



UNIVERSITY OF GOTHENBURG  
SCHOOL OF BUSINESS, ECONOMICS AND LAW

# **A comparison of sin- and ethical stocks’ performance on the Swedish equity market:**

*with focus on the impact of liquidity, institutional ownership, firm age and equity on the difference in excess returns between sin- and ethical stocks.*

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## Abstract

This thesis studies the returns of ESG stocks and sin stocks through constructed value- and equally weighted portfolios in the Swedish stock market. The stocks are also compared on a firm level. The excess returns obtained from the ESG and sin stocks are compared to each other to see how they can be explained by the key variable's liquidity, institutional ownership, firm age<sup>1</sup> and book value of equity. This is accomplished through the usage of OLS regressions and panel data. It is found that both ESG and sin stocks overperform against the market when the stocks are constructed as portfolios. When comparing these stocks on a firm level with the usage of panel data, it is however found that ESG stocks still overperform the market while sin stocks underperform. The consistency in the returns of ESG stocks is therefore higher. When comparing the excess returns (alpha) between ESG and sin stocks it is found that liquidity, institutional ownership and firm age have an effect on this difference in excess returns, while the book value of equity was found to be insignificant. Moreover, in accordance with the efficient market hypothesis, the market is inefficient in the pricing of these stocks. Furthermore, this thesis contributes to the field of investment ethics by showing the aforementioned, the authors<sup>2</sup> have not found a previous study that incorporates these factors to explain the difference in the alpha of ESG and sin stocks on the Swedish stock market. These results also contribute to the ongoing stakeholder and shareholder theory debate, where having an all or nothing mindset is indicated to be insufficient.

**Keywords:** Sin stocks, ESG stocks, Sweden, OMXSPI, stakeholder theory, shareholder theory, efficient market hypothesis, excess return, CAPM, liquidity, institutional ownership, firm age, book value of equity.

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<sup>1</sup> Firm age refers to how long a stock has been publicly traded on the stock market.

<sup>2</sup> Hereafter when the authors are mentioned, it is referred to the authors of this thesis (see the front page).

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## Definitions

**Financial performance:** In this thesis financial performance is related to the stock returns generated by the stocks that are being studied. Dividends are excluded in this thesis.

**Sin stocks:** Sin stocks are in this thesis defined as firms active in the sectors of gun manufacturing, crude oil, gas, nuclear, gambling, alcohol and the tobacco industries. See section 3.2.1 in the thesis for a detailed explanation.

**ESG stocks:** ESG stocks are in this thesis defined as companies which have a substantial focus towards the disclosure of environmental, social and governance factors. See section 3.2.2 in the thesis for a detailed explanation.

**Corporate social responsibility (CSR) and Corporate sustainability (CS):** These two concepts of sustainability are in this thesis used to explain the same underlying purpose, that is how firm's impact society and its responsibilities towards society. These two concepts have been known to deviate in its distinction at times (Lourenco, Branco, Curto & Eugenio, 2012).

**Sustainable responsible investing (SRI) and ESG criteria:** Within the field of sustainable responsible investing (SRI), investing based on ESG criteria is considered a subgroup of sustainable investing (USSIF, 2019).

**Sustainability:** The concept of sustainability builds on the fundamental view that the needs of today should be met without harming the ability of the future generations to meet their own needs (UN, 2019).

## Table of contents

<b>1. Introduction.....</b>	<b>1</b>
1.1 Background .....	1
1.2 Problem area.....	3
1.3 Purpose of the study .....	5
1.4 Research question.....	5
1.5 Outline of the thesis.....	5
<b>2. Theoretical framework and literature review .....</b>	<b>6</b>
2.1 Theoretical framework .....	6
2.1.1 Shareholder theory and Stakeholder theory.....	6
2.1.2 Efficient market hypothesis .....	8
2.2 Literature review .....	9
<b>3. Methodology and data collection.....</b>	<b>14</b>
3.1 Research design.....	14
3.1.1 Formula for the first regression .....	15
3.1.2 Formulas for the second regression .....	15
3.2 Description of data .....	16
3.2.1 Sin Stocks .....	17
3.2.2 ESG stocks.....	18
3.2.3 Nasdaq OMXSPI .....	19
3.2.4 Variables used in the regressions.....	20
3.3 Construction of the sin- and ethical stock portfolio .....	20
3.4 Selection of asset pricing model.....	22
3.5 Consideration of risk in the obtained returns .....	24
3.6 Limitations of the study.....	25
<b>4. Results .....</b>	<b>26</b>
4.1 General description of the data.....	26
4.1.1 Descriptive data in the first regression .....	26
4.1.2 Descriptive data in the first regression .....	27
4.2 Obtained results from the regressions .....	28
4.2.1 Obtained results from the first regression.....	28
4.2.2 Obtained results from the second regression.....	29
4.3 Robustness checks.....	31
<b>5. Analysis of the results .....</b>	<b>33</b>
<b>6. Conclusion and contribution.....</b>	<b>37</b>
<b>References</b>	
<b>Appendix</b>	

# **1. Introduction**

## **1.1 Background**

Equity investors, both retail and institutional, are becoming increasingly involved and concerned with investing their funds in an ethically responsible way (Knoepfel, 2001; UBS, 2017; Swedbank, 2018). At the early stages of socially responsible investing, retail investors were the main actors within this investment universe, however contemporary institutional investors have incorporated this view of investing greatly as well (Scholtens & Sievänen, 2013). Investing in a socially acceptable manner has become of particular increased importance in the Nordic countries showcased by for example the accelerated growth of equity funds oriented towards sustainability in recent years (Scholtens & Sievänen, 2013). If one narrows the scope from the Nordic countries to looking solely at Sweden, which is the country of focus for this thesis. It can be seen that in Sweden the movement of sustainability has been impactful to date coupled with fast growth of investors invested in sustainable funds and where the general interest for investing sustainably is high (Regeringen, 2016; Scholtens & Sievänen, 2013; Swedbank, 2018). Sweden has also adopted an ambitious sustainable agenda together with the introduction of extensive sustainable reporting requirements (Regeringen, 2017; Regeringskansliet, 2018; FAR, 2018). For example, Swedish firms trading on regulated markets are obliged to follow these reporting requirements (FAR, 2018). Furthermore, the sustainable agenda stems from the seventeen UN sustainable development goals (Regeringen, 2017; Regeringskansliet, 2018). To showcase Sweden's fast progression in the field of sustainability, it can be noted that Sweden was as of 2018 ranked number one the SDG index, which is a measure of how well countries implement the sustainable development goals (SDG index & dashboards, 2018). With this in mind, Sweden becomes an interesting case to study in terms of the impacts of sustainability on investing, since society's high pace in embracing the concept of sustainability.

From a historical point of view, common strategies for investors to accomplish the aim of investing in an ethical manner is to divest in stocks that are coined “sinful” i.e. by applying a negative screen as well as investing in firms that rank high on environmental, social and governance (ESG) criteria (UBS, 2017; Berry & Junkus 2012; Eurosif, 2018; Gary 2016). Furthermore, using ESG criterions to accomplish the aim of investing sustainable is becoming

one of the most popular approaches among institutional investors (Eurosif, 2018). Logically, the opposite of investing ethically could be found in stocks termed sinful. “Sin” stocks are in previous studies defined as companies engaged in the business of weapons manufacturing, gambling, alcohol, and tobacco (Statman, 2000; Hong & Kacperczyk, 2009; Perez-Liston & Gutierrez, 2018; Fauver & McDonald IV, 2014). This thesis studies the returns of Swedish sin stocks and ESG stocks, it also broadens the commonly used sin stock definition by including sectors that would be considered unethical based on today's institutional investors' standards (SEB, 2019; Länsförsäkringar, 2019; Öhman, 2019). The sectors included in this thesis definition of sin stocks, apart from the aforementioned, are firms connected to or purely focused in the areas of crude oil, gas and nuclear (Ngene, Tota-Maharja, Eke & Hills, 2016; Collins, Ugochukwu & Ertel 2008; Metz, 1994). Even though the mentioned strategies help investors hold a portfolio geared towards sustainable stocks and neglect sin stocks, a larger body of previous studies have shown that sin stocks achieve excess returns over the equity markets as well as offering lower risk to the overall investment portfolio (Hong & Kacperczyk, 2009; Trinks & Scholtens, 2017; Fabozzi, Ma & Oliphant, 2008). Meanwhile, it is important to point out that there have been studies suggesting no excess returns of sin stocks (Lobe & Walkshäul, 2011; Humphrey & Tan, 2014). Sin stocks have also been known to receive lower analyst coverage and institutional ownership due to the social stigma surrounding these type of companies (Hong & Kacperczyk, 2009). Looking at firms that engage extensively in ESG reporting activities, which is firms that focus heavily on corporate social responsibility (CSR), the results on ESG firms indicate that it is generally associated with creating more shareholder value, however there are in some cases no clear evidence of the direction of this casualty (Renneboog, Ter Horst & Zhang, 2008; Taylor, Vithayathil & Dobin, 2018; Flammer, 2015). This opens up for an opportunity to gain further insight into the difference in realized returns from these different investment approaches (investing in sin stocks or ESG stocks) in a country-specific context, in this case, Sweden. A comprehension regarding some of the underlying reasons for the achieved financial returns will also be found through key variables<sup>3</sup>.

The findings of this thesis are of interest for the ongoing shareholder and stakeholder debate, where ESG stocks could be considered to incorporate more of a stakeholder perspective than sin stocks do (Renneboog, Ter Horst & Zhang, 2008; Scholtens & Sievänen, 2013). Ethical

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<sup>3</sup> The key variables of interest in this thesis are liquidity, institutional ownership, firm age and book value of equity.

investing tends to include stakeholders' economic interests but also environmental, societal and organizational (i.e. labor unions, in reference to organizational factors) (Scholtens & Sievänen, 2013). This thesis therefore aims to contribute to the existing literature surrounding investment ethics by studying unethical investments (i.e., sin stocks) compared to more sustainable investments (ESG stocks). Hereby shedding light on the financial performance (stock returns) and some of its underlying reasons through key variables for the realized returns in a context where the general movement of sustainability has been impactful to date.

## **1.2 Problem area**

The expansion of ethical funds sheds further light on the ongoing shareholder- and stakeholder theory debate, that is, if firms should engage in pure value maximization or also focus on other type of stakeholder activities to create value (ETFGI, 2019; Dillenburger, Greene & Erekson, 2003; Machan, 2017). The increased discussion surrounding the value related to firms applying a shareholder- or stakeholder perspective has also been further elevated by the recent financial crisis (Tse, 2011; Scholtens & Sievänen, 2013). With the growth around the world in terms of awareness among investors in relation to environmental, social and corporate governance issues an area of significant research opportunities is provided (Renneboog, Ter Horst & Zhang, 2008). Putting this in context to the aforementioned debate, shareholder theory assumes that a portfolio geared towards sustainability (ESG criteria selection) will underperform the market portfolio. This is because of its increased inclusion of other activities than maximizing profits, where future profits are considered to be the main driver of stock prices (Renneboog, Ter Horst & Zhang, 2008; Friedman 1970; Ball & Brown, 1968; Berk & Demarzo, 2014). From an investor point of view, the movement of sustainable responsible investing could therefore be subject to Milton Friedman's critique. According to Friedman it could possibly be more efficient for sustainable investors to shift back to investing in conventional funds and rather use the excess returns by donating money to good causes (Friedman, 1970; Renneboog, Ter Horst & Zhang, 2008). Thereby studying how unethical stocks (sin stocks) performs compared to ethical stocks (ESG stocks) knowledge can be added to the shareholder and stakeholder debate. As mentioned in the introduction, there has been important research done on whether firms which are perceived as sustainable outperform or underperform in terms of stock returns, in relation to firms which are not perceived in the same way. Mixed results in terms of the performance between the two have been found (Lourenco et al, 2012). Moreover, being perceived as a sustainable company has come to be considered a source of competitive advantage for contemporary firms (Lourenco et al, 2012; Porter & Kramer, 2006). As

mentioned, this thesis contributes to these previous findings and the stakeholder and shareholder theory debate. Once again, this is done by studying if firms perceived as sustainable (ESG stocks) underperforms or overperforms and more precisely in a country-specific market, in this case the Swedish stock market (OMXSPI). Further, how this compares to stocks that could be considered to be the opposite to socially acceptable, sin stocks (Humphrey & Tan, 2014; Borgers, Derwall, Koedijk & Ter Horst, 2015). The difference in returns and realized risk from investing in ESG- and sin stocks are also of interest, and additionally if this difference (returns) can be explained by key variables. The creation of value is in this thesis primarily measured as the realized stock returns to investors.

The mentioned studies on sustainable investments could be conflicting with the prediction of Friedmans school of thought which would claim that ESG stocks, which engage in CSR i.e. stakeholders' activities, will decrease the value received to shareholders (Friedman, 1970; Vasal 2009). Companies that solely focus on increasing the economics welfare to shareholders according to the view of Friedman (1970) (i.e. sin stocks in this thesis) should achieve higher returns. Once more, previous studies on sin stocks suggest that there is overperformance in relation to the market (Hong & Kacperczyk, 2009; Fabozzi, Ma & Oliphant, 2008). However, there have also been studies showing that there is no difference in the realized returns for sin stocks (Lobe & Walkshäul, 2011; Humphrey & Tan, 2014). These results can add to understand the objective of today's investors, where from a pure value maximization perspective previous studies suggest not to neglect sin stocks. Yet as previously mentioned, institutional ownership and analyst coverage of sin stocks have been found to be lower than for other type of stocks (Kong & Kacperczyk, 2009). To conclude this part, the linkage of shareholder returns to CSR issues has been considered to be a good way of establishing the acceptability of the corporate sustainability concept in the view of investors and management (Vasal, 2009). This further motivates the methodology approach in this thesis.

### **1.3 Purpose of the study**

This study aims to understand the underlying reasons in the financial performance (stock returns) between unethical stocks i.e. sin stocks, and stocks that rank high based on the ESG factors, i.e. ethical stocks in Sweden.

### **1.4 Research question**

Is there a difference between sin- and ethical stocks in Sweden when it comes to their financial performance, and if so, why?

### **1.5 Outline of the thesis**

To help the continued reading, the reader should know that the rest of this thesis has been structured in the following way: the preceding part provides the theoretical framework and previous research within the field of this study, as well as the hypothesis development. The third and fourth part provides the methodology and results found from the empirical data. And to conclude this thesis, the fifth and sixth part of this study will analyze the results and concluding remarks will be provided.

## **2. Theoretical framework and literature review**

### **2.1 Theoretical framework**

#### **2.1.1 Shareholder theory and Stakeholder theory**

The neoclassical theory of the firm builds on the assumption that firms only have one goal of profit maximization (Runesson, Samani & Marton, 2017; Shapiro, 1976). The neoclassical theory provides a simplified view of the corporation, which is not realistic in practice, however it provides a starting point for understanding shareholder theory. Milton Friedman, who has been vocal within the field of shareholder theory, argues that the corporate executives of enterprises only have a direct responsibility towards their employers i.e. the shareholders (Friedman, 1970). This responsibility is to make sure that the action being taken within an enterprise ensures that it makes as much money as possible while also adhering to the general rules of the society which it operates in. This aligns with the assumptions under the neoclassical paradigm which states that firms always seek to maximize their profits, and that the behavior within the firm should always reflect the object of profit maximization (Runesson, Samani & Marton, 2017; Shapiro, 1976). Action taken within a firm that is not consistent with maximizing profit is considered to be a consequence of poor implementation of firm objectives (Rose, 2000; Shapiro, 1976). In other words, according to shareholder theory all action taken within a firm should reflect the objective of maximizing profits in the long term (Jensen, 2002; Friedman, 1970). This view is also in alignment with textbook economics, that embraces the shareholder value view, while stakeholders are guarded by contracts and regulation (Roland & Tirole, 2010). On the other hand, stakeholder theory states that managers have a responsibility to prioritize the well-being of all those that might be affected by the corporations' action (Machan, 2017; Jensen, 2002). Stakeholders include those that can affect the overall welfare of a firm, such as employees, customers, communities, the government and the environment (Jensen, 2002). These stakeholders should according to theory be considered because they can substantially affect the overall welfare of the firm. One objection to this point of view is that stakeholder theory lacks in providing a primary objective to the corporation's purpose (Jensen, 2002). Instead stakeholder theory aims to serve several interests groups which instead results in all interest groups being cheated (Jensen, 2002). However, in order to achieve the aim of value maximization all of the stakeholders must be pleased, since these provide the basis for creating value (Jensen, 2002). Continuing with the view of Friedman, the state should only get concerned when market participants cannot reach agreements that have low transaction costs.

Engaging in CSR would mean that the firm sacrifices profits on the expense of social interest, the firm would go beyond its contractual obligations (Friedman, 1970). Friedman further argues that businessmen are confused when claiming that they are defending free enterprise when stating that business is not purely engaged with generating profits but also promoting a social conscience, meaning that they have a responsibility in terms of eliminating discrimination or avoiding pollution. Therefore, he means that these types of social activities cripple the free enterprise and an agent engaging in these activities are enabling social views and acting as a public employee. This could be simiralized to the conflicting interests of value maximization and stakeholder theory (Jensen, 2002; Porter & Kramer, 2011). The key takeaway from Friedman's argumentation is that the corporate executives (i.e. agents) have a primary responsibility to the owners of the corporation. This also helps the owners in judging how well the manager is performing since the measurement of the firm objective is straightforward, which basically stems from the conflict of interest presented in agency theory (Friedman, 1970; Jensen & Meckling; 1976). Friedman states that if one wants to engage in activities that are concerned with one's "social responsibility" this should be done in the form of acting as a principal (i.e. the agent spending their own money), not as an agent of a corporation. This would mean that the executive (when acting as an agent of the firm) is using the money of the firm to reduce returns to its shareholders which is not in alignment with the objectives of the corporation.

There is also a lot of goodwill to be generated for corporations when being viewed as acting as socially responsible, which should be expenses that are justified by its own self-interest, firms that are engaging in social responsibilities are in a way window dressing according to Friedman (Friedman, 1970). The financial benefits generated from engaging in corporate social responsibilities has been mixed, while some studies state that the effect of CSR is positive since it reduces information asymmetry (Taylor, Vithayathil & Dobin, 2018; Flammer, 2015). This is conflicting with the view presented by Friedman. One main objection to the purpose of the corporate manager according to Friedman has been that corporate managers should manage the firm, so it benefits mainly stakeholders (Machan, 2017). However, pleasing a number of different interest groups of the firm would make it difficult to steer the company and would provide an impossible task for the companies since there are many different groups to entertain (Machan, 2017; Weiss, 2006).

### **2.1.2 Efficient market hypothesis**

Fama presented the efficient market hypothesis (EMH) in the 1970's (Runesson, Samani & Marton, 2017; Fama, 1970). The theory of efficient markets states that security prices fully incorporate all information available in the market at a given time, it is believed that the market is very efficient in reflecting available information into the security prices. The fundamental idea is that when new information arises it spreads fast and is priced into individual securities right away (Malkiel, 2003). The theory also builds on the idea of a random walk, which means that information is immediately reflected in stock prices and that tomorrow changes in the price will only reflect the news of tomorrow and therefore it is independent of the price changes happening the prior day (Malkiel, 2003). Furthermore, the theory states that in an efficient market it is impossible to gain abnormal returns (by abnormal returns one refers to returns that exceed the market returns) since information is available to all participants in the market and it is evaluated to the same risk (Fama, 1970; Boboc & Danica, 2013). Liquidity is an important concept when speaking on the efficiency of markets since this reflects how easy it is to make a trade at a given time for a certain price (Runesson, Samani, Marton, 2017). Having markets that are highly liquid is an underlying assumption of EMH since it builds on the idea of perfect markets, where one condition is a large number of sellers and buyers.

There are three different forms of market efficiency presented: strong-form efficiency, semi-strong-form efficiency, and weak-form efficiency. (Runesson, Samani & Marton, 2017; Fama, 1970). Strong form efficiency means that all information, both public and private, are reflected in the security price. Semi-strong form efficiency assumes that all information that is publicly known is reflected in the security price. The market is fast in incorporating this information. And finally, weak-form efficiency assumes that only historical information is included in the security price, which in turn would mean that security prices cannot be used to predict future prices. Under the assumption of weak-form efficiency, excess returns cannot be gained using investment strategies incorporating historical information, technical analysis will not be applicable. There have been several critiques of the hypothesis, and there are plenty of studies finding inconsistencies in the market efficiency over time (Boboc & Danica, 2013). For example, the US stock market has been found to have time periods of inefficiencies, with 1973 to 2003 being the most efficient period (Alvarez-Ramirez, Rodriguez, Espinosa-Paredes, 2012). Evidence of inefficiency which in turn cause a time-varying return predictably in the Dow Jones index has also been found (Kim, Shamsuddin & Lim, 2011)

## 2.2 Literature review

Hong and Kacperczyk (2009) study what are known as sin stocks which are publicly traded companies that engage in some unethical activities. These are companies involved in the industries of tobacco, gambling, and alcohol. They hypothesize that there are constraints from the societal norms in funding companies engaged in the business that have a “sin” character, this is especially true for institutional investors. With this in mind, they find that sin stocks are generally less held by institutional investors (such as pension plans) compared to other types of investors, such as hedge funds, which can be considered to be arbitrageurs. Furthermore, these types of stocks receive less analyst coverage compared to other types of firms. There is also evidence found that sin stocks have a higher expected return than other comparable stocks. This is in alignment with sin stocks being neglected by the norm-constrained investors as well as their heightened risk for facing litigation due to its divergence from social norms. Finally, they state that the performance of sin stocks outside the United States suggest that societal norms affect stock prices and returns. Continuing on this topic, Trinks and Scholtens (2017) found in their study concerning negative screening that there is an opportunity cost for investors to neglect investing in firms that are considered controversial, i.e. sin stocks. Investing in controversial stocks can provide higher risk-adjusted returns to the investors according to their study. Trinks and Scholtens (2017) suggest that there can be a trade-off regarding values and beliefs on the one hand, and financial returns on the other. Meanwhile, Lobe and Walkshäusl (2011) find in their study that upon a comparison with non-socially responsible firms and socially responsible firms picked from the market portfolio does not lead to a significant difference in financial performance, which is conflicting with the previously presented study’s findings. They created an index of both global and domestic indexes containing unethical stocks in order to compare their returns. Edman (2011) also found socially responsible investing, by applying screening methods, may lead to improved investment returns. Humphrey and Tan (2014) did a similar study when also comparing the risk and returns of a screened and unscreened portfolio of stocks and found that there was no significant difference obtained regarding risk and returns and concluded that a socially responsible fund should be indifferent from screening the portfolio.

Social views in different countries have been found to impact sin stocks differently when it comes to firm valuation and excess returns, according to Fauver and McDonald IV (2014). Sin stocks are said to have an 8% lower equity valuation in countries where society takes a clear

stand against industries deemed to be sinful. Furthermore, they find that sin stocks tend to have an annual excess return of 1-2%. These returns do differ between countries that have clear capital and investment controls and those that do not. Similar results, of a pure sin stock portfolio, outperforming the markets, were found by Fabozzi, Ma and Oliphant (2008). Borgers et al (2015) studied the economic significance of social dimensions in investment decisions by looking at what determines funds exposure towards controversial companies and if the exposure to controversial stocks (i.e. sin stocks) will enhance the funds' returns. They found that exposure to socially irresponsible stocks was lower for funds aiming to attract socially conscious investors and institutional investors. The returns generated by holding more sin stocks were positive; however, the risk-adjusted return had spread between the funds with the highest sin stock and lowest exposure that were not statistically significant. The results of the study further indicated that fund managers did not invest heavily in sin stocks due to social considerations and practical constraints. Dukes (2008) studied how personal values affect the pricing of stocks. It was found that the biggest argument for not buying sin stocks was because it will not look good. Heinkel, Kraus and Zechner (2001) explored the effects of exclusionary ethical investing. This study shows that exclusionary ethical investing makes polluting firms less held by investors since "green" investors do not want to hold polluting firms. The lower interest in holding stocks in polluting firms leads to lower prices for these firm which raises the cost of capital. If the increased cost of capital exceeds the cost of the polluting firm cleaning up its activities, the polluting firm will become socially responsible. When it comes to the effects of investor sentiments, Perez-Liston and Gutierrez (2018) found that these positively influences sin stock returns for a limited period of time (four months approximately). What is termed irrational shocks also had a positive effect on sin stock returns, but this was weaker and said to be insignificant according to them. Kim and Venkatachalam (2011) investigates the impact of financial reporting quality on sin stock returns. It is found that the reporting quality of firms deemed to be sinful was better in terms of the predictability of earnings and future cash flow as well as having a timely loss recognition. Despite sin stocks', higher returns and better financial reporting quality, investors were willing to neglect to invest in sin stocks and instead comply with the norms of society. Chang and Krueger (2013) study the vice fund (VICEX) in the US, which is a fund consisting of unethical companies trading in the United States. The study finds a support that the vice fund provides a higher risk-adjusted return over the studied ten-year period than the S&P 500 does as well as compared to a Morningstar based benchmark.

Kempf and Osthoff (2007) study the effect of following SRI ratings to achieve abnormal returns in the US stock market (SP500). They find that a portfolio with a high SRI rating does achieve abnormal returns compared to a portfolio with a lower rating, therefore the best trading strategy for an investor would be to buy firms with high SRI rating and sell companies with low SRI ratings, this is conflicting with previous studies. This study suggests that past SRI ratings are of valuable information to investors, which when applying a simple trading strategy (the strategy is explained above) leads to higher returns. Liston and Soydemir (2010) study the risk-adjusted returns of a sin portfolio and what is termed a faith-based investment portfolio. To test the returns, they use three different models; CAPM, Fama and French three-factor model and Carhart four-factor model. It is found that investors that seek to get some sort of market protection should invest in the sin portfolio while investors seeking more exposure to the market should apply a faith-based investment portfolio. The sin results challenge the efficient market hypothesis because of the norm-neglect hypothesis (i.e. that investor's neglect of sin stocks leads to higher returns). Salaber (2007) studies sin stocks on the European market (18 European countries used) in order to understand what determines the risk-adjusted returns of these firms. He finds that sin stock performance is largely based on legislation and cultural environment in different countries. It has been found that CSR disclosure generally leads to higher firm value (Taylor, Vithayathil & Dobin, 2018). Flammer (2015) found similar results, that upon the disclosure of CSR leads to abnormal returns upon its announcement. Lo and Kwan (2017) look at the effects of firms engaging and implementing ESG activities on stock values in Hong Kong and found that the market generally responds positively to firms active in these activities, but according to the study this evidence was weak. When looking at purely SRI fund performance Renneboog, Ter Horst and Zhang (2008) provides a review of prior studies within the field, finding that on an aggregate level in the US and UK for SRI funds there was little difference to conventional funds on average, while in continental Europe there was underperformance. They mean that investors are willing to, therefore, accept financial underperformance in order to not compromise their personal beliefs. Vasal (2009) studied the returns of a socially screened portfolio based on ESG criteria in the Indian capital market it was found that the socially screened portfolio did not underperform the market, rather indications of excess returns compared to the market portfolio was found, this because the excess returns could not be determined to be statistically significant. To further understand what drives stock returns, there has been previous studies looking at the number of trading years for specific stocks, where the firm age has been known to impact the returns generated by stocks (Matemilola, Ariffin, Nassir, Azaman-Saini, 2017). Relating to the trading years of

the firm, the IPO effect is one of these and is a well-documented phenomenon for newly listed firms (Ritter, 1991; Jieting, Yucan, Xiaomin, 2011; Matemilola, Ariffin, Nassir, Azaman-Saini, 2017). It has been found that newly listed firms tend to initially overperform which is followed by underperformance in the subsequent years following their IPO. Looking at the effects of how the book value of equity for a firm and liquidity in a publicly trading firm affects stock returns, it has been found to have a significant effect in explaining stock returns (Jieting, Yucan, Xiaomin, 2011; Datar, Narayan, Radcliffe, 1998). As previously mentioned in this literature review, Hong and Kacperczyk (2009) use institutional ownership as a measure in understanding investor behavior. Moreover, they also found that Institutional ownership did have indirect implications on liquidity through its impact on a stock spread.

The development of the hypothesis for this thesis is based on the research presented in this literature review. The first hypothesis that is presented is based on the abnormal returns between two constructed portfolios (sin stock portfolio and ESG stock portfolio) and the market proxy. It has been hypothesized that there is a difference between the returns received from a sin stock- or ethical portfolio compared to the market index. As has been presented in this literature review, there is evidence of a divergence in returns received to investors investing in a sin stock portfolio and ethical portfolio, both indicating over- and underperformance in relation to the market.

### ***Hypothesis 1a***

H<sub>a</sub> = There is a difference in returns generated between unethical stocks (sin stocks) and the Swedish equity market.

### ***Hypothesis 1b***

H<sub>a</sub> = There is a difference in returns generated between ethical stocks (ESG stocks) and the Swedish equity market.

In the second hypothesis, it is hypothesized that there is a difference between sin stocks and ESG stocks in their excess returns. Further, if the obtained returns in hypothesis one partly can be explained by key variables (institutional ownership, firm age, equity and liquidity), in this case with the usage of financial accounting information and technical stock variables<sup>4</sup>. As has

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<sup>4</sup> Technical stock variables relate to tools that can be used to understand the price movement of stocks (Nazário, Silva, Sobreiro & Kimura, 2017).

been presented in this literature review the variables that are used have had an impact on the returns of stock prices. Therefore, it is reasonable to test for these variables potential impact on the obtained returns in the first regression of this thesis.

***Hypothesis 2a***

H<sub>a</sub> = There is a difference in excess returns between sin stocks and ESG stocks.

***Hypothesis 2b***

H<sub>a</sub> = The difference in excess return is influenced by at least one key variable.

### **3. Methodology and data collection**

#### **3.1 Research design**

This study analyzes empirical data using a quantified research method and does more precisely apply a cross-sectional regression analysis (Wooldridge, 2009). The OLS-regression requires high awareness and expertise to make sure that the interpretation and analysis of the data are done in a correct manner, not the least it must follow the underlying assumptions of a regression (Crawley & Whalen, 2014; Dzemski, 2017). Some of the tests are stated in the footnotes in the results section. It is essential to examine the causality of the relationship behind the dependent and independent variables correctly and with accuracy in order to state the reliability of the study (Cooke, 1998). Further, the independent variables in a regression analysis aim to explain the variability of the dependent variable (Jaggia & Kelly, 2019). Since there are many factors that affect the movement of stock prices, a multivariate regression analysis will also be applied (Berk & Demarzo, 2014; Hong & Kacperczyk, 2009; Chu, 1997; Jaggia & Kelly, 2019). Regressions are restricted in the way of usage since it cannot describe all underlying relations. However, Dzemski (2017) and Crawley and Whalen (2014) claim that regressions provide a good prediction in order to explain the world of politics, which further motivated the usage of regressions to fulfill the purpose of this study. Once again, it is of great importance to state the reliability of a regression-based study, meaning that the underlying OLS assumptions are fulfilled, which was tested further in the study (Jaggia & Kelly, 2019; Dzemski, 2017). Survivorship biases is also taken into consideration when obtaining the sample of stocks for this study (Linnainmaa, 2013). This means that companies that have gone bankrupt or has been unlisted will be included in the overall sample. If one does not consider the concept of survivorship biases the outcome of the study might become biased, which in turn could hurt reliability of the study. CybAero, which is included in the sample of this study has filed for bankruptcy (CybAero, 2018).

This study develops two different hypotheses (see section 2.2), which means that two separate regressions were conducted. The first regression tests the returns of constructed sin- and ethical stock portfolios against the OMXSPI (the proxy for the market portfolio on the Swedish market in this thesis). To conduct the first regression the two portfolios are constructed using value and equal weighting, for the measurement of the returns the calendar time approach is used (Jaffe, 1974; Mandelker, 1974; Dutta, 2015). The calendar time approach was originated by Jaffe (1974) and Mandelker (1974) and this approach builds on the average abnormal time

series returns for monthly portfolios. The second regression tests the difference in the alpha (excess return) between the ESG and sin stocks and aims to explain some of its alpha by using underlying key variables (see 3.2.4 for the variables applied in this regression). For the second regression panel data is used and alpha is also the dependent variable. Panel data structures the data in another way that allows for measurement overtime (compared to cross-sectional data). By structuring the data this way individual outcomes can be measured and more accurate predictions can be provided. It should be stated that there are several exogenous factors outside the model that can explain the underlying reasons in financial returns, the chosen variables are selected on the basis of previous research (see section 2.2).

### 3.1.1 Formula for the first regression

$$R_{i,t} - Rf_t = \alpha_i + \beta_i(Rm - Rf_t) + \epsilon_{i,t} \quad (1.1)$$

Where  $R_{i,t}$  is the return on the stock,  $Rf_t$  is the risk-free interest rate,  $\alpha_i$  is the alpha i.e. the excess return of the stock,  $\beta_i$  is the beta of the stock in relation to the market,  $Rm_t$  is the return of the market portfolio and  $\epsilon_{i,t}$  is the error term.

### 3.1.2 Formulas for the second regression

$$\alpha_i = (R_{i,t} - Rf_t) - \beta_i(Rm - Rf_t) + \epsilon_{i,t} \quad (1.2)$$

$$\alpha_i = \beta_0 + X_1\beta_1 + X_2\beta_2 + \dots + X_n\beta_n + \epsilon_{i,t} \quad (1.3)$$

The first formula (1.2) used in the second regression uses the same variables as in the first regression (1.1), the difference is found in that the equation has been solved for  $\alpha_i$ , which is the alpha i.e. the excess return of each stock in the regression. The second formula (1.3) shows the regression model with alpha as the dependent variable. Where  $\alpha_i$  is the alpha of the stock, and  $\beta_x$  represents the impact of the independent variables on the  $\alpha_i$ .

### 3.2 Description of data

Historical data of different stocks were collected from 2009-09-01 until 2019-01-31 on the Swedish stock market. The Swedish stock exchange contains a security universe of approximately 890 trading stocks (Bloomberg, 2019). In this universe stocks trading on the regulated market i.e. the Stockholm stock exchange, the pre-markets and the Multilateral Trading Facility (MTF) i.e. first north and spotlight exchange are also included (Nasdaq, 2019a). The mentioned time period captured stock returns post the 2007-2008 financial crisis outbreak. Furthermore, the volatility during the financial crisis reached levels that were far above the normal stock market volatility, this later returned to what could be considered more normal levels during the second half of 2009 (Schwert, 2011; Karunanayake, Valadkhani & O'Brien, 2010). Having volatility that is abnormal as a starting point can hurt the reliability (in this case the stability) of the study, therefore, it was decided to use 2009-09-01 as the starting point of this study (Bryman, 2016). Monthly data of the stock returns were downloaded from the Bloomberg database on the 4<sup>th</sup> of February 2019. Prior studies within the field of sin stock returns have used monthly data (Fauver & McDonald IV, 2014; Hamilton, Hoje & Statman, 1993; Lobe & Walkshäusl, 2011). Data on 36 sin stocks were found in the Bloomberg equity screener, which is based on the definition of sin stocks presented in section 3.2.1 for this study, this composes the sin stock portfolio. 60 stocks were found for stocks that fulfill the ESG-scoring criteria and a negative screen of sin stocks in the Bloomberg database, this is the foundation for the ethical portfolio. These two portfolios were compared to data based on the Swedish OMXSPI-index returns.

When conducting a study looking at 96<sup>5</sup> firms that are divided into two groups (sin stocks and ESG-stocks) one can be exposed to unsystematic risk. This means that when there are a limited number of firms in the sample each firm has a palpable effect on the outcome (Markowitz, 1952). The unsystematic risk cannot be directly avoided when conducting this study. However, when selecting the companies included in the portfolios the definitions of sin stocks and ESG stocks was strictly followed, which removed the subjectivity involved in the selection of companies. Finally, a one-month treasury bill (SSVX 1M) was retrieved from the Swedish central bank, Riksbanken, which is the risk-free rate used for this study (Riksbanken, 2019). Once the data was downloaded from Bloomberg, it was examined to make sure that there were no fallacies present before conducting the regressions. For example, the financial accounting

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<sup>5</sup> Edman (2011) uses in his abnormal return study a maximum of 100 companies.

variable (book value of equity) were cross-checked against annual report filings to make sure the provided data was accurate. To illustrate, the firm Swedish Match had a book value that was negative (Bloomberg, 2019; Swedish match, 2018). This was controlled in the annual report for the relevant years to assure that the numbers were accurate. As previously mentioned, this was done for companies where the KPI:s were spread from what could be considered the “norm”. The sin stocks and ESG stocks were also sectors classified (industry effects) to find the effects of specific sectors on the returns realized in regression one, this was done as a robustness check. The industry classifications were obtained through a previous study, it was also checked against Bloomberg and the Swedish bank Avanza’s webpage (Mavruk, 2017; Bloomberg, 2019; Avanza, 2019). The data that was available for sector classifications extended to 2014, therefore it had to be assumed that the sector classifications for each company had not changed since 2014 to the present date, in this case 2019. Since some companies included in this thesis were not publicly listed firms prior to 2014 more current information was found in Bloomberg and Avanza (Bloomberg, 2019; Avanza, 2019). The data from 2014 was also checked against the more current information. See appendix pie chart 1, 2 and 3 for how the portfolio's exposure to certain sectors look. By accounting for industry effects, industry-specific factors could be controlled within certain industries such as the oil and gas industry. The stock returns within this industry greatly depend on the movement of the oil price, therefore the effect of the oil price can indirectly be derived (Broadstock, Cao & Zhang, 2012). The oil price is of particular interest because the sin stock portfolio has an exposure of 39% to the oil and gas industry (see appendix pie chart 1).

### **3.2.1 Sin Stocks**

The most commonly used definition of sin stocks in previous studies is that they are present in the sectors of gun manufacturing, gambling, alcohol and the tobacco industries (Statman, 2000; Hong & Kacperczyk, 2009; Perez-Liston & Gutierrez, 2018; Fauver & McDonald IV, 2014). As said in the introduction, this study broadens this widely used definition of sin stocks. Oil and gas companies are included in the sample of sin stocks. This because oil and gas companies have a clear negative impact on the environment and public health (Ngene et al, 2016; Collins, Ugochukwu & Ertel 2008). Ethical funds in Sweden also frequently exclude oil and gas related companies, which further motivated the inclusion of oil and gas companies (SEB, 2019; Länsförsäkringar, 2019; Öhman, 2019). Companies related to nuclear activities have also been included (Metz, 1994). Nuclear activities are related to environmental issues and weapons manufacturing. Sin stocks are defined hereafter to stocks in the sectors of gun manufacturing,

crude oil, gas, nuclear, gambling, alcohol and the tobacco industries (Statman, 2000; Hong & Kacperczyk 2009; Ngene et al, 2016; Collins, Ugochukwu & Ertel, 2008; Perez-Liston & Gutierrez, 2018). Sin stocks are in general perceived as firms with a core business engaged in immoral or unethical activities (Fondkollen, 2019). Furthermore, previous studies on sin stocks have not included adult entertainment services in their sample due to not having a clear enough industry classification (Hong & Kacperczyk, 2009; Hong, Kubik & Stein, 2004; Salaber, 2007). This study does not use adult entertainment as sin stocks, with the same motivation as previous studies. As mentioned in the outset of the method section, the collection of sin stocks led to an unbiased sample consisting of 36 stocks. These 36 stocks have a clear distinction towards consumer services (gambling) and oil and gas sectors (see appendix pie chart 1 or table 10, for sector exposure). To see the specific companies and which sector these stocks are included within see table 7 in the appendix (sector classification is based on data from Mavruk, 2017; Bloomberg, 2019; Avanza, 2019).

### **3.2.2 ESG stocks**

In contrast to a sin stock portfolio, an ethical stock portfolio was also created using stocks, which have a substantial focus towards the disclosure of environmental, social and governance (i.e. ESG). The disclosure performance (amount of ESG data reported) is ranked by Bloomberg based on well firm disclosure in terms of the three different ESG criteria (Bloomberg, 2019). Companies that do not disclose any ESG information will not receive a score by Bloomberg. The score ranks from 0.1 to 100, where 0.1 is when the company discloses a minimum amount of ESG data and 100 is those that disclose every data point collected from Bloomberg. The data points are connected to how important they are in relation to other data such as greenhouse gas emissions, which when this relationship is great, it will receive a higher weighting than other disclosures. Considerations in this Bloomberg measure of ESG scoring are also taken to the sector the firm operates in.

As mentioned in the introduction, one approach to investing responsibly and sustainably is incorporating ESG-factors in to the investment criteria, this will help in managing risks and providing sustainable returns (PRI, 2019; Lo & Kwan, 2017; Fondbolagens förening, 2019; Trinks & Scholtens, 2017; Gary 2016; Radu & Funaru, 2011). Also, in the universe of sustainable investments, the application of ESG-criteria selection is the fastest growing strategy for fund managers and is increasingly becoming the norm, a greater application among investors of ESG-based investment decision making is, therefore, occurring (Eurosif, 2018;

Bianchi & Drew, 2012; Gary 2016). This incentivized the study to use ESG screening as a criterion to create a portfolio that considers sustainable development and therefore ethical investing. However, it is important to point out that when applying ESG-criteria for responsible and sustainable investing, companies that are considered unethical based on negative screens can be included (Gary, 2016). The authors, therefore, applied a negative screen to the ESG-stock universe using the previously presented definition of sin stocks, which in turn increases the validity of the study (Bryman, 2016). A negative screen excludes companies that are engaged in undesirable activities (Berry & Junkus 2012; Humphrey & Tan, 2014; Trinks & Scholtens, 2017). This way the authors were able to construct an ethical portfolio in the best possible way given the tools at hand while remaining unbiased in their selection of stocks on the Swedish equity market. Applying a positive screen to create the ethical portfolio would add subjectivity in terms of which companies to include or exclude on the Swedish market and could, therefore, hurt the validity of the study (Bryman, 2016). A positive screen includes companies that strive towards the betterment of for example human rights and the environment (Berry & Junkus, 2012; Gary, 2016; Fondkollen, 2019). To conclude, Bloomberg's ESG-index was used as a filter in order to find companies that have a high focus towards ESG. The portfolio consists of 60 different companies within several different sectors (see appendix pie chart 2 or table 9 for sector exposure), thereby this indicates that it will not be a biased sample towards certain sectors which can lead to adverse results. To see the specific companies and which sector these stocks are included within see table 8 in the appendix (sector classification is based on data from Mavruk, 2017; Bloomberg, 2019; Avanza, 2019).

### **3.2.3 Nasdaq OMXSPI**

The performance of the two created portfolios was measured against the Swedish OMXSPI-index, also referred to as the all-share index of Sweden, since it consists all listed stocks of the Swedish Stockholm stock exchange (Nasdaq, 2019b). This index does not include dividends. Further, this means that the market portfolio will be OMXSPI for this study. which will act as a proxy for the Swedish stock market. Data for the OMXSPI-index was retrieved from Bloomberg (Bloomberg, 2019). OMXSPI is a suitable benchmark towards the two created portfolios since it weights together with the value of all listed firms on the Swedish stock exchange, without restriction to size or market capitalization (Nasdaq, 2019b). Since all listed firms in the Swedish stock market are included in the index, the unsystematic risk is diversified away and the volatility of the market portfolio is mainly exposed towards systematic risk, i.e.,

market risk (Markowitz, 1952; Berk & Demarzo, 2014; Bryman, 2016). Therefore, this broad index provided a comprehensive view regarding the growth and performance of the Swedish Stockholm stock exchange. The authors also contacted NASDAQ over the phone, to see if there was a similar all share index to OMXSPI that used equal weighting for the construction of the portfolio, this because of the discussion in part 3.3 in this method section. The immediate index would be the OMXS50EW, which equally weights the 50 biggest companies on the Swedish stock exchange (Nasdaq, 2019c). It was decided not to use this index since it does not provide a good proxy of the market portfolio.

#### **3.2.4 Variables used in the regressions**

In the literature review of this study (see section 2.2) the used KPI:s in this study has historically been found to partly explain stock returns. This study used four key variables, where one of them is a financial accounting variable (book value of equity) and three of them are considered to be technical stock variables (Firm age, liquidity, institutional ownership). All of the variables except firm age were downloaded from the Bloomberg database, for these variables yearly data was obtained. Firm age was obtained from the Swedish bank Avanza (Avanza, 2019). This means that the second regression accounts for yearly data instead of monthly. It was decided to be better fitting since the financial accounting variable could not be obtained on a monthly basis without making linear assumptions of its progression which in turn is favorable for the reliability of the results. The closest possible frequency for financial accounting would be quarterly data. For the technical variables, this was not a problem, but for consistency purposes, yearly data was also used. As mentioned in the first part of this method section some data that deviated from the “norm” were cross-checked in their annual report filings. In order to conduct this part of the regression, the stock returns alphas had to be adjusted to a yearly basis instead of monthly. In section 3.6 the limitations of using a few key variables are discussed.

#### **3.3 Construction of the sin- and ethical stock portfolio**

One main difference between the sin- and ethical stock portfolio is that the ESG portfolio contains larger companies (market capitalization) than the sin stock portfolio, which contains on average smaller companies (market capitalization). From the perspective of risk, the unsystematic risk is mostly diversified away with a portfolio containing 30 companies or more (Berk & Demarzo, 2014; Elton & Gruber, 1977; Markowitz, 1952). From that perspective, the number of companies held in the sin stock portfolio is not problematic. When a portfolio is equally weighted the systematic risk tends to increase, for a value weighted portfolio the

systematic risk compared to an equally weighted portfolio would be lower (Pae & Sabbaghi, 2015). This higher systematic risk stems from the convexity of the interest tax shield and capital structure of the firms in the portfolio. The difference in systematic risk between equally and value-weighted portfolios increase with the number of companies held in a portfolio. Therefore, both methods were applied in order to observe the differences. However, the authors are aware that the sin stock portfolio has few companies with large market capitalizations, which when tested, showed that the two largest companies would have an impact of 50% to the total portfolio weight of the portfolio and the six largest firms would have an effect of 85%, that is if the portfolio is value weighted. Constructing the portfolio based on value weighting makes the sin stock portfolio exposed to higher volatility and a more substantial unsystematic risk since the large impact of these few firms (Berk & Demarzo, 2014; Markowitz, 1952). Therefore, it was chosen to accept either higher systematic risk if the portfolio is an equally weighted, or lower systematic risk if the portfolio is value weighted (Pae & Sabbaghi, 2015). Previous studies have also used an equal weighting to construct portfolios and benchmarked them against a value-weighted market index (Hong & Kacperczyk, 2009; Edman, 2011). Constructing both value and equally weighted portfolios has also been used as a robustness check (Edman, 2011). The formulas for conducting the weighting and calculating the returns are as followed:

### **Equally weighted portfolio**

$$E(R_{Pe}) = \sum_n^1 \left( \frac{1}{n} * E(R_j) \right) \quad (1.4)$$

This formula (1.4) shows how the equally weighted portfolios are calculated. The formula shows that each company has the same weighting in the portfolio. The quota of  $n$  stock is multiplied with the individual expected return for each stock,  $E(R_j)$ . These returns are then summarized.

### **Value weighted portfolio**

$$E(R_{Pv}) = \sum_n^1 \left( \frac{\text{Value of investment}_j}{\text{Total value of portfolio}} \right) * E(R_j) \quad (1.5)$$

This formula (1.5) shows how the value weighted portfolios are calculated. This formula shows the market value of each stock divided by the total market value of the portfolio multiplied by the expected return of each stock,  $E(R_j)$ . These returns are then summarized.

### **Expected return of a portfolio**

$$E(R_p) = \sum_{j=1}^m w_j E(R_j) \quad (1.6)$$

This formula (1.6) shows the expected return of a portfolio. The formula shows the weighting ( $w_j$ ) of each stock in the portfolio multiplied by the expected return of each stock ( $E(R_j)$ ). These returns are then summarized.

In appendix graph 1 the difference between constructing the sin stock portfolio and the ESG portfolio based on value or equal weighting can be seen. This graph presents the realized returns for the studied period. This was constructed through indexation of the constructed portfolios cumulative returns. For the construction of the two portfolios it would be better fitting to use equal weighting since the sin stock portfolio contains small companies from a market capitalization perspective, which makes the realized return for the selected time period concentrated to a few companies. By weighting equally, the dilemma of smaller companies returns not being captured in the returns can be avoided. Meanwhile, the OMXSPI is value weighted which would imply that the two portfolios should be value weighted as well since this provides consistency in the comparisons. However, both weighting approaches were tested in the regressions.

### **3.4 Selection of asset pricing model**

To obtain a model which could help explain the differences in potential abnormal returns, the capital asset pricing model (CAPM) was chosen. The model is very practical and straightforward in its application, it is also considered to be robust and has passed the test of time and is today a predominant model (Berk & Demarzo, 2014; Hillier, Ross, Esterfield, Jaffe & Jordan, 2013; Fama & French, 2004). CAPM is based on that risk should be considered as a premium to predict potential returns (Perold, 2004). The required rate of return is the increase in value one could expect to realize based on the inherent risk level of the asset. One practical problem with applying the CAPM model is to identify the efficient portfolio i.e. the market portfolio (Berk & Demarzo, 2014). For this study the market portfolio is OMXSPI, as

previously stated this is a value-weighted index, which is a requirement for the market portfolio (Nasdaq, 2019b; Berk & Demarzo, 2014). OMXSPI captures the entire Swedish equity market, which makes the unsystematic risk as small as possible given the restriction of the market (Nasdaq, 2019b; Markowitz, 1952). The formula (1.7) of CAPM is as followed:

$$R_e = R_f + \beta(R_m - R_f) \quad (1.7)$$

Where:  $R_e$  is the Expected return of the security,  $R_f$ : is the risk-free rate,  $\beta$ : is the beta of the security, i.e., the volatility of the security compared to the market proxy, which in this study is OMXSPI and  $R_m$ : is the expected market return (Hillier et al, 2013; Berk & Demarzo, 2014). The CAPM-model was developed from Markowitz portfolio theory with its core associated to diversification, meaning that increasing the numbers of companies in a portfolio will reduce the unsystematic risk of a portfolio i.e. the firm specific risk which in turn will limit the possibility of obtaining abnormal returns (Markowitz, 1952; Fama & French, 2004).

For conducting a study of this type, it would have been logical to use the Fama and French three factor model or the Carhart four factor model. This because the models have been found to have greater explanatory power than CAPM, however the difference in explanatory power is not found to be substantial (Hillier et al, 2013; Barhodly & Peare, 2004; Sattar, 2017). Meanwhile using the Fama and French three factor model or Carhartt model has been found to require a lot time and effort, also there is a limitation of accessible data to construct the three factor model and Carhartt model, the data available ends at 2016 (Sattar, 2017; Houseoffinance, 2019; Kenneth R. French data library, 2019). Due to these reasons it was decided to use the CAPM model for this thesis. As mentioned earlier, a one-month treasury bill (SSVX 1M) was used as the risk-free interest rate, this is the shortest term available for a Swedish treasury bill from Riksbankens webpage (Riksbanken, 2019). The risk-free interest rate for each month for the selected time period of the study (2009-09-01 until 2019-01-31) was captured. This because applying for example the one-month treasury bill from January 2019 to the entire period of the study would be faulty. By using the monthly risk-free rate, the returns of the portfolio will match the returns of the risk-free rate. No transformation had to be made to the one-month treasury bill since it already fulfilled the desired time interval. To calculate the returns of the stocks on a monthly basis a simple return formula was used, dividends paid out to investors will be excluded in this study (Berk & Demarzo, 2014):

$$\text{Total stock return} = \frac{(P_1 - P_0)}{P_0} \quad (1.8)$$

This formula (1.8) shows the total stock return where  $P_1$  is the current price of the stock, and  $P_0$  is the prior date price of the stock.

### 3.5 Consideration of risk in the obtained returns

For the first hypothesis of the study, the measurement of returns on a comparable basis to the market portfolio was made. The implied volatility of the sin stock portfolio and the ethical stock portfolio is widespread. The volatility of the equally weighted sin stock portfolio amounted to 6.48% on a monthly basis, while the volatility of the equally weighted ESG portfolio amounted to 4.5% on a monthly basis. Therefore, this risk had to be accounted for when measuring how well an investor is being compensated for the increased risk their taking from holding the different portfolios. To adjust for the risk the Sharpe ratio was used (Berk & Demarzo, 2014; Schuster & Auer, 2012). The Sharpe ratio is one of the most commonly applied performance measures and accounts for risk through volatility (Schuster & Auer, 2012). One common problem with the Sharpe ratio is that it can occur a sample size bias which can lead to an overestimation of the value of the Sharpe ratio. There are other measures that can be used for measuring risk adjusted returns. For example, Treynor ratio is one common measure of risk but instead of using the implied volatility of a portfolio it uses the beta. In this case beta is the movement of the portfolio against the market portfolio (Treynor, 1965). By using the Sharpe ratio another measure of risk will be used (volatility). It was easier to understand which portfolio has been superior to hold not only from an excess return perspective but also when accounting for the risk (volatility) the investor had to bear to hold these different portfolios of stocks. The formula for the Sharpe ratio (1.9) is the following:

$$S = \left( \frac{R_p - R_f}{\sigma_p} \right) \quad (1.9)$$

Where  $R_p$  is the average realized return for the respective stock portfolios,  $R_f$  is the average one-month treasury bill and  $\sigma$  is the average volatility of the portfolios.

### **3.6 Limitations of the study**

In the preceding parts of this method section different aspects and its potential back draws of this study's approach has been discussed. Apart from these discussions in the method section, one important limitation of this study is the use of variables to explain the excess returns of the sin- and ESG stock portfolios, which serves to answer the second hypothesis of this study. The authors of this study have aimed to choose the variables that potentially could have high explanatory power for the excess returns realized from the portfolios based on previous studies findings (see section 2.2). Most of the variables used to explain the excess returns are technical stock variables, there are also other types of variables such as financial accounting variables that can explain excess returns at times in the stock market. By mainly using technical stock variables the authors adapt in a way a technical stock approach in determining what could impact the stock prices movements of longer periods of times, in this case nine and a half years. This contrasts for example the view of the fundamental value approach (intrinsic value) in determining the movement of stock prices. Therefore, there are obvious limitations in using a few key variables to explain the excess returns of the stock portfolios since there are many factors that could explain the excess returns gained in the sin- and ESG stock portfolios of this study. While the authors could widen the variables used to explain hypothesis two this would still be a limitation.

## 4. Results

### 4.1 General description of the data

This part of the thesis is structured to first present descriptive statistics (section 4.1.1 and 4.1.2) and then present the obtained results from the regressions (section 4.2.1 and 4.2.2), which is the basis for the findings of this thesis. To conclude this section a review of the robustness checks will be made (section 4.3).

#### 4.1.1 Descriptive data in the first regression

For the first regression, the descriptive data showcases a value and equally weighted sin stock portfolio and ESG portfolio. To conduct this regression the portfolios had to first be constructed. In table 1 a description of the data is provided. The summary data that is presented is shown after winsorizing of the data had been made. This was done initially because there were clear outliers in both the residuals and the observations. These values were dropped because they were extreme in relation to the other observations. A cut off of 1 and 99 were used, where 1 is the 1st percentile and 99 is the 99th percentile. Dropping these values were also of importance in order to fulfill the underlying OLS assumptions. As can be seen in the summary plot there are 112 observations (except for ESG equal, where two observations were dropped), it is also seen that the standard deviation is higher for the equally weighted portfolios. For example, the standard deviation for ESG equal is 0.0419 and for sin equal the standard deviation is 0.0648. Furthermore, it can be observed that the min values are similar but when looking at the max values it can be observed that for the sin stock portfolio the max values are significantly higher than those of the ESG portfolio. Finally, it was checked that the residuals in the data for the first regression were homoscedastic and normally distributed.

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
ESG Value - Rf	112	0.0599	0.0409	-0.1261	0.0884
ESG Equal - Rf	110	0.0978	0.0419	-0.0947	0.1216
SIN Value - Rf	112	0.0182	0.0460	-0.1082	0.1683
SIN Equal - Rf	112	0.0132	0.0648	-0.1016	0.4188
OMXSPI - Rf	112	0.0040	0.0397	-0.1241	0.0808

**Table 1** - shows the descriptive statistics of the portfolios.

### 4.1.2 Descriptive data in the first regression

For the second regression the variables used to explain the difference in alpha between ESG and sin stocks are the basis for the data. These variables are liquidity, institutional ownership, firm age and book value of equity. These variables are presented on a yearly basis. In table 2 the summary of the data is presented. As can be seen the number of observations differs between the variables. This is due to that for some of the variables data was not available for the entire period. This is especially clear for institutional ownership where the amount of observations is 734. Furthermore, it is observed that some firms did not have any institutional ownership at certain years, which can be seen at the min value of 0. Also, in terms of min values book value of equity has a negative value, which depends on that some firms had a negative equity. Swedish match is an example of a firm with a negative equity (as mentioned in the method section). No direct adjustments were made to the data used for the second regression, this because panel data was used, and alpha was predicted out<sup>6</sup>. A random effects model is applied in order to fulfill the panel data assumptions. The model assumes that the individual specific effect is random and has no correlation to the independent variables<sup>7</sup>.

<b>Variable</b>	<b>Obs.</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Equity	822	20692	39866	-4179	336262
Firm age	850	17.46	10.51	1	40
Institutional Ownership	734	0.23	0.47	0	3.78
Liquidity	789	18.45	26.38	0.02	138.25

**Table 2** - provides a description of the data for the second regression where alpha has not yet been predicted.

Since this regression used alpha as the dependent variable, it had to be predicted using the return data that was retrieved from Bloomberg. However, since the variables are on a yearly basis the stock returns had to be collapsed to the twelve-month average return in order to be in alignment with the independent variables. That means that alpha was predicted for each stock on a yearly basis. In order to predict the alpha “command 1” in the appendix was applied in the statistics programme STATA. Alpha was solved from a normal linear regression and then it was collapsed on a monthly average.

<sup>6</sup> Since no significant outliers were detected and the data fulfilled the assumptions for a random effect model no adjustments were made.

<sup>7</sup> The choice of a random effect model became obvious after conducting a Hausman-test in STATA.

## 4.2 Obtained results from the regressions

### 4.2.1 Obtained results from the first regression

The first regressions for each portfolio are shown in table 3 (ESG value, ESG equal, SIN value and SIN equal). Three of the portfolios (ESG value, ESG equal and sin value) are significant, therefore in these cases the null hypothesis for 1a and 1b can be rejected. Sin equal does have a p-value of 0.067 and is therefore insignificant, its deviation from the market portfolio cannot be explained. It can be observed that for the portfolios that show significance, returns over the market return are realized and therefore they outperform the market portfolio (OMXSPI). The reader should know that, when the market returns are mentioned in this results part OMXSPI is the underlying market. For ESG value the monthly average excess return was 0.2%, for ESG equal this value was 0.5%, for sin value this value was 1.6% and for sin equal the value was 1%. This deviance can also be seen in the indexation graph 1 in the appendix. The r-squared ( $r^2$ ) for each portfolio is very high which means that the dependent variable is explained largely by the independent variable. This is especially the case for the ESG value portfolio which almost has an R-squared of 1. One reason for this high r-squared can be found in that the ESG portfolio contains many of the same companies as the market portfolio, these are also the biggest ones, since OMXSPI is value weighted these companies greater explains the returns in the market portfolio. When testing beta against one it is found that the two sin stock portfolios are significantly different from one<sup>8</sup>. The two ESG portfolios obtains insignificant values in terms of beta against one. This further confirms that the ESG portfolios moves in a similar fashion to OMXSPI. The sector distribution of the two portfolios are also similar, further strengthening this effect (see appendix pie chart 2 and 3). To solve for this problem, it was decided to apply panel data in order to capture the firm level effects, this in order to control for the endogeneity problem of reversed causality. And as can be seen the problem related to the high r-squared in the ESG stocks were solved when viewing panel data. Therefore, panel data was used as a robustness check and was conducted to understand the abnormally high r-squares received from the portfolio regressions<sup>9</sup>. Before switching to using panel data a change of the underlying market to OMX30 was also done, this will be further explained in section 4.3. As can be seen table 3, when applying panel data there still are excess returns over the market portfolio (OMXSPI) for ESG stocks of 0.3% and for sin stocks an underperformance against

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<sup>8</sup> When testing beta against one, the sensitivity to systematic risk in the portfolios are tested.

<sup>9</sup> Tests for fulfilling the OLS-assumptions were successfully made with positive results such as; Breusch pagan test, White test, Durbin Watson, a check for the distribution of residuals and winsorizing outliers.

the market portfolio (OMXSPI) of -0.6% can be seen. This deviates for the results obtained in the portfolios. On an ending note, the standard errors can be observed in the parenthesis for each regression. Low values can be observed which means that a good estimate of the population parameter can be made.

<b>Portfolio</b>	<b>ESG Value</b>	<b>ESG Equal</b>	<b>SIN Value</b>	<b>SIN Equal</b>	<b>ESG Panel</b>	<b>SIN Panel</b>
Market Return	1.018*** (0.01)	1.056*** (0.03)	0.615*** (0.09)	0.713*** (0.14)		
Market Return (Panel)					0.921*** (0.02)	0.320*** (0.03)
Alpha	0.002*** (0.00)	0.005*** (0.00)	0.016*** (0.00)	0.010 (0.01)	0.003*** (0.00)	-0.006*** (0.00)
R-square (R <sup>2</sup> )	0.983	0.919	0.282	0.191	0.260	0.028
D.Freedom	110	108	110	110	6583	3626

\* p<0.1, \*\* p<0.05, \*\*\*p<0.01

**Table 3** - shows the regressions for value- and equally weighted sin stock and ESG stock portfolios. These stocks are also shown on a firm level.

#### 4.2.2 Obtained results from the second regression

In this regression, as previously explained, alpha (alpha is excess returns in relation to the market portfolio OMXSPI) is the dependent variable. For this regression a random effect panel data (i.e. firm level) model is used because each period, each company and each observation need to be analyzed in relation to its cluster. This regression is made in steps since one variable is added at a time, therefore there are five different models illustrated in table 4. It is important to point out that there are other possible combinations that can be used for adding the variables apart from the presented combinations in this table. The reason for using this combination is because of its optimal R-squared to other combinations. The dummy variable in this regression is sin stocks, and by using a dummy variable the effect of switching to sin stocks from ESG stocks can be seen. Therefore, the difference in excess returns between sin and ESG stocks are observed. Therefore, the null hypothesis for hypothesis 2a can be rejected. It is found that the excess returns of sin stocks are 0.8% lower than the excess returns of ESG stocks, as seen in model one. Model four was found to be the optimal model since it had a high R-squared in combination with the most significant variables. What can be observed is that the R-squared is increasing almost linearly when adding independent variables (i.e., changing from Model one to Model five), however the change is never substantial. Further, in affinity to an increased R-squared in Model four, there are four significant independent variables that have an effect on Alpha. Thereby in accordance with Dzemski (2017) Model four is interpreted to be the best

fitted model in order to predict Alpha. In model four it was found that liquidity have a negative effect of -0.0035% on the difference in alpha between ESG and sin stocks, when you increase liquidity by one unit (i.e. equivalent of a one million Swedish SEK in trading volume). Institutional ownership was found to have a positive effect on the alpha with an effect on difference in excess return of 0.39% when increasing institutional ownership with one unit (i.e. one billion Swedish SEK in trading volume when increasing an increased institutional ownership). When increasing firm age with one unit it was found to have an effect on alpha of 0.026%<sup>10</sup> (i.e. increasing firm age with one year). Finally, it can be seen in model five that book value of equity had no effect (this is due to its insignificance) on the difference in excess returns between in ESG and sin stocks. To conclude, the null hypothesis for hypothesis 2b can be rejected. Finally, it can be seen through the Wald Chi square test that all models have values that are high which shows that model are reliable and robust.

<b>Models Dep. Var.</b>	<b>Model 1 Alpha</b>	<b>Model 2 Alpha</b>	<b>Model 3 Alpha</b>	<b>Model 4 Alpha</b>	<b>Model 5 Alpha</b>
Effect Of Sin	-0.008*** (0.002)	-0.010*** (0.002)	-0.010*** (0.003)	-0.007** (0.003)	-0.008** (0.003)
Liquidity		-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)
Institutional Ownership			0.005*** (0.002)	0.004*** (0.001)	0.003** (0.001)
Firm age				0.000*** (0.000)	0.000*** (0.000)
Equity					-0.000 (0.000)
R-Square Overall (R <sup>2</sup> )	0.0422	0.0551	0.0685	0.0878	0.1020
Wald's Chi Square	19.13	17.33	23.44	30.71	32.96

\* p<0.1,    \*\* p<0.05,    \*\*\*p<0.01

**Table 4** - shows the regression for excess returns and how this explained by the presented variables<sup>11</sup>.

<sup>10</sup> In order to help the reader, if firm age is scaled to ten years the effect is 0.26% on the difference in excess return.

<sup>11</sup> In appendix table 12 this regression is also shown but with cumulative abnormal return (CAR) as the dependent variable (instead of average abnormal return) and a lagged liquidity variable is also presented.

### 4.3 Robustness checks

In the first regression there is no consideration taken to the difference in risk between the four portfolios. Since the risk adjusted returns are of relevance (see section 3.5) this was considered through the application of the Sharpe ratio. As can be seen when accounting for risk, the relation in terms of the return's consistency remains the same as in the regressions. In table 5 sin value provides the highest risk adjusted returns out of the four portfolios. It should once again be noted that sin equal is insignificant in the regressions. The Sharpe ratio amounts to 0.3948, this can be compared to the portfolio with the second highest Sharpe ratio of 0.2269 found in the equally weighted ESG portfolio.

<b>Portfolio</b>	<b>ESG Value</b>	<b>ESG Equal</b>	<b>SIN Value</b>	<b>SIN Equal</b>	<b>OMXSPI</b>
Average Return	0.0090	0.0132	0.0212	0.0162	0.0070
Risk Free Rate	0.0030	0.0030	0.0030	0.0030	0.0030
Standard Deviation	0.0409	0.0450	0.0460	0.0648	0.0397
<b>Sharpe Ratio</b>	<b>0.1468</b>	<b>0.2269</b>	<b>0.3948</b>	<b>0.2030</b>	<b>0.1008</b>

**Table 5** - shows the Sharpe ratio for each portfolio. As can be seen the standard deviation for ESG equal differs from the standard deviation used in the regressions. This is because the standard deviation here does not apply winsorizing, in other words the entire population is used when using the Sharpe ratio.

Since there is a wide distribution of sectors in both the ESG stocks and sin stocks, considerations were made to industry effects in order to test the effects different sectors had on the obtained returns. This was done through the usage of the sector classification provided through the sources mentioned in the method section (pie chart 1 and 2 or table 9 and table 10). For example, in the sin stocks sample oil and gas is known to be dependent on the development of the oil and gas price. As can be seen in table 6 for ESG stocks it was found that financials, health care and industrials overperform against the market proxy. For sin stocks only one sector overperformed, it was found that consumer services overperformed against the market portfolio.

As stated in the section where the obtained results for the first regression were presented, several tests were done on the portfolios before deciding to use panel data to find firm level effects and therefore reduce endogeneity effects (in form of control for reversed causality) obtained from the initial portfolio regression. One of the tests involved switching the underlying market portfolio to OMX30, which contains the 30 most traded companies on the Stockholm stock exchange. A reason for trying this was also because previous studies studying the Swedish market use OMX30 as the market portfolio, also it was believed that the

endogeneity issue could be decreased by using another market proxy. The ESG portfolio contains 25 of the 30 most traded companies. The robustness check against OMX30 were done in order to see if the R-squared would decrease (as can be seen in appendix table 11), changing the market proxy had no large effects on the R-squared, which would once again be explained by the above discussion.

<b>Sectors</b>	<b>ESG Financials</b>	<b>ESG Health Care</b>	<b>ESG Industrials</b>	<b>SIN Consumer Services</b>
Market Return	1.013*** (0.03)	1.064*** (0.14)	1.192*** (0.10)	0.300*** (0.09)
Alpha	0.004*** (0.00)	0.020*** (0.01)	0.009** (0.00)	0.009** (0.00)
R-Square (R <sup>2</sup> )	0.370	0.087	0.046	0.008
D. Freedom	2015	447	2015	1455

\* p<0.1, \*\* p<0.05, \*\*\*p<0.01

**Table 6** - shows the industries that have a significant impact on the excess return. Insignificant industries are not shown, only the ones that are significant.

## 5. Analysis of the results

The results presented in the previous section of this thesis finds the opposite of the Friedman school of thought. This assumes that companies engaging in stakeholder activities will underperform in relation to firms that do not put the same emphasis on stakeholder activities and rather focuses purely on shareholder wealth maximization (Friedman, 1970; Renneboog, Ter Horst & Zhang, 2008). Both of the constructed ESG stock portfolios and one of the sin stocks portfolios (the equally weighted sin stock portfolio is insignificant) outperform against the market portfolio, OMXSPI. But in the conducted robustness checks (in this case on a firm level) it becomes clear that the consistency in the abnormal returns for ESG stocks is greater than those of sin stocks, where sin stocks actually underperform in the Swedish stock market on a firm level. This could be attributed to the wide distribution of the returns in the sin stock sample (based on the mean values provided in the descriptive data), where some sin stocks have had substantial positive returns and others very negative returns during the studied time period, this will be explained in further detail later on. From these findings, it can be concluded that there is a difference in the realized returns between ESG and sin stocks against the market portfolio, and also against each other. Looking at sector classifications on a firm level, financials, health care and industrials outperform for ESG stocks against the market portfolio while for sin stocks one sector outperforms the market, which is consumer services. Moreover, in terms of the difference in excess returns a discrepancy of 0.8% on a yearly basis, in this case with the usage of the twelve-month average return, can be found between ESG stocks and sin stocks. This means that engaging in ethical investing through the ESG approach within the universe of SRI investing is something that is more lucrative than sinful investing in Sweden from an investor point of view, based on the findings presented in this thesis. Engaging in stakeholders' activities could therefore be said to be valued by the market participants<sup>12</sup>. Coupling these findings with previous research on investing ethics, Taylor, Vithayathil and Dobin (2018) and Flammer (2015) find that CSR disclosure generally has led to higher firm value. More specifically Lo and Kwan (2017) found that implementing and engaging in ESG activities affects stock values positively, other studies have also found that sustainable investing and ESG stocks should not underperform the market portfolio (Edman, 2011; Vasal, 2009). The results of this thesis, therefore, provide evidence of the benefits of firms embracing the concept of ESG in equity markets (and in a way including the interest of stakeholders).

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<sup>12</sup> In terms of powerful market participants, institutional investors i.e. institutional ownership managed capital that amounted to approximately 130% of Sweden's GDP 2011. Source: Jakobsson, U., Wiberg, D. (2014). See figure 7, page 49.

Contemporary investors seem to reward firms that are taking action within sustainability, which validates the relevance of the movement of sustainability within the investment community today. This is also of interest since Sweden has come far in embracing sustainable investing and a sustainable agenda in general (Scholtens & Sievänen, 2013; Regeringen, 2017).

In terms of the key variables' liquidity, institutional ownership and the number of trading years on the stock market impacted the differences in excess returns (predicted alpha) of ESG and sin stocks. Book value of equity was found to be insignificant, and no conclusions relating to this variable can be drawn. The significant variables effect on the stock returns are in alignment with previous studies findings (Ritter, 1991; Jietaing, Yucan, Xiaomin, 2011; Datar, Narayan, Radcliffe, 1998; Hong & Kacperczyk, 2009). Moreover, evidence of inefficiency in accordance to the efficient market hypothesis (EMH) is found in the results for both the pricing of ESG and sin stocks, since it exists excess returns and this is also affirmed through liquidity which has a slightly negative effect on alpha of -0.0035%, that is, when liquidity is increased with one unit (i.e. one million SEK) the differences in excess returns between the two type of stocks decrease. This is not in alignment with the EMH which under this market assumption there can exist no excess returns in the market (Fama, 1970; Boboc & Danica, 2013). As found in the results, by increasing the number of transactions between the market participants (buyers and sellers) through increased liquidity the returns should according to the EMH move to align with the security market line (i.e. the returns of OMXSPI which is the market portfolio) and price stocks in a way where there are no excess returns present in the market. This notion aligns with corporate finance theory (Berk & Demarzo, 2014; Fama, 1970). Meanwhile, this concept could be contradicting because as the interest for a stock increases (higher liquidity through more transactions) it could push the price of the stock upwards and increase the realized abnormal returns evenmore, one could consider a parallel to a stock market bubble, which is mostly characterized by sharp price increases, which historically has been times where the market is inefficient (Kim, Shamsuddin & Lim, 2011). In the obtained results it is found that if institutional ownership increases by 1 billion SEK, the difference in excess returns between the stocks increases by 0.39%. Increased institutional ownership temporarily increases the liquidity in a stock since  $x$  institution have to increase their holdings of  $y$  stock in the sample of companies in this thesis. Increased institutional ownership could also act as an indication of quality for the stocks targeted by the institutional investor<sup>13</sup>. This in turn can cause to attract

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<sup>13</sup> Velury, U., Jenkins, D. (2006) find that institutional ownership has a positive impact on earnings quality of firms.

even more investors to buy the same stocks, which could explain the increase in excess returns when institutional ownership increases.

Liquidity is a fundamental concept when speaking of the EMH since it reflects how easy it is to trade at a given time, also since the theory builds on the assumption of perfect markets where one condition is a large number of buyers and sellers (Runesson, Samani & Marton, 2017). On another note, the decrease in excess returns when liquidity rises also indicates that the ESG and sin stocks are overpriced under the assumption of the theory. This is because as more buyers and sellers make transactions (increased liquidity in this case) the pricing of the stocks gets more accurate according to theory. Continuing with the last variable that was significant, the number of trading years on the stock exchange had a positive effect on the realized excess returns. When the firm age was increased with one year it was found to have an effect on excess returns of 0.026%. This impact could be due to as time goes the firms get more experienced and that the risk of failure for the firm decreases as it enters more mature stages, previous studies looking at firm age has made similar arguments (Matemilola et al, 2017). Another explanation could be found in that as investors get more familiarized with the firm overtime (the information asymmetry reduces), the general information surrounding the company increases which improves the understanding and pricing of the stock. This train of thought could be paralleled to IPO underpricing (Berk & Demarzo, 2014).

By first conducting the regressions through the construction of portfolios for the ESG stocks and sin stocks and then comparing them on a firm level against the market portfolio, the effects of holding a portfolio in terms of the realized returns to the investor can be observed. This is especially the case for sin stocks, as seen in the results, on a portfolio level the value weighted portfolio is significant (as mentioned in the outset of this analysis, the equally weighted sin stock portfolio was insignificant) and overperforms the market portfolio. But when comparing sin stocks on a firm level it is seen that they actually underperform in comparison to the market portfolio. When controlling for reversed causality by structuring the data on firm level the problem of endogeneity decreases and the validity of the output increases. Also, this could also be attributed to the effects of diversification in the sense that the wide distribution of sin stock returns is averaged out which in this case results in overperformance when these stocks are composed into a portfolio (Markowitz, 1952).

To conclude this section, it is overall found that on a portfolio level the results are similar to those of previous sin stock studies, but on a firm level the findings in this thesis go against these studies (Hong & Kacperczyk, 2009; Trinks & Scholtens, 2017; Fauver & McDonald IV, 2014; Fabozzi, Ma & Oliphant, 2008). A possible explanation for these differences is found in the previous paragraph (the effect of diversification on the distribution of returns). In terms of ethical investments, our findings confirm previous studies, where there is excess return on both a portfolio level and firm level on Swedish ESG stocks against the market (Kempf & Osthoff, 2007; Taylor, Vithayathil & Dobin, 2018; Flammer, 2015; Lo & Kwan, 2017; Vasal, 2009). While this thesis conclude that returns of ESG stocks in the studied period for the Swedish market has been more consistently favorable, by using measures that account for the risk of the portfolios (Sharpe ratio in this thesis) the highest risk adjusted returns on a portfolio level was obtained from the value weighted sin stock portfolio. As mentioned in the method section (3.3) the six largest firms in the value weighted portfolio accounts for 85% of the portfolio value, therefore it is inadequate to solely rely on this obtained Sharpe ratio for the value weighted portfolio.

## 6. Conclusion and contribution

This thesis set out to further understand the underlying reasons in the financial performance (stock returns) between unethical stocks (sin stocks) and ethical stocks (ESG stocks). In terms of the research question in this thesis, it is found that there is a difference between these two types of stocks both on a portfolio level and a firm level, it becomes clear that in Sweden ESG stocks has provided more consistent excess returns than sin stocks. However, on a portfolio level sin stocks provided the highest risk adjusted return. The difference in excess returns between sin- and ESG stocks was on a firm level 0.8%. Liquidity (-0.0035%), institutional ownership (0.39%) and firm age (0.026%) impacted the difference in excess returns, where institutional ownership had the biggest impact. These results partly provide new insights to the stakeholder and shareholder theory debate, by showing that partly taking consideration to stakeholders in Sweden can provide excess returns and is something that is valued by the market participants, as seen in the impact that institutional ownership has on excess returns. The pricing of these stocks is not in alignment with the efficient market hypothesis (EMH), whereas it exists excess returns for the stock samples which under the assumptions of the theory is not possible. Also, when liquidity is increased the stocks move to align with the security market line (negative impact on returns with -0.0035%).

This thesis contributes to the field of investment ethics by showing how the difference in excess returns between ESG and sin stocks partly can be explained by the key variables' liquidity, institutional ownership and firm age. The authors have not found a study that looks at the aforementioned factors in the Swedish stock market. It is also shown that sustainable investing is rewarded in the Swedish stock market. In terms of the shareholder and stakeholder theory debate this study shows that partly incorporating a stakeholder mindset suggests being rewarded, having an all or nothing mindset when it comes to these theories does seem to be insufficient. Suggestions on future research within this field could be to study other countries that rank high on the SDG index i.e. countries that have come far in embracing sustainability and research if the same in terms of ethical stocks being rewarded (excess returns) against unethical stocks.

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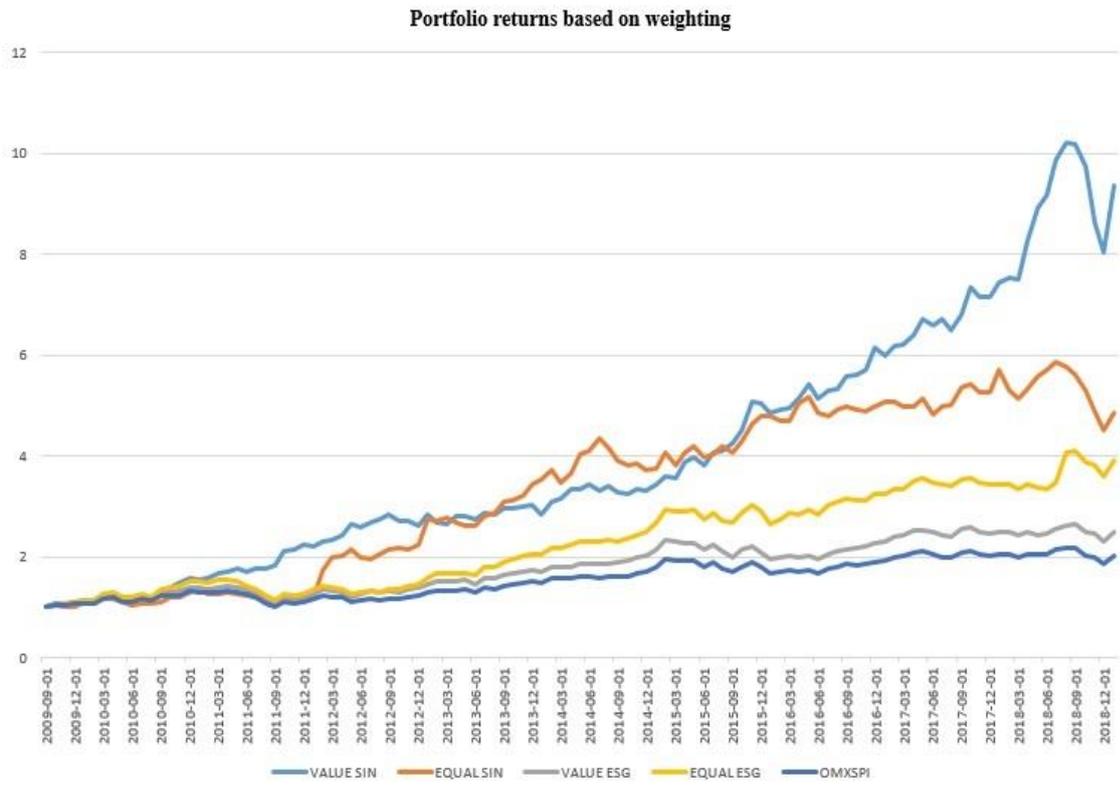
## Appendix

Company	Sector	Continued	Continued
<b>LUPE SS Equity</b>	Oil & gas	<b>MACKB SS Equity</b>	Consumer goods
<b>SWMA SS Equity</b>	Consumer goods	<b>SEGRMTF SS Equity</b>	Oil & gas
<b>SAABB SS Equity</b>	Industrials	<b>MISE SS Equity</b>	Oil & gas
<b>KINDSDB SS Equity</b>	Consumer services	<b>AVTB SS Equity</b>	Industrials
<b>EVO SS Equity</b>	Consumer services	<b>MATRA SS Equity</b>	Oil & gas
<b>BETSB SS Equity</b>	Consumer services	<b>FGG SS Equity</b>	Consumer services
<b>CHERB SS Equity</b>	Consumer services	<b>SPIFF SS Equity</b>	Consumer services
<b>KAMBI SS Equity</b>	Consumer services	<b>UMIDAB SS Equity</b>	Consumer goods
<b>IPCO SS Equity</b>	Oil & gas	<b>ABI SS Equity</b>	Oil & gas
<b>LEO SS Equity</b>	Consumer services	<b>GCOR SS Equity</b>	Consumer services
<b>KOBRMTFB SS Equity</b>	Consumer goods	<b>DOME SS Equity</b>	Oil & gas
<b>MRG SS Equity</b>	Consumer services	<b>NETB SS Equity</b>	Consumer services
<b>TETY SS Equity</b>	Oil & gas	<b>AOI SS equity</b>	Oil & gas
<b>MAHAA SS Equity</b>	Oil & gas	<b>SNM SS equity</b>	Oil & gas
<b>CRWN SS Equity</b>	Oil & gas	<b>ENQ SS Equity</b>	Oil & gas
<b>RAKE SS Equity</b>	Consumer services	<b>CASO SS equity</b>	Oil & gas
<b>ANGL SS Equity</b>	Consumer services	<b>CBA SS equity</b>	Industrials
<b>DRIL SS Equity</b>	Basic material	<b>SVIK SS equity</b>	Industrials

**Table 7** - shows the tickers of the companies included in the sin stock portfolio based on the sin stock definition in this thesis applied in the Bloomberg equity screener. The sector classifications are also shown in accordance to Mavruk, 2017; Bloomberg, 2019; Avanza, 2019.

Company	Sector	Continued	Continued
<b>BOL SS Equity</b>	Basic material	<b>SKAB SS Equity</b>	Industrials
<b>ELUXB SS Equity</b>	Consumer goods	<b>PEABB SS Equity</b>	industrials
<b>SEBA SS Equity</b>	Financials	<b>MTGB SS Equity</b>	Consumer services
<b>SKFB SS Equity</b>	Industrials	<b>WALLB SS Equity</b>	Financials
<b>BILL SS Equity</b>	Basic material	<b>ALFA SS Equity</b>	Industrials
<b>ASSAB SS Equity</b>	Industrials	<b>TEL2B SS Equity</b>	Telecommunication
<b>HOLMB SS Equity</b>	Basic material	<b>NCCB SS Equity</b>	Industrials
<b>SWEDA SS Equity</b>	Financials	<b>AXFO SS Equity</b>	Consumer services
<b>SSABA SS Equity</b>	Basic material	<b>MEKO SS Equity</b>	Consumer goods
<b>SHBA SS Equity</b>	Financials	<b>LOOMB SS Equity</b>	Industrials
<b>NIBEB SS Equity</b>	Industrials	<b>RATOB SS Equity</b>	Financials
<b>SAND SS Equity</b>	Industrials	<b>SECUB SS Equity</b>	Industrials
<b>TRELB SS Equity</b>	Industrials	<b>ATRLJB SS Equity</b>	Financials
<b>ESSITYA SS Equity</b>	Consumer goods	<b>AFB SS Equity</b>	Industrials
<b>ERICB SS Equity</b>	Technology	<b>VITR SS Equity</b>	Health care
<b>HUSQB SS Equity</b>	Consumer goods	<b>GETIB SS Equity</b>	Health care
<b>HPOLB SS Equity</b>	Basic material	<b>HUFVA SS Equity</b>	Financials
<b>ICA SS Equity</b>	Consumer services	<b>BALDB SS Equity</b>	Financials
<b>TELIA SS Equity</b>	Telecommunication	<b>INDUA SS Equity</b>	Financials
<b>CAST SS Equity</b>	Financials	<b>FINGB SS Equity</b>	Industrials
<b>VOLVB SS Equity</b>	Industrials	<b>AZA SS Equity</b>	Financials
<b>SHOT SS Equity</b>	Consumer services	<b>INTRUM SS Equity</b>	Financials
<b>NOLAB SS Equity</b>	Industrials	<b>LUNDB SS Equity</b>	Financials
<b>HMB SS Equity</b>	Consumer services	<b>INVEB SS Equity</b>	Financials
<b>NDA SS Equity</b>	Financials	<b>KINVB SS Equity</b>	Financials
<b>FABG SS Equity</b>	Financials	<b>ORX SS Equity</b>	Health care
<b>NOBI SS Equity</b>	Consumer goods	<b>HLDX SS Equity</b>	Consumer goods
<b>ORI SS Equity</b>	Consumer goods	<b>HEXAB SS Equity</b>	Industrials
<b>JM SS Equity</b>	Financials	<b>VSSABB SS Equity</b>	Industrials
<b>ATCOA SS Equity</b>	Industrials	<b>HNSA SS Equity</b>	Health care

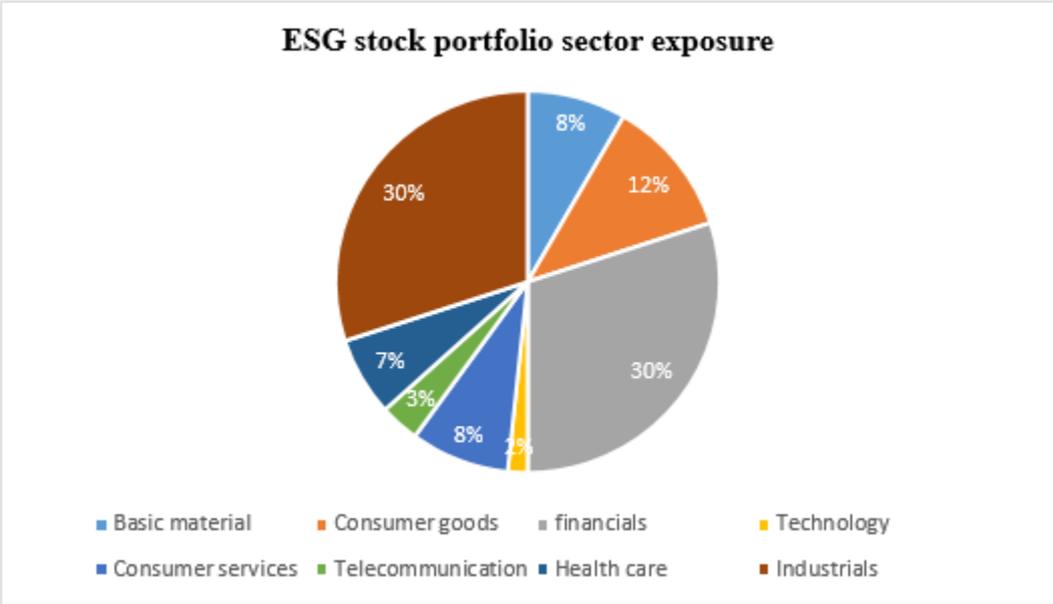
**Table 8** - shows the tickers of the companies included in the ESG stock portfolio based on the ESG criteria scoring applied in the Bloomberg equity screener. The sector classifications are also shown in accordance to Mavruk, 2017; Bloomberg, 2019; Avanza, 2019.



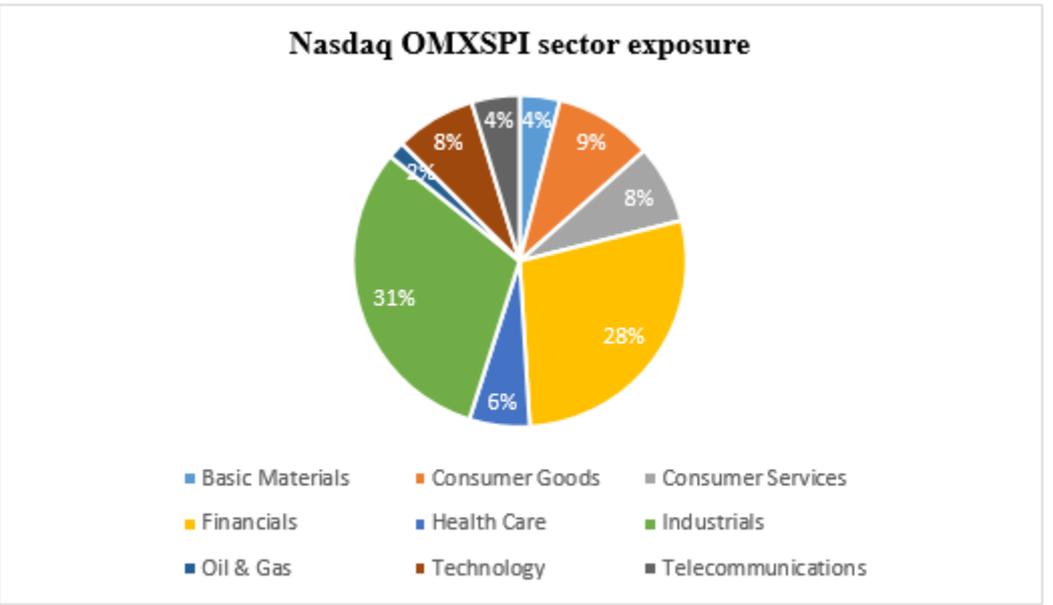
**Graph 1** - shows the difference between using equal and value weighting for the sin stock- and the ESG portfolio. This is an indexation of the cumulative returns of these portfolios for the selected time period of this study.



**Pie chart 1** - shows the sin stock portfolio sector exposure to different sectors. This portfolio is heavy on Consumer services and Oil & Gas. Source: Mavruk, 2017; Bloomberg, 2019; Avanza, 2019.



**Pie chart 2** - shows the ESG stock portfolio sector exposure to different sectors. This portfolio is heavy on Industrials and financials. Source: Mavruk, 2017; Bloomberg, 2019; Avanza, 2019.



**Pie chart 3** - shows the Nasdaq OMXSPI sector exposure to different sectors. This index is heavy on industrials and financials. This is similar to the constructed ESG stock portfolio. Source: <https://indexes.nasdaqomx.com/Index/Breakdown/OMXSPI> used 2019-03-05.

```

//ESG-Loop for prediction of Alpha//
gen ESGhat = 0
local i = 1
while `i' <= 60 {
local j = 1
while `j' <= 10 {
reg Esg_Rf Omxspi_RF if TickerESG==`i' & Year== `j'
predict x if TickerESG==`i' & Year == `j', xb
replace ESGhat = x if TickerESG==`i' & Year == `j'
drop x
local j = `j' + 1
}
local i = `i' + 1
display `i'
}

gen alphaESG = esgrf - ESGhat

//SIN-Loop for prediction of Alpha//
gen SINhat = 0
local i = 1
while `i' <= 36 {
local j = 1
while `j' <= 10 {
reg sinrf omxspirf if TickerSIN==`i' & Year== `j'
predict x if TickerSIN==`i' & Year == `j', xb
replace SINhat = x if TickerSIN==`i' & Year == `j'
drop x

local j = `j' + 1
}
local i = `i' + 1
display `i'
}
gen alphaSIN = sinrf - SINhat

```

**Command 1** - this above-mentioned command was used in STATA in order to predict out the alpha of each stock. The command is built on two different loops where 'i' is referred to the number of companies within the sin- and ESG stock sample and 'j' is referred to the numbers of years. A regression is further made based on every company's performance for each year. From there on, basic algebra is used to solve the formula, which in turn provides the alpha for each company.

<b>Sector ESG</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cum. Percent</b>
Basic Material	560	8.33	8.33
Consumer Goods	784	11.67	20.00
Consumer Services	560	8.33	28.33
Financials	2016	30.00	58.33
Health Care	448	6.67	65.00
Industrials	2016	30.00	95.00
Technology	112	1.67	96.67
Telecommunication	224	3.33	100.00
<b>Total</b>	<b>6720</b>	<b>100.00</b>	

**Table 9** - shows the sector classification for ESG stocks (the same as presented pie chart 2). This table presents the same thing as the pie chart, but in numbers.

<b>Sector SIN</b>	<b>Frequency</b>	<b>Percent</b>	<b>Cum. Percent</b>
Basic Material	112	2.78	2.78
Consumer Goods	448	11.11	13.89
Consumer Services	1456	36.11	50.00
Industrials	448	11.11	61.11
Oil & Gas	1568	38.89	100.00
<b>Total</b>	<b>4032</b>	<b>100.00</b>	

**Table 10** - shows the sector classification for sin stocks (the same as presented pie chart 1). This table presents the same thing as the pie chart, but in numbers.

<b>Portfolio</b>	<b>ESG Value</b>	<b>ESG Equal</b>	<b>SIN Value</b>	<b>SIN Equal</b>
OMX30	0.974***	1.001***	0.610***	0.689***
Market Return	(0.03)	(0.05)	(0.10)	(0.14)
Alpha	0.007***	0.011***	0.017***	0.012**
	(0.00)	(0.00)	(0.00)	(0.01)
R-Square (R <sup>2</sup> )	0.916	0.756	0.271	0.174
D. Freedom	110	110	110	110

\* p<0.1, \*\* p<0.05, \*\*\*p<0.01

<b>Portfolio</b>	<b>ESG Value</b>	<b>ESG Equal</b>	<b>SIN Value</b>	<b>SIN Equal</b>
OMXSPI	0.970***	1.020***	0.615***	0.713***
Market Return	(0.03)	(0.05)	(0.09)	(0.14)
Alpha	0.005***	0.009***	0.016***	0.010
	(0.00)	(0.00)	(0.00)	(0.01)
R-Square (R <sup>2</sup> )	0.928	0.804	0.282	0.191
D. Freedom	110	108	110	110

\* p<0.1, \*\* p<0.05, \*\*\*p<0.01

**Table 11** - shows the regression for the ESG and sin stock portfolios with OMX30 as the underlying market portfolio, this test was conducted to see if the high R-squares would decrease. The second table shows OMXSPI to help the reader easier compare the differences.

<b>Models Dep. Var.</b>	<b>Model 1 Alpha</b>	<b>Model 2 Alpha</b>	<b>Model 3 Alpha</b>	<b>Model 4 Alpha</b>	<b>Model 5 Cum. Alpha</b>	<b>Model 6 Alpha</b>
Effect Of Sin	-0.008*** (0.002)	-0.010*** (0.002)	-0.010*** (0.003)	-0.007** (0.003)	-0.079*** (0.017)	-0.008*** (0.002)
Liquidity		-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	
Institutional Ownership			0.005*** (0.001)	0.004*** (0.001)	0.0224** (0.010)	0.000 (0.001)
Firm age				0.000*** (0.000)	-0.002*** (0.000)	0.000*** (0.000)
Liquidity Lagged (t-1)						0.000 (0.000)
R-Square Overall (R <sup>2</sup> )	0.0422	0.0551	0.0685	0.0878	0.0339	0.0890
Wald's Chi Square	19.13	17.33	23.44	30.71	27.22	33.62

\* p<0.1, \*\* p<0.05, \*\*\*p<0.01

**Table 12** - in model five the cumulative abnormal return (CAR) is used as the dependent variable. In model 6 liquidity is a lagged variable. The reason for testing these is because it has been done in prior research.