%</td>
</tr>
<tr>
<td>LESG Q1</td>
<td>64</td>
<td>0.0014</td>
<td>0.002</td>
<td>0.813</td>
<td>1.006</td>
<td>0.069</td>
<td>14.532</td>
<td>77%</td>
</tr>
<tr>
<td>HFF Q1</td>
<td>64</td>
<td>-0.0003</td>
<td>0.001</td>
<td>0.000</td>
<td>0.955</td>
<td>0.057</td>
<td>16.803</td>
<td>82%</td>
</tr>
<tr>
<td>LFF Q1</td>
<td>64</td>
<td>0.002</td>
<td>0.001</td>
<td>1.475</td>
<td>0.753</td>
<td>0.047</td>
<td>16.110</td>
<td>81%</td>
</tr>
<tr>
<td>Diff ESG r (High - Low)</td>
<td>64</td>
<td>-0.001</td>
<td>0.002</td>
<td>-0.610</td>
<td>0.031</td>
<td>0.072</td>
<td>0.435</td>
<td>0.3%</td>
</tr>
<tr>
<td>Diff Fin-Flex r (High-Low)</td>
<td>64</td>
<td>-0.002</td>
<td>0.002</td>
<td>-1.008</td>
<td>0.203</td>
<td>0.079</td>
<td>2.550</td>
<td>9%</td>
</tr>
</tbody>
</table>

Panel B: Quarter 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>ALPHA</th>
<th>STD Alpha</th>
<th>t-stats Alpha</th>
<th>BETA</th>
<th>STD BETA</th>
<th>t-stats Beta</th>
<th>R-squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>HESG Q2</td>
<td>65</td>
<td>0.001</td>
<td>0.001</td>
<td>0.978</td>
<td>0.886</td>
<td>0.037</td>
<td>23.781</td>
<td>90%</td>
</tr>
<tr>
<td>LESG Q2</td>
<td>65</td>
<td>0.004</td>
<td>0.002</td>
<td>2.674</td>
<td>0.913</td>
<td>0.079</td>
<td>11.545</td>
<td>68%</td>
</tr>
<tr>
<td>HFF Q2</td>
<td>65</td>
<td>0.002</td>
<td>0.001</td>
<td>2.177</td>
<td>1.089</td>
<td>0.049</td>
<td>22.271</td>
<td>89%</td>
</tr>
<tr>
<td>LFF Q2</td>
<td>65</td>
<td>-0.001</td>
<td>0.001</td>
<td>0.000</td>
<td>0.566</td>
<td>0.055</td>
<td>10.383</td>
<td>63%</td>
</tr>
<tr>
<td>Diff ESG r (High - Low)</td>
<td>65</td>
<td>-0.004</td>
<td>0.002</td>
<td>-2.090</td>
<td>-0.028</td>
<td>0.084</td>
<td>-0.329</td>
<td>0.2%</td>
</tr>
<tr>
<td>Diff Fin-Flex r (High-Low)</td>
<td>65</td>
<td>0.003</td>
<td>0.001</td>
<td>2.048</td>
<td>0.522</td>
<td>0.074</td>
<td>7.053</td>
<td>44.1%</td>
</tr>
</tbody>
</table>
4.2.1. ESG results

At the top of Table 5, panel A (Q1), it is shown that the alpha for portfolio with high ESG rating is 0.000 and alpha for portfolio with low ESG ratings is 0.0014 respectively. This signifies that the alpha for LESG Q1 is almost 1 per mille higher than the alpha for HESG Q1. The panel B signifies that alpha for LESG Q2 is 3 per mille higher than the alpha for HESG Q2. This means that LESG portfolio outperforms HESG portfolio in both quarters. Beta in Q1 for HESG is 1.037 and 1.006 in LESG, in Q2 beta for HESG is 0.886 and for LESG it is 0.913. This shows that in Q1 the beta is higher in HESG, while in Q2 the beta is higher in LESG. STD Alpha has the same value for HESG in both Q1 and Q2 and the same value for LESG in both quarters. T-stats alpha has higher results in LESG in both quarters. In Q1, T-stats alpha for HESG is 0.400 and for LESG it is 0.813. In Q2 T-stats alpha for HESG is 0.978 and for LESG it is 2.674. The significance used is 5%, and the value should be outside the interval [-1.99;1.99] to reject the null hypothesis. The T-stats alpha values for HESG Q1, LESG Q1 and HESG Q2 are in the interval which means that the null hypothesis cannot be rejected. In Q2, the LESG portfolio has an T-stats alpha value of 2.674 which indicates the null hypothesis can be rejected. In both Q1 and Q2, STD Beta is higher in LESG than in HESG. Finally, T-stat Beta in Q1 is 32.481 in HESG and 14.532 in LESG, while in Q2 it is 23.781 in HESG and 11.545 in LESG. These values indicate that the null hypothesis will be rejected since they lie outside the interval.

4.2.2. Financial flexibility results

Companies with an alpha in LFF Q1 is 0.002 and for HFF Q1 it is -0.0003. Alpha for LFF Q2 is -0.001 and for HFF Q2 it is 0.002. This means that in Q1 companies with LFF outperformed, while in Q2 HFF performed better. In beta, HFF is higher in both Q1 and Q2. This means that it is more risky but better to invest in companies with high financial flexibility. The difference in beta in Q2 is greater than the difference in Q1, 0.522 and 0.203. This shows that in Q2 the beta is more volatile than in Q1. STD Alpha is the same in both Q1 and Q2. T-stat alpha for LFF Q1 is higher than HFF Q1, and t-stats alpha for HFF Q2 is higher than LFF Q2. All these values will not be rejected besides HFF in Q2, since 2.177 is higher than the critical value. In Q1, STD Beta has higher results in HFF and the reverse in Q2. Finally, T-stats Beta in Q1 is slightly higher in HFF, while in Q2 the difference in HFF is double the amount in LFF. Both Q1 and Q2 will be rejected since they are greater than the critical value 1.99.

Furthermore, to collect the results 5 stocks out of the Stockholm stock index OMXS30 for every portfolio is used, this sample size may have an influence on the results acquired, and may be questionable. But a larger sample size would give more accurate results.
4.3 Hypothesis testing

In this chapter, we provide the test statistics results for the four hypotheses stated in section (3.1). The test statistics for hypotheses 1 & 3 are performed by comparing each portfolio separately during quarters 1 and 2 to the market benchmark. While test statistics for both hypotheses 2 & 4 are performed by comparing each portfolio to its comparable counterpart during the same quarter. The results for t-statistic for each quarter are shown in Table 5, in both panels A and B under column t-stats Alpha.

Hypothesis 1

\( H_0 \) : A portfolio consisting of stocks with high Financial flexibility does not yield abnormal risk-adjusted return.

\( H_A \) : A portfolio consisting of stocks with high Financial flexibility does yield abnormal risk-adjusted return.

For the first quarter of 2020, the test statistic value is -0.19 which is smaller than the critical value |1.99| at a 5% significance level. It means we fail to reject the null and there is no evidence to support that the portfolio consisting of stocks with high financial flexibility yields abnormal risk-adjusted return compared to the market.

For the second quarter of 2020, the test statistic value is 2.17, which is greater than the critical value |1.99| at a 5% significance level. We reject the null hypothesis and conclude that a portfolio consisting of stocks with high financial flexibility does yield abnormal risk-adjusted return compared to the market.

Hypothesis 2

\( H_0 \) : A portfolio consisting of stocks with high Financial flexibility does not yield abnormal risk-adjusted return, compared with a portfolio consisting of stocks with low Financial flexibility.

\( H_A \) : A portfolio consisting of stocks with high Financial flexibility does yield abnormal risk-adjusted return, compared with a portfolio consisting of stocks with low Financial flexibility.

Further, we take the difference between portfolios of high financial flexibility and low financial flexibility in quarter 1 and quarter 2 respectively. For the first quarter, the test statistic is -1.01 which is smaller than the absolute critical values |1.99| at a 5%, significance level. We fail to reject the null and there is no evidence that the
portfolio consisting of stocks with high financial flexibility yields abnormal risk-adjusted return compared with a portfolio consisting of stocks with low financial flexibility.

In the second quarter, the test statistic value is 2.05 which is greater than the critical value at a 5% significance level. We reject the null and conclude that the portfolio consisting of stocks with high financial flexibility does yield abnormal risk-adjusted return compared with a portfolio consisting of stocks with low financial flexibility.

**Hypothesis 3**

\[ H_0 : \text{A portfolio consisting of stocks with a high ESG-rating does not yield abnormal risk-adjusted return.} \]

\[ H_A : \text{A portfolio consisting of stocks with a high ESG-rating does yield abnormal risk-adjusted return.} \]

The decision rule is to reject the null hypothesis if the test statistics’ absolute value is greater than the critical values at a certain significance i.e \( \alpha = 5\% \). Hence, in this case, the test statistic value for the portfolio with high ESG-rating stocks is 0.40 in the first quarter of 2020 and 0.97 in the second quarter of 2020, which is smaller than the critical values at a 5%, significance level \( |1.99| \), which means that we fail to reject the null and conclude that a portfolio with high ESG-rating does not yield a risk-adjusted return in the first quarter or in the second quarter of 2020 compared to the market.

**Hypothesis 4**

\[ H_0 : \text{A portfolio consisting of stocks with a high ESG-rating does not yield abnormal risk-adjusted return compared with a portfolio consisting of stocks with a low ESG-rating.} \]

\[ H_A : \text{A portfolio consisting of stocks with a high ESG-rating does yield abnormal risk-adjusted return, compared with a portfolio consisting of stocks with a low ESG-rating.} \]

Further, we take the difference between the high and low ESG rating portfolios in the first quarter, and second quarter of 2020 respectively. For the first quarter, we find no evidence that a portfolio consisting of stocks with a high ESG-rating does yield a risk-adjusted return compared to a portfolio consisting of stocks with a low ESG-rating. Since the t-statistics value is 0.60 which is smaller than the critical values at a 5% significance level. It means we fail to reject the null hypothesis.

For the second quarter of 2020, we reject the null hypothesis since the test statistics value is equal to -2.09 which is smaller than the critical values at a 5% significance level. We can conclude that a portfolio consisting of stocks with a high ESG-rating does yield a higher risk-adjusted return compared to a portfolio consisting of stocks with a low ESG-rating.
5.0 Discussion and critical reflection

5.1 ESG rating impact on the stock market

One of the questions addressed in this thesis is whether the ESG rating had an impact on the stock performance during the crash and the recovery period. The results show a significant indifference between the portfolio with high ESG rating and the market portfolio during the crash period. Furthermore, when comparing the portfolio with high ESG rating to the portfolio with low ESG rating, we find an insignificant difference between them during Q1. These findings are consistent with the results shown by Bae et al. (2020) who analyze the period from February 18, 2020 to March 20, 2020 and find that CSR and stock returns are uncorrelated during this period. Likewise, Demers et al. (2021) also conclude that firms with high ESG rating do not overperform firms with low ESG rating in case of financial crisis. Contrary to our findings, Ding et al. (2021), Broadstock et al. (2021), Lins et al. (2017) and Albuquerque et al. (2020) show that firms with more CSR activities experience higher stock returns, and thus, conclude that there is a relation between ESG and stock performance in times of crisis.

The study finds that there is an insignificant difference between the market and the portfolio with high ESG during Q2. We also show that the portfolio with low ESG rating significantly outperforms the portfolio with high ESG rating under the recovery period. That implies that there is a negative relation between ESG rating and stock returns. This finding is contrary to the results reported by Bae et al. (2020) who investigate the post-crisis recovery from March 23, 2020 to June 5, 2020 and conclude that there is no association between CSR and stock returns. In similarity to Bae et al. (2020), Buchanan et al. (2018) conclude that CSR has no impact on firm value after the financial crisis of 2008. Our results in Q2 are contradicting all the previous research presented which reported either positive relation between CSR and stock return or no correlation between them.

5.2 Financial conditions impact on the stock market

The second question addressed is on the financial flexibility and if it has an impact on the Stockholm OMXs30 index during the Covid-19 pandemic. Previous study by Fahlenbrach et al. (2021) obtained the results that a company that is financially flexible handles crises pretty well in comparison to non-financial flexible companies. It is also stated that those companies that are financially flexible have little to no debt/leverage and more money. Ding et al (2021) states similar results, that those with better financial conditions outperforms companies with less financial conditions and are better prepared for crises like Covid-19. In this study, the results obtained in Q1 and Q2 are different. The variables in Table 4.2. shows greater values in high financial flexibility for both Q1 and Q2 besides two variables in Q1; Alpha and T-Statistics Alpha, which shows negative values when Covid-19 was declared as a pandemic. This means that in Q2 high financial flexible companies outperformed which is in line with the results by Fahlenbrach et al (2021) study but not in Q1 which they underperformed.
5.3 Knowledge contribution

The purpose of this paper is to examine the performance of the Swedish stock market during Covid-19 from the 1st of January 2020 to the 30th of June 2020, and to find out whether the performance of the stocks during the pandemic can be explained by the companies' ESG rating (high & low) and their financial flexibility (high & low), such as high liquidity and less leverage.

However, the main finding of this paper, when looking at the stocks with high financial flexibility, we find that for the first quarter of 2020 there is no significant difference between the firms with high financial flexibility and low financial flexibility performance i.e both firms do not outperform the market during the pandemic. Whilst, for the second quarter, we conclude that stocks with high financial flexibility do yield abnormal risk-adjusted returns compared to the market. Further, in the first quarter, we conclude that firms with high financial flexibility do not yield abnormal risk-adjusted returns compared to firms with low financial flexibility. Hence, for the second quarter, we find that firms with high financial flexibility do yield abnormal risk-adjusted returns compared to low financial flexibility firms.

When it comes to the ESG-rating, looking at the first and second quarters respectively, we find no evidence supporting that firms with high ESG-ratings yield abnormal risk-adjusted returns compared to the market benchmark. In addition, looking at the high ESG-rating stocks and their performance, compared to firms with low ESG-rating in the first quarter, we conclude that there is no significant difference between them. Thus, in the second quarter, we find that there is a negative relationship between High ESG-rating stocks and their performance, compared to firms with low ESG-rating.

Subsequently, the findings in this study are consistent with the previous research in this field, in terms of the impact of financial flexibility on the stock performance during COVID-19. Thus, regarding the impact of the ESG-rating on the performance of the stocks in quarter 2 (Q2), our finding that there is a negative relationship between High ESG-rating stocks and their performance deviates from the findings presented in previous studies.
5.4 Critical reflection

There is a question that may arise regarding the use of the single -CAPM and if it is an appropriate or accurate model that can provide the coefficients of the different portfolios we need to answer the research questions. Since the previous researchers in this field have used the three and four-factor models version of CAPM when they examine similar questions. However, the answer to this question is that the findings of this paper are in line with the previous study in this field. The only deviation is when we find a negative relationship between the high ESG-rating and the performance of the portfolio, which may be explained by the short horizon of the timeframe of this paper and the sample selection and its size. Therefore, the use of the single-CAPM model provides similar results and confirms the previous research.

Another question related to the test statistics, and whether the results are misleading in terms of the findings that may not justify the decision when rejecting the null hypothesis. However, the authors of this paper take this aspect into account when testing whether or not the portfolios yield abnormal risk-adjusted returns. The test for Jensen's alpha is not only done for each portfolio separately, thus the difference for the different portfolios in relation to their equivalents and comparable portfolios is considered, and tested in the same way.
6.0 Conclusion

This thesis aims to investigate whether the ESG-rating and financial flexibility influence the performance of the Stockholm stock index, OMXs30, during the pandemic. Two-time frames are examined in this thesis (1) the market crash due to the declaration of COVID-19 as a pandemic by WHO, from the 1st of January 2020 to the 31st of March 2020 (2) the post-crash period when the market was recovering, from the 1st of April 2020 to the 30th of June 2020. The research questions are investigated by using Sharpe-Lintner single-factor CAPM and constructing four equally weighted portfolios (1) high ESG-rating (2) low ESG rating (3) high financial flexibility (4) low financial flexibility. Each portfolio, the difference between the high-ESG portfolio and the low-ESG portfolio, the difference between the high financial flexibility portfolio and the low financial flexibility portfolio is compared to the market portfolio under Q1 and Q2 of 2020. OMXs30 is used as a proxy of the Swedish market and Jensen’s alpha is used to capture abnormal risk-adjusted returns.

Regarding the first question, the results show that there is a significant indifference between the portfolio with high ESG rating and the market portfolio during the crash period. Furthermore, an insignificant negative alpha is found when comparing the difference between the portfolio with high ESG-rating and the one with low ESG-rating to the market, under the same period. Our study shows also that the portfolio with high ESG yields an insignificant positive abnormal risk-adjusted return under the recovery period. Moreover, the portfolio with low ESG rating significantly outperforms the portfolio with high ESG rating under Q2.

Regarding the second question, when comparing the portfolio with high financial flexibility to the market under Q1, an insignificant difference between them is found. Similar results obtained when comparing the difference between the portfolio with high financial flexibility and the one with low financial flexibility to the market under Q1. It is also found that the portfolio with high financial flexibility yields significant positive abnormal risk-adjusted return compared to the market portfolio during Q2. The portfolio with high financial flexibility significantly outperforms the portfolio with low financial flexibility during Q2.

Thus, we conclude that there is a significant negative relation between ESG rating and stock performance under the recovery period. Additionally, significant evidence is provided in this study about the positive relation between the financial flexibility and the stock performance under the recovery period.
6.1 Future research

Since we conclude that there is a negative relation between stock performance and ESG rating under the recovery period, it would be interesting to investigate whether this effect depends on the different sectors of the sample firms we investigate in this study. Moreover, a larger sample and a longer period could be studied to strengthen the results obtained. Similar to the study conducted by Buchanan et al. (2018), it would be interesting to include the institutional ownership variable. Considering the level of IO would provide insights of the effect of it on the CSR rating impact and financial flexibility impact on the stock performance during the pandemic.

7.0 Limitations of research

In this study, there is a limitation associated with the time span. We choose to study the 30 largest companies included in the Stockholm Index, known as OMXS30, as a proxy for the Swedish stock market. Therefore the sample selection may not be representative of the purpose of this paper. Moreover, a restriction was made, that we exclude stocks for 5 companies, namely (Nordea Bank, SEB Bank, Swed Bank, SHB Bank, and Autolive SDB). The exclusion is due to the availability of required data regarding their financial condition, which made the final sample consisting of stocks for 25 companies. In addition, only the first half of 2020 is considered to be the timeframe for this study. As the pandemic is not over yet, we can not assume that the stock market has fully recovered, and therefore the assumption that the second quarter of 2020 is a recovery period may not be accurate.

Another limitation is related to the formation of the portfolios. When we construct portfolios with a low ESG-rating, the lowest rate in our sample is between the range (C- and C+). Therefore, all firms included in the portfolio with a low ESG rating, have a rating range between (C- to C+), which according to the Refinitive definition a score indicates a satisfactory relative ESG performance. Therefore it may have affected the results when we compare the low-ESG rating Stocks to the high ESG-rating stocks performance.

However, everything we mentioned above, and due to the short horizon for the timeframe and the selection of the sample size, the accuracy of the results of this paper may be affected, and can therefore not be generalized.
8.0 References


Davies,G. and Rober,B. (2021), Sweden has avoided a COVID-19 lockdown so far: Has its strategy worked?, ABC News. Available at:


Appendices

Appendix A. Financial-Flexibility range order in terms of key-ratios for companies included in OMXS30.

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME</th>
<th>CASH/TOTAL ASSET</th>
<th>LTD/TOTAL ASSET</th>
<th>STD/TOTAL ASSET</th>
<th>AVERAGE</th>
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<td>5</td>
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<tr>
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<tr>
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<tr>
<td>E</td>
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<td>G</td>
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<tr>
<td>I</td>
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<tr>
<td>J</td>
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<td>13</td>
<td>6</td>
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<tr>
<td>O</td>
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<td>22</td>
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<td>12.33</td>
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<td>7</td>
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<tr>
<td>X</td>
<td>ESSITY AB</td>
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<td>19</td>
<td>17</td>
<td>18.67</td>
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</table>

*LTD: is Long-term debt, and STD: is Short-term debt.*
Appendix B. ESG-Rating Score for companies included in OMXS30.

<table>
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<th>NAME</th>
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<td>INVESTOR AB</td>
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<tr>
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<td>ERICSSON B</td>
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<tr>
<td>EVOLUTION AB</td>
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<tr>
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<td>C+</td>
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</tr>
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<td>TELIA COMPANY AB</td>
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<td>A-</td>
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<td>ESSITY AB</td>
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</tbody>
</table>

*A+ : indicates the highest score, while C- indicates the lowest score in our sample.