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BETTING AGAINST MORAL: SIN VS ETHICAL RESPONSIBILITY

European Evidence

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ABBREVIATIONS & VARIABLE DENITIONS

3F	Fama and French three-factor asset pricing model
4F	Carhart four-factor asset pricing model
5F	Fama and Frenc five-factor asset pricing model
AUM	Asset Under Management
BS6F	Barillas and Shanken six-factor asset pricing model
CAGR	Compound Annual Growth Rate
CAPM	Capital Asset Pricing Model
CMA	Conservative minus Aggressive
CSP	Corporate Social Performance
CSR	Corporate Social Responsibilities
EGM	Electronic Gaming Machine
ESG	Environmental, Social and Governance
FF6F	Fama and French six-factor asset pricing model
GGR	Gross Gaming Revenue
GSIA	Global Sustainable Investment Alliance
HML	High minus Low
HML^m	High minus Low (Asness and Frazzini, 2013)
HPR	Holding Period Return
I/A	Investment to Total Asset Ratio
ICAPM	Intertemporal Capital Asset Pricing Model
Mkt	Market factor
MOM	Momentum factor
MPT	Model Portfolio Theory
MSCI	Morgan Stanley Capital International
OLS	Ordinary Least Square
P/B	Price to Book Ratio

P/E	Price to Earnings Ratio
RMW	Robust minus Weak
ROE	Return on Equity
SIC	Standard Industrial Classification
SMB	Small minus Big
SRI	Socially Responsible Investing
TRBC	Thomson Reuters Business Classification
TS	Triumvirate of Sin
UK	United Kingdom
UMD	Up minus Down
US	United States
WML	Winner minus Loser

Return	Portfolio raw return
Excess return	Portfolio return over risk-free rate
Alpha	Portfolio's annual adjusted return in terms or risk and explanatory power, is the estimate of the parameter 'α' in Fama and French's three, five and six- factor model (1993,2015,2018), Carhart's (1997) four-factor model and CAPM one factor model
R^2	Goodness-of-fit of the data in the model
$\beta_i, \beta_{SMB}, \beta_{HML}$	Fama and French three-factor loadings on the market
$\beta_i, \beta_{SMB}, \beta_{HML}, \beta_{MOM}$	Carhart four-factor loadings on the market
$\beta_i, \beta_{SMB}, \beta_{HML}, \beta_{RMW}, \beta_{CMA}$	Fama and French five-factor loadings on the market
$\beta_i, \beta_{SMB}, \beta_{HML}, \beta_{RMW}, \beta_{CMA}, \beta_{WML}$	Fama and French six-factor loadings on the market

VAASAN YLIOPISTO
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TIIVISTELMÄ

Tämä opinnäytetyö tutkii mahdollisuutta luoda ylituottoa Euroopan osakemarkkinoilla sijoittamalla yleisiä moraalisia arvoja ja eettisiä mielipiteitä vastaan. Akateemisista tutkimuksista on saatu merkittävä määrä viittauksia, jotka osoittavat yhteyden ylituoton ja syntisiksi katsottujen teollisuusalojen välillä, kuten tupakka-, alkoholi- ja uhkapeliala (Richey, 2017; Hong ja Kacperczyk, 2009). Vastaavasti, vastuullista sijoitusstrategiaa käsittelevät akateemiset tutkimukset ovat tuottaneet ristiriitaisia tuloksia korkean ESG-luokiteltujen osakkeiden ja ylituoton välillä (Gil-Bazo, Ruiz-Verdu ja Santos, 2010; Halbritter ja Dorfleitner, 2015). Hyödyntäen Datastream-tietokannasta saatua taloudellista dataa, Thomson Reuters ASSET4 -tietokannasta saatuja ESG-arvoja sekä Kenneth R.French-tietokannasta saatua faktori dataa, opinnäytetyö pyrkii tutkimaan syntiosakkeiden sekä vastuullisten sijoitusstrategioiden tuottoja Euroopassa. Opinnäytetyö tutkii 18 eri Euroopan valtion osaketietoja, hyödyntäen Fama and French five-factor -mallia (Fama ja French, 2015), Fama and French six-factor -mallia (Fama ja French, 2018) ja Capital Asset Pricing -mallia (Sharpe, 1964), rakentamalla long-short -sijoitussalkun, joka sisältää moraalisesti epäilyttäviä syntiosakkeita sekä lyhyeksi myytyjä ESG-osakkeita. Tutkiakseen syntiosakkeiden sekä vastuullisten sijoitusstrategioiden vaikutuksia, opinnäytetyössä muodostetaan kaksi erillistä long-short -sijoitussalkkua, jotka perustuvat aikaisempiin akateemisiin tutkimuksiin. Opinnäytetyö selvittää, että syntiosakkeiden tuotto ylittää markkinatuoton koko tutkimusjakson ajan, mutta vastaavasti ESG-osakkeiden lyhyeksi myynti ei tuota sijoittajalle lisätuottoa. Käyttäen tutkimusjaksona 15 vuoden osaketuottoja tammikuusta 2003 joulukuuhun 2018 sekä ESG-arvoja joulusta 2002 joulukuuhun 2017, tässä opinnäytetyössä todetaan, että syntiosakkeet tarjoavat ylituottoa markkinatuottoihin sekä ESG-osakkeisiin nähden koko tutkimusajanjakson aikana. Kuitenkin on merkittävää, että ESG-osakkeiden tuotto ylittää markkinatuoton, tällöin ESG-osakkeiden lyhyeksi myynti ei lisää ylituottoa kun rakennetaan long-short -sijoitussalkkua. Tutkielman mukaan laajempi syntisalkku, joka sisältää kaikki syntisenä pidetyt teollisuudenalat ylittää kapeamman syntisalkun tuoton, joka sisältää ainoastaan perinteiset syntiosakkeet (alkoholi, tupakka ja uhkapeli).

KEY WORDS: Sin, Vice, SRI, ESG, Fama and French (2015, 2018), Long-Short, Europe

1. INTRODUCTION

Popularity of socially responsible investing (SRI) has increased steadily through decade becoming major trend in mutual funds, institutions and academic literature in financial research. SRI can be broadly defined as any investment strategy which takes into account ethicality of the investment with financial return, often summarized under ESG - Environment, Social justice and Corporate governance. SRI excludes so called "sin stocks" from investment universe which are considered to take advantage of people weakness and frailties, thus considered as unethical or immoral. Generally, sin stocks, also known as vice stocks, are considered to be alcohol, tobacco and gambling stocks which consist of majority of the sin stock universe. Additionally, weapons and conflict (defence) stocks and adult entertainment stocks are considered in the sin stock universe with latest addition, marijuana stocks. With the ongoing concern of global warming, oil and coal stocks have been assimilated with traditional sin stocks lately. Due to the questionable morality of these companies' products, many of the investors exclude sin stocks from the investment universe, especially public institutions such as mutual funds, pension funds, university institution etc. who are liable to their stakeholders. Hong and Kacperczyk (2009) find that institutions has smaller holding on sin stocks, are less covered by analyst and have higher expected return to their comparable.

This thesis will examine the performance of investing against moral in European stock markets by constructing a portfolio of long in sin stocks and short on ESG stocks. Academic literature suggest that investors pay financial cost from abstaining from sin stocks (Hong & Kasperczyk, 2009) and research on SRI provide contradictory result on return on SRI (Gil-Bazo et al., 2010, Halbritter and Dorfleitner, 2015). By constructing zero-cost portfolio of neglected stocks with higher expected return and shorting stocks which have gained popularity (overbought) at least partially due to ethical reasons and thus lower expected return, we estimate to take advantage of investors morality. Research will examine whether

investor is able to benefit from ongoing trend of ethical responsibility in society and among investors.

1.1. Research problem and hypothesis

The purpose of the study is to examine whether investor can profit from global trend of ethical responsibility in corporate, environmental and governance responsibility by investing into the sin stocks and shorting the ESG stocks.

Thesis' research hypothesis can be formed as following:

H1: Betting against moral provides statistically significant excess return on European stock markets.

H1 is expected to hold due to supporting literature that finds sin stocks have provided excess return in Europe in the past (Hong & Kasperczyk, 2009; Salaber, 2009) and also in US (Richey,2017). Additionally, researchers have provided findings to support that investors may pay financial cost from investing in ESG stocks in Europe (Halbritter and Dorfleitner 2015) and in US (Gil-Bazo et al., 2010).

In case H1 holds, H1can be divided to several sub hypotheses to examine the cause. H1 has two independent factors distinct from another, excess positive return of the sin stocks and excess negative return of the ESG stocks. These factors play individual role in the research and thus need to be separated and examined individually. Sub hypotheses can be formed as following:

H1.1: Sin stocks individually provide excess return on European stock markets.

H1.2: Shorting ESG stocks provide excess return on European stock markets

Thesis will examine 18 European countries (Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden and United Kingdom) for 15-year period from 2003-2018, which include 1 global crises (subprime) and 1 European (European debt) crises to provide comprehensive results on different market cycles. Research will use Fama and French five-factor model and six-factor model to interpret the results and Capital Asset Pricing Model CAPM for comparison.

1.2. Research motivation

Motivation of the thesis is to investigate whether investor can benefit in the market from other investors value choices. According to the academic studies, investors who invest in ESG stocks, may encounter financial cost as well as investors neglecting sin stocks may pay financial cost. These value based decisions from investors may potentially reduce their overall return compared to the decision made by purely financial perspective. This thesis will investigate the opposing perspective to value choices and attempt to provide proof that investors that include value choices in their investing decision pay financial cost from it.

1.3. Thesis Structure

This paragraph will lead through the thesis structure and how the research is conducted. Current chapter 1 provides overall introduction to the thesis as well as introduces the motivation for the thesis and assembles the research question which this thesis will attempt to provide answer. The thesis will continue with chapter 2, which will cover theoretical framework of assets pricing model, sin stocks and SRI, divided into three main sections. Covering theoretical framework will provide the required background information to interpret this thesis

Chapter 3 will cover previous academic researches and literature providing the reader comprehensive insight on the on the topics of the thesis. Th chapter is divided into three main subsections according to the topic covered. Chapter starts with covering academic research

on the performance of the sin stocks in Europe and US. Addition to the investment performance the section will go through the probable cause behind the historical performance of the sin stocks. Second section of the chapter will cover the relevant literature on addiction and the consumptions of the most widely used sin products to offer the reader understanding of the background and the products which are considered sinful and immoral. Last subchapter will present the academic literature of SRI return from Europe, US and Asian-Pacific.

Chapter 4 will focus in methodology and data used in the thesis. The chapter will explain the data used and also provide insight of the methodology applied in the research. Also, the chapter involves some statistic information of the portfolio construction and development of the portfolios through the research period.

Chapter 5 will discuss the empirical framework and results of the thesis. The chapter is divided into three sections each covering research method used in this thesis. The chapter starts with Fama and French 5 factor model, following Fama and French 6 factor model and finishing with Capital asset pricing model in the end.

Chapter 6 will conclude the entire thesis and summaries and research question, hypothesis and the results of the thesis. Also, the chapter will provide some suggestions for future researches on the topic

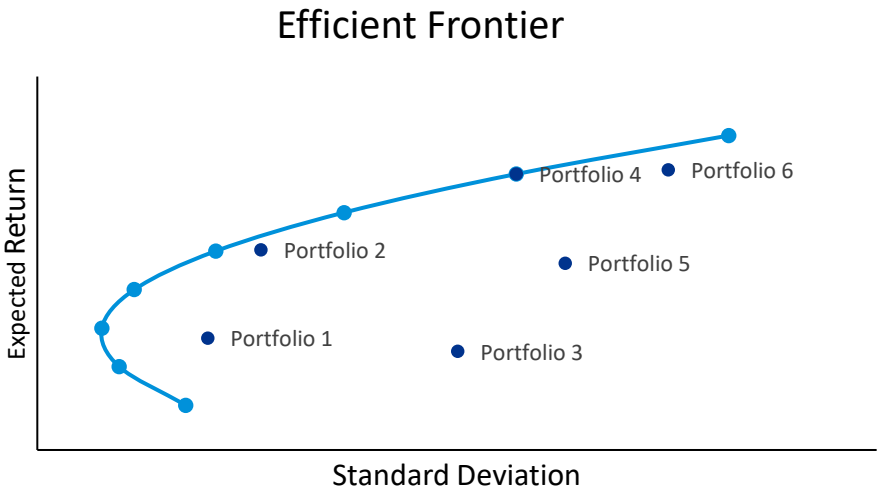
2. THEORETICAL FRAMWORK

The chapter will introduce the theoretical background to the topic's that are in core of this thesis. The chapter will first cover asset pricing models which aims to explain the return of an asset or portfolio with mathematical framework. The thesis will go over the development of the asset pricing model from the modern portfolio theory to current most acknowledge theories. Following with subchapters covering sin stocks generally, including the overall sin market. Last part of the chapter will go through socially responsible investing and its background. The section will also provider readers the information about socially responsible investing market and how these socially responsible investing is scored.

2.1.1. Modern Portfolio Theory

The modern portfolio theory (MPT) introduced by Markowitz (1952) establishes the foundation of portfolio construction by investors and portfolio optimization problem faced by any investor, therefore is one of the most important financial economics theories. This mathematical framework is based on the assumption that from two portfolios offering the same expected returns, rational investors will prefer the one which has less risk, i.e. the investors are risk-aversive and requires additional return for additional risk. Therefore, the optimization problem can be formulated as defining the allocations of different assets, which maximize the expected return for given risk level or vice versa minimized risk for given expected return. The portfolios that provide highest expected rate of return on given level of variance form the efficient frontier.

Figure 1. Illustrative efficient frontier



2.1.2. Capital Asset Pricing Model

Capital Asset Pricing Model (CAPM) has been the foundation of the asset pricing model and widely used despite numerous studies providing theoretical and empirical evidence of its insufficiency (Fama and Macbeth, 1973; Gibbons, 1982). Model was introduced over half century ago when Sharpe (1964) and Lintner (1965) independently presented the model based on earlier work of Markowitz's MPT. Model is based on two main assumptions; all investors have same expectations about the state of the economy, and risk-free rate borrowing and lending is possible at the same interest rate. After that many alternative adjustments have been introduced to traditional CAPM which tackle these assumptions, like zero-beta CAPM by Black (1972) and ICAPM by Merton (1973). Thereafter, scholars and practitioners have attempted to further develop a mathematical formula to explain returns of an asset.

CAPM provides investor expected return of a stock or portfolio in association with market return and stock or portfolio beta, i.e. describes the relationship between systematic risk of stock and expected return. For this reason, CAPM can also be called as one-factor model.

CAPM is also widely used as measurement of cost of capital. CAPM can be written as follows:

(1) $$ER_i = R_f + \beta_i(ER_m - R_f)$$

Where:

ER_i: Expected return on assets *i*
R_f: Risk-Free Rate
β_i: Beta on asset *i*
ER_m: Expected return on market

2.1.3. Multi-factor Asset Pricing Model

After evidence of CAPM's insufficiency, scholars and practitioners have attempted to further develop a mathematical formula to explain return of an asset. Fama and French (1993) presented first multi-factor model, three-factor model (3F) which included factors that have earlier recorded above average returns in the markets, Size effect (small capitalization minus big capitalization portfolio) (SMB) by Banz (1981) and Value effect (high book-to-market minus low book-to-market portfolio) (HML) by Basu (1983). Usually presented in a beta representation as:

(2) $$ER_i = R_f + \beta_i\left(Mkt - R_f\right) + \beta_{SMB}(SMB) + \beta_{HML}(HML) + \varepsilon$$

Where:

ER_i: Expected return on assets *i*

R_f: Risk-Free Rate
β_i: Market beta on asset *i*
Mkt: Return of the stock market
β_{SMB}: Coefficient SMB
SMB: Small Minus Big
β_{HML}: Coefficient HML
HML: High Minus Low
Ɛ: Error term

Later Carhart (1997) included Momentum effect (past winner's minus past loser's portfolio) (MOM) in the 3F model after Jagadeesh and Titman (1993) discovered past winners continue to provide excess return in the market and vice versa. Carhart observed similar outcome and found that four-factor model (4F) significantly improves the average pricing error of 3F model. In international test Fama and French (2012) found that 4F model can acceptably explain return on global portfolio insisting the portfolio does not contain too much microcaps or stocks of particular region. Presented as following:

$$ER_i = R_f + \beta_i(Mkt - R_f) + \beta_{SMB}(SMB) + \beta_{HML}(HML) + \beta_{MOM}(MOM) + \varepsilon \quad (3)$$

Where:

ER_i: Expected return on assets *i*
R_f: Risk-Free Rate
β_i: Market beta on asset *i*
Mkt: Return of the stock market
β_{SMB}: Coefficient SMB
SMB: Small Minus Big

β_{HML}: Coefficient HML
HML: High Minus Low
Ɛ: Error term

Later Fama and French (2015) further developed their original 3F model by adding two additional factors, profitability (robust operating profit minus weak operating profit) (RMW) and investment (conservative investment minus aggressive investment) (CMA) factors suggested by earlier result on Novy-Marx (2013) and Ahorani et al. (2013), respectively. The new five-factor model (5F) did not include Carhart's MOM although they found out that 4F model can acceptably explain return on global portfolio. Some practitioners and scholars have wondered the decision of Fama and French leaving momentum out from their 5F model. Fama and French note in their research that it would be interesting to extend the research to include momentum but does not explain the reason for not including it in the model (AQR, 2014). Like earlier factors, additional factors are not state variables mimicking portfolios, but diversified portfolios that provide different combinations of exposures to the unknown state variables. Formula presented as following:

(4) $$ER_i = R_f + \beta_i(Mkt - R_f) + \beta_{SMB}(SMB) + \beta_{HML}(HML) + \beta_{RMW}(RMW) + \beta_{CMA}(CMA) + \varepsilon$$

Where:

ER_i: Expected return on assets *i*
R_f: Risk-Free Rate
β_i: Market beta on asset *i*
Mkt: Return of the stock market
β_{SMB}: Coefficient SMB
SMB: Small Minus Big

β_{HML}: Coefficient HML
HML: High Minus Low
β_{RMW}: Coefficient RMW
RMW: Robust Minus Weak
β_{CMA}: Coefficient CMA
CMA: Conservative Minus Aggressive
Ɛ: Error term

Scholars have continued to develop these models in order to better capture the variables behind the return of an asset. Latest models go up to six-factors (FF6F) where Fama and French (2018) further developed their model to include Carhart's suggested momentum factor from 4F model which they left out in 5F model. Also, noticeable detail in 5F model was that value factor HML became redundant, implying that the exposure of the loading was absorbed by other additional factors. This was also noticed by other scholars and practitioners, whom have proposed alternative methods for value factor. Asness and Frazzini from AQR Capital Management (2013) proposed HML^{m} factor where the book-to-price value is calculated from more timelier price date when the portfolio is constructed and not the lagged price suggested in 5F model (AQR, 2013). Another six-factor model (BS6F) is presented by Barillas and Shanken (2017) which is based on 3F model and Hou, Xue, Zang's (2015) q-model. BS6F contain size factor SMB from 3F, Investment (I/A) and profitability factor (ROE) from q-model, momentum (UMD) from 4F and finally value factor HML^{m} from Asness and Frazzini (2013). Although, the additional factors in the recent models explains more of the markets return and reduces significance of the intercept, it still can't fully explain the return of the markets and Fama and French state (2018) adding factors to the model itself isn't expedient. FF6F model presented as following:

$$ER_i = R_f + \beta_i\left(Mkt - R_f\right) + \beta_{SMB}(SMB) + \beta_{HML}(HML) + \beta_{RMW}(RMW) + \beta_{CMA}(CMA) + \beta_{WML}(WML) + \varepsilon \quad (5)$$

Where:

ER_i: Expected return on assets *i*
R_f: Risk-Free Rate
β_i: Market beta on asset *i*
Mkt: Return of the stock market
β_{SMB}: Coefficient SMB
SMB: Small Minus Big
β_{HML}: Coefficient HML
HML: High Minus Low
β_{RMW}: Coefficient RMW
RMW: Robust Minus Weak
β_{CMA}: Coefficient CMA
CMA: Conservative Minus Aggressive
β_{WML}: Coefficient WML
WML: Winner Minus Loser
Ɛ: Error term

This research will utilise both 5F model and FF6F model to interpret the results of betting against morality in the European stock markets.

2.2. Sin stocks

Sin stocks are publicly traded companies that sell products or services which are considered to be unethical or immoral. In academic literature sin stocks are also referred as "vice stocks", "unethical stocks", "controversial stocks" and "shunned stocks". Since ethicality and morality is subjective to a person and society at given time, also what is considered sinful adjust accordingly and what has been sinful in past may not be in the future and vice versa. Since these matters are subjective to a person and society one sector can be sinful for one investor but not for another. Generally, sectors that make profit from exploiting human weaknesses and frailties are considered to be sin stocks. Three most common sectors of sin stocks are alcohol, tobacco and gambling which are also referred as the "Triumvirate of sin"

in the literature. Outside of the Triumvirate of sin are smaller industries which are referred as subcategories including weaponry, adult industry and most recent addition marijuana.

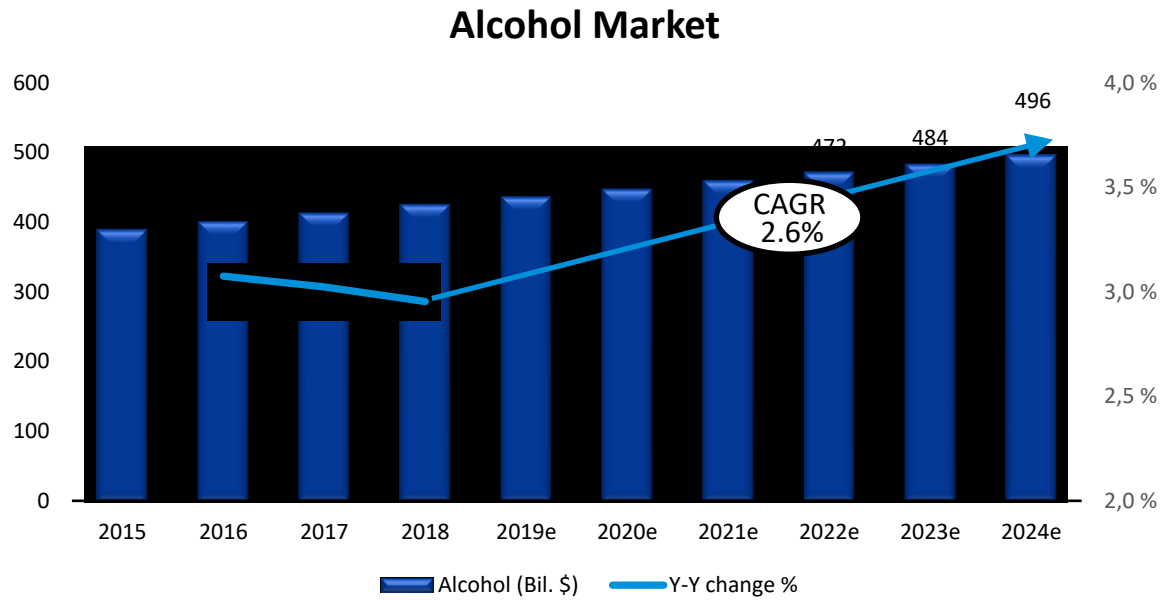
Outside the literature what is considered to be a sin stock can vary from investor to another. As mentioned earlier, ethicality and morality can vary to a person and socially unacceptable behaviours can diverge from society to another and time to time. For example, wineries have a long tradition in Southern Europe such as Spain, Italy and France wine is considered to be normal part of the meal. Since wine has long history in these country as producing and consuming, drinking wine is seen as socially acceptable and not immoral, thus wine stocks are not likely to be considered as sin stocks. Similar conclusion can be made about breweries in European countries such as Germany, UK and Spain. Beer has integrated into society and populations everyday life's as acceptable beverage. Comparable debate can be made from the weaponry industry. Mostly, the industry is considered to be sinful due to the intention and purpose of the end products produced but some may view it as patriotism and manner of self-defence. For these reasons, outside the literature sin stocks cannot be defined seamlessly since the matter is subjective, but in the literature and among academic's definition is generally accepted but is in constant adjustment as social norms change.

One of the common features of the sin industries is the high barriers to entry for new companies. Strict legislation and other restrictions in the industry limit the willingness of new competitors to enter the market. In some situation, this result to relatively oligopolistic or even monopoly market in some area but in general the industry is healthy and competitive. For example, Veikkaus has a monopoly position in Finland's gambling industry and Systembolaget has monopoly in Swedish alcohol industry for beverage containing over 3,5% alcohol by volume. These state-owned companies maintain monopoly position in order to control the side effects of these products and fund all kinds of health care and charity programs (Veikkaus, 2019; Systembolaget, 2019).

2.2.1. Sin Stocks Market

Investors that are avoiding sin stock industries are missing out multibillion-dollar market investment opportunity. Each Triumvirate of sin industries account for hundreds of billion industries annually in Europe and revenue wise, each industry is expected to continue the growth in coming years (Statista, 2019). Alcohol beverage market in Europe is largest in the world accounting to $426 billion in 2018 of which two largest segments, wine and beer accounted for $177.13 and $154.8 billion in 2018, respectively. Market is expected to grow between 2019-2023 by 2.6% annually. For comparison, second and third largest markets, U.S and China account for $251 and $246 billion in 2018, respectively. Measured by sales value of alcoholic drinks in Europe in 2015, Germany and France lead by €18.7 and €12.6 billion, respectively. The market in Europe is fragmented between the areas, while Czech Republic had highest consumption of beer per capita in 2015, Italy, Spain and France had highest consumption of wine per capita. Although, the revenue of alcoholic drinks is increasing and expected to increase, consumption by volume has been decreasing lately. Total consumption of alcoholic beverages in Europe was 76.57 million litres in 2018 compared to 76.89 million litres in 2015. Consumption of beer and spirits have decreased by 0.33% and 0.82% annually, respectively, while wine and other beverages have increased by 0.5% and 0.8% annually, respectively (Statista, 2019).

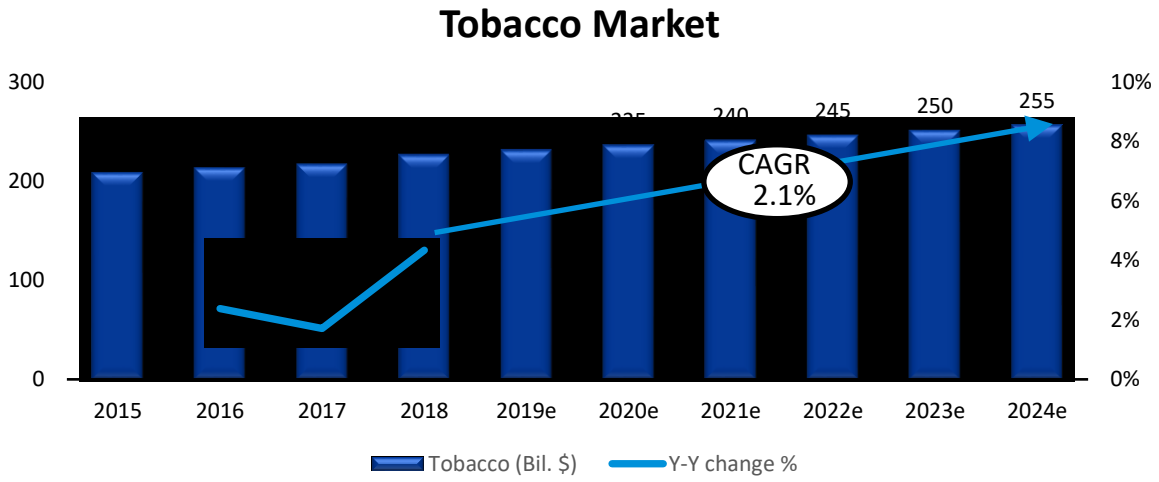
Figure 2. Development of European alcohol market



Cigarettes account for around 90% of the overall tobacco markets in Europe and globally 93%. Globally cigarettes alone were 700-billion-dollar market in 2018 even though trend of retail volume has decreased from its near future peak in 2012 of 6 trillion smokes to 5.4 trillion in 2018 (Tobacco free kids, 2018). Europe is no different from the global trend, volume of cigarettes has decreased annually by 1.15% from 2015 to 2018, from 1,093 billion to 1,044 billion smokes, respectively. Total consumption of overall tobacco products is with in line with cigarette consumption and is in decreasing trend by 1.12% annually, from 1.19 billion portion to 1.14 billion from 2015 to 2018, respectively (Statista, 2019). Although, the trend of smoking is decreasing European Commission report that 26% of EU population smoke and 29% of the young Europeans (aged 15-24) smoke (European Commission, 2019). Even the decreasing trend in Europe and globally, tobacco market continues to increase by revenue in Europe. Total tobacco market (cigarettes, smoking tobacco and cigars) account for $225 billion in 2018 comparison to $207 billion in 2015, CAGR of 2.09%. Market is expected to continue grow 2.1% annually from 2019 to 2023 (Statista, 2019). European market is only slightly behind the leading market, China, where the market is around $231 billion.

Outside tobacco products which can be categorized into the segment is snus and e-cigarettes, which both are increasing popularity specially among young citizens in Europe. Global snus market was valued at 800 million dollars in 2017 and expected to reach 1.9 billion dollars in 2025, CAGR of 11.3% (Market watch, 2018). European market itself is projected to reach $600 million in 2022 (The Swiss Times, 2019). According to Business Herald (2019), snus contains about 1% of the risk of cancer and cardiovascular disease and it is considered to be 95%-99%, less harmful than smoking, thus seen as viable alternative for smoking in social situations. Scandinavian snus market is estimated to be 430 million cans in 2018, approximate growth of 6% from previous year (Swedish Match, 2019). Another left out product from tobacco products is newcomer, e-cigarettes, which made entrance to the market in 2003 (Bhatnagar et al, 2004). Estimate of the global e-cigarette market vary from around $11-13 billion in 2018 and is the estimate of the expected growth diverge widely from 18-53 billion by 2024, CAGR between 8.55-30%. Additionally, to the wide estimate of the global market size, estimate of the region of highest consumption vary from North America, Europe and China. One may predict this is due to high proportion of online sales, accounting for 30-50% of overall sales globally (Greenhalgh, 2019; Vynz Research, 2019; Mordor Intelligence, 2019). All in all, these two products which are not yet included into the tobacco products market share are growing substantially and expected to continue growth in the future. By this, filling up the ongoing trend of decreasing volume of traditional smoking.

Figure 3. Development of European tobacco market



Global gambling market size reached $449 billion in 2018 and has grown by 4.1% annually since 2014. European market accounted for approximately 18% of the global market reaching $84 billion in 2018 in GGR (Gross Gaming Revenue). Global market is expected to continue grow by CAGR of 5.9% until 2022 reaching $565 billion. Gambling market is divided into 4 segments; casino, lotteries, sports betting and others. Largest of the segments in 2018 was lotteries with 46.1% of the total market share accounting for $207 billion, while fastest-growing segment was sports betting with expected CAGR of 6.9% (The Business Research Company, 2019). European gambling market grew by 3.5% annually from 2015 to 2018, €93.5 billion to €103.5 billion respectively and is expected to have a CAGR of 1.25% until 2024 reaching $111.5 billion in overall market size. In 2018 lotteries was the largest segment followed by EGMs (Electronic Gaming Machine) and betting, 32.3%, 28.5% and 18.8%, respectively. Fastest growing segment is betting with CAGR of 4.3% between 2018-2024. All segments are expected to grow except EGMs which is expected to decline by 0.8% annually until 2024. In Europe Italy is largest market followed by U.K., Germany and France with market of €19.4, €16.9, €14.4 and €10.5 billion respectively (H2 Gambling Capital - July 2019).

Figure 4. Development of European gambling market

Triumvirate of sin is multibillion-dollar market annually alone in Europe, each industry growing and expected to continue the trend. These defensive recession proof industries have been excluded from many of the modern mutual funds and is neglected by institutional investors. Agent rejecting to consider these industries in their portfolio are at least narrowing down their possible diversification in the investment universe.

2.3. Socially Responsible Investing

Socially responsible investing (SRI) is broadly used term for ethical, environmentally sustainable, and corporate responsible investment strategy. As it is broadly used term, clear definition has been missing in the industry until recently. In 2016 Eurosif's Board reached a consensus on a definition of SRI, "Sustainable and responsible investment ("SRI") is a long-term oriented investment approach which integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio. It combines fundamental analysis and engagement with an evaluation of ESG factors in order to better capture long term returns for investors, and to benefit society by influencing the behaviour of companies" (EuroSif, 2018). Definition indicates that SRI is an investment strategy which reflect both long term returns for investors and same time influencing the behaviour of companies to benefit the society. Environmental, social and governance (ESG) factors playing central part in both.

SRI can be divided to several categories which were introduced in 2012. Seven categories of strategies are according to Eurosif following:

1) Sustainability Themed Investment;
2) Best-In-Class Investment Selection;
3) Exclusion of Holdings from Investment Universe;
4) Norm-Based Screening;
5) ESG Integration Factors in Financial Analysis;

6) Engagement and Voting on Sustainability Matters;
7) Impact investing;

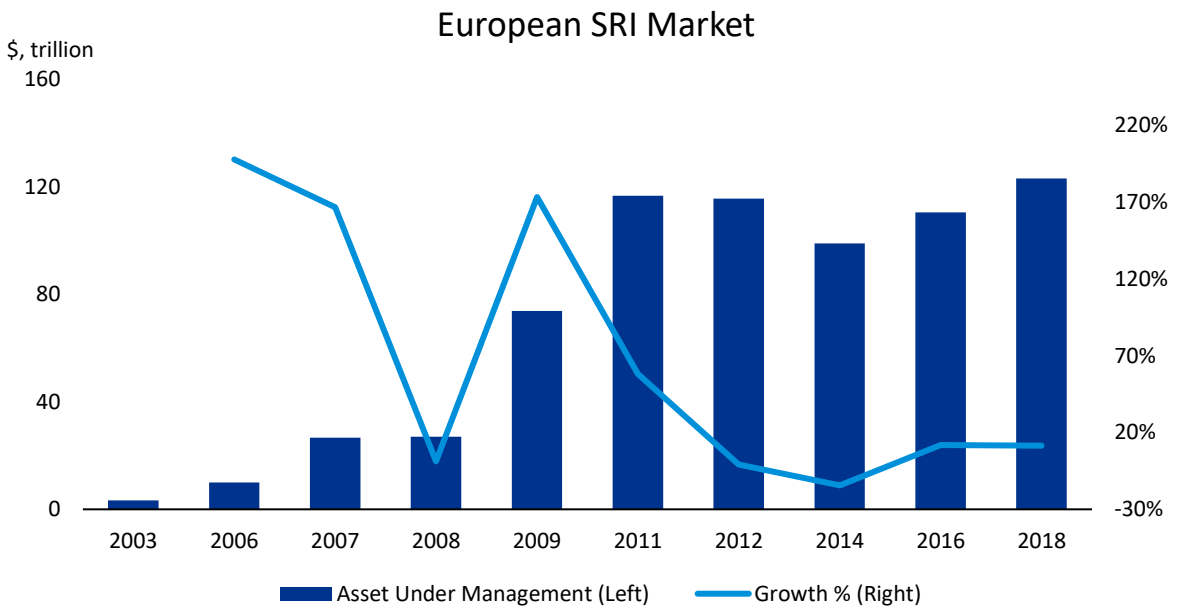
Eurosif classifications are closely in aligns with other international organizations framework but may have some variations.

Consensus in academic literature agrees SRI originates from biblical time's religious values and institutions as in Jewish, Christian and Islamic traditions laid down many directives on ethical restriction on investing and loans (Schueth, 2003; Renneboog, 2008; Brzeszczyński & McIntosh, 2014). Still now days some of the traditions have remained and e.g. Islamic law (Sharia) forbids interests on principal of the loan as it is inequitable or inefficient gain (Khan, 2013). As sin stocks and as mentioned earlier, definition of SRI has reformed with time and society. Earliest adaption of modern SRI was made by founder of Methodism John Wesley's sermon "The use of Money" in 18th century. Basic principles of the sermon were "We should not "gain all we can" by causing injury to another, whether to his trade, his boy or his soul" and "It is wrong to make a living from selling those things which would harm a neighbour's health" (Hall, 2007), reflecting now days corporate social responsibilities (CSR) and environmental issues. More recent adaption of SRI to prevailing society can be seen from mid-20th century when Martin Luther Kind addressed civil rights, labour issues and equality for women in 1960s (King, 1968) which further broadened in 1970s. 1980s brought up global environmental issues with Russian Chernobyl nuclear power plant incident, U.S Exxon-Valdez oil spill incident and Indian Bhopal gas leak incident (Schueth, 2003). Since the late 1990s, SRI has become increasingly defined as a means to promote environmentally sustainable development due to the awareness of global climate change (Richardson, 2008) and most recently world's largest pension fund, Norway's wealth fund dumped over $10 billion worth of stocks related to fossil fuels and additionally stated that will divest from sin stocks related to alcohol and gambling (Forbes, 2019; Financial Times, 2019).

2.3.1. SRI Market

Popularity of SRI has increased steadily in past few decades where data is available reaching at the global level $30.7 trillion at the start of 2018, a 34% increase in two years including all asset classes (GSIA, 2018). Sustainable investing has grown in all five major markets (Europe, US, Canada, Japan & Australia/New Zealand) in overall professionally managed asset under management (AUM) except in Europe where the share decreased from 52.6% to 48.8% from 2016. Highest increase in AUM was in Japan where the share of sustainable investing increased from 3.4% to 18.3%, from 2016 to 2018. AUM range between different markets from 18% in Japan to 63% in Australia and New Zealand from overall AUM of the region. In the global scale, Europe leads by managing almost half of global sustainable investing assets and US being second largest of the regions, 46% and 39%, respectively. Exclusion screening remains to be the most popular strategy globally with $19.8 trillion in AUM, ESG integration becoming second largest strategy with 69 percent growth over the past 2 years with 17.5 trillion in AUM. Most dominant asset classes are public equity and fixed income with 51% and 36% share of the total AUM globally, respectively.

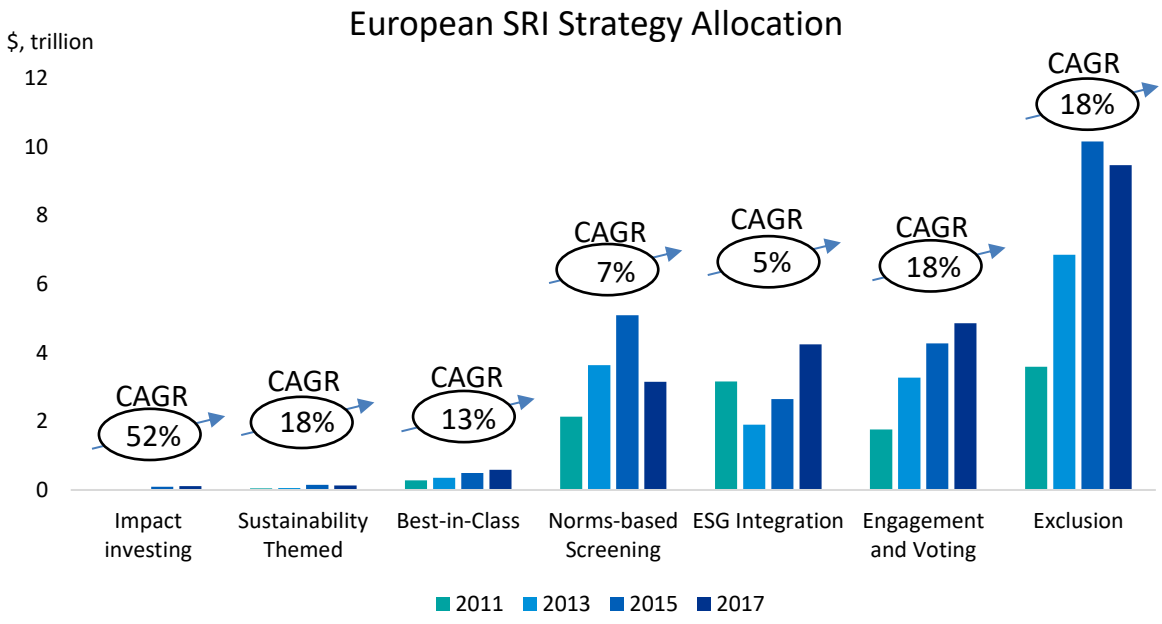
Figure 5. Development of European SRI market in AUM



Source: Eurosif and GSIA reports

According to Global Sustainable Investment Alliance (GSIA) total commitment on SRI strategies were €12.3 trillion in 2018, growth of 11 percent from 2016. However overall share on professionally managed assets in the market declined from 53 percent to 49 percent. The decline is expected to be due to move to stricter standards and definitions on SRI. Exclusion remain to be the dominant strategy in Europe with 55% of the global market share and around €9.5trillio in AUM followed by engagement and voting with 56% of the global market share and around €5 trillion in AUM. Norm-based screening is the most popular strategy in Europe when looked at global allocation with 77% share globally and least popular strategy being sustainability themed investing strategy with 17% share globally, with €3.1 trillion and €138 billion, respectively. Fastest growing strategy in Europe is ESG integration with compounded annual growth rate (CAGR) of 27% from 2015 to 2017 and €4.2 trillion in AUM and weakest grower in same duration is norm-based screening with CAGR of -21% and €3.1 trillion in AUM.

Figure 6. Development of SRI strategy allocation in Europe



Source: Eurosif and GSIA reports

“The lack of definitions and clear metrics still hampers our industry. In fact, in this review we clearly notice how the general discussions around definitions are leading to a more general concern for greenwashing, gaining ground as part of the barriers to SRI in general.” (Eurosif, 2018)

2.3.2. ESG-Score

In order to satisfy increasing desire of investors to take into account SRI in their asset allocation multiple banks, analyst house, databases and many more institutions have gradually increased available data on ESG-ratings. Despite of numerous sources for ESG-rating, each data provider is independent provider of ESG-score and have own unique method to calculate the final score. Due to the absence of standardised method, International Organization for Standardization (ISO) has formed a technical committee in 2018 in order to standardise ESG ratings, Technical Committee 322 Sustainable Finance (ISO/TC322) (ISO; 2018).

Although there is no standardised methodology to calculate ESG- ratings for the companies, many of the largest ESG-score providers have similar methodology for the core parts. The largest ESG research and data provider Morgan Stanley Capital International (MSCI) covers over 13,000 equity and fixed income issuers linked to over 590,000 equity and fixed income securities (MSCI, 2018). MSCI constructs final ESG-ratings from 3 main pillars, Environment, Social and Governance, which includes 10 themes and 37 ESG key issues all together.

Table 1. Morgan Stanley Capital International ESG factsheet (2018) of three ESG pillars

3 Pillars	10 Themes	37 ESG Key Issues	
Environment	**Climate Change**	Carbon Emissions Product Carbon Footprint	Financing Environmental Impact Climate Change Vulnerability
	Natural Resources	Water Stress Biodiversity & Land Use	Raw Material Sourcing
	Pollution & Waste	Toxic Emissions & Waste Packaging Material & Waste	Electronic Waste
	Environmental Opportunities	Opportunities in Clean Tech Opportunities in Green Building	Opp's in Renewable Energy
Social	**Human Capital**	Labor Management Health & Safety	Human Capital Development Supply Chain Labor Standards
	Product Liability	Product Safety & Quality Chemical Safety Financial Product Safety	Privacy & Data Security Responsible Investment Health & Demographic Risk
	Stakeholder Opposition	Controversial Sourcing	
	Social Opportunities	Access to Communications Access to Finance	Access to Health Care Opp's in Nutrition & Health
Governance	**Corporate Governance***	Board* Pay*	Ownership* Accounting*
	Corporate Behavior	Business Ethics Anti-Competitive Practices Tax Transparency	Corruption & Instability Financial System Instability

** Corporate Governance Theme carries weight in the ESG Rating model for all companies. In 2018, we introduce sub-scores for each of the four underlying issues: Board, Pay, Ownership, and Accounting.*

Source: MSCI ESG Rating Methodology 2018

MSCI ESG-rating Framework takes into account over 1,000 data points on ESG policies, programs and performance, and reviews data on 65 000 individual directors additionally to 13 years of shareholder meeting results. These data are used to measure Exposure metrics which is based on over 80 business and geographic segment metrics and Management metrics including 600 policy metrics, 240 performance metrics and 96 governance key metrics. Metrics are used to score 37 key issues which are used to further score 10 themes inside the 3 main pillars, Environment, Social and Governance, to obtain the final ESG-rating. MSCI ESG-ratings rate companies on scale between best (AAA) and worst (CCC) after Key Issue Scores are normalized by each industry and weighted averages of the scores are aggregated (MSCI; 2018).

3. LITERATURE REVIEW

As almost any topic in literature, results on the academic research on sin stocks and SRI have contradiction in the results. Dissenting results keep the debate ongoing whether these strategies are able to provide abnormal return for the investor. Following chapter will examine different outcomes on the both topics and aims to provide comprehensive summary on the area.

3.1. Sin Stock Returns

Research literature about sin stocks in both empirical and theoretical relevance is still limited although increasing amount of literature about SRI. Latest paper on the topic (Richey,2017) examines US market over the period from 1996 to 2016 including alcohol, tobacco, gaming and national defence industry. Using daily return data Richey finds that using CAPM, Fama-French three-factor, Carhart four-factor, and Fama-French five-factor Model positive and significant alpha for the sin stock portfolio can be obtained throughout the sample period except in Five-Factor model. However, alpha obtains its significance in the subsample during bull market in Five-Factor model, which gesture that sin stocks over performs the overall market during bull market.

In the most widely cited research on the sin stocks, Hong and Kacperczyk (2009) provide evidence for the abnormal returns of the sin stocks. Hong and Kacperczyk found out that during the period of 1980-2003, vice stocks are less held by norm-constrained institutions which are accountable for stakeholders' such as pensions funds, public governance funds like state and university funds compare to mutual or hedge funds. Authors found that on average sin stocks have institutional ownership of 19% while comparables have on average 22%. Meaning that stocks of companies with sinful product or service have 14% lower institutional ownership than their comparables. They also found that between 1976-2003, vice stocks are covered less by analyst than comparable stocks which strengthens the gesture that they are neglected by norm-constrained investors and face greater litigation risk. During the time

period, typical comparable for sin stock had 2.5 analyst coverage while sin stocks had 16% lower coverage by analysts, followed only by 2.1 analysts. For this, authors find that sin stocks tend to be relatively cheaper than their comparables when Price-to-book (P/B) or Price-to-earning (P/E) measurements are used. P/B was 15% lower between 1965-2004 when compared to the stocks of the same characteristics but without a sinful product or service. Hong and Kacperczyk use data from 1926 to 2004 to provide evidence on the returns of the sin stocks and their comparables. They construct long-short portfolio, long on sin stocks and short on the comparables and find that portfolio provides 45 basis points per month when adjusted for the CAPM and 39 basis points per month when adjusted for 4F model. Using cross-sectional regression controlling for firm characteristics between 1965-2004, authors find that sin stocks outperform their comparables by 30 basis point per month. All results were statistically and economically significant. Additionally, they did not find any systematic relationship between sin stocks returns and the association of litigation risk, meaning sin stocks provide higher return to compensate investors for the litigation. Furthermore, Hong and Kacperczyk provide evidence that sin stocks outperformance over the market is due to defensive nature of sin stocks which provide products that have addictive traits. Finally, authors found that sin stocks use relatively more private debt financing than other companies, implying that sin stocks should be less sensitive to recession than other stocks which use more external funds to finance company growth and investments (see e.g. Baun and Larrain, 2005; Raddatz, 2003). Baun and Larrain's (2005) data show that tobacco industry had very low external finance dependence, which was the sole industry from triumvirate of sin listed separately.

Salaber (2009) conclude to similar findings in her research with broader timeframe between 1926-2005. Salaber's research report excess return for sin stocks relative to the broad market but when compared to industry-comparable stocks this abnormal return disappears. Salaber use conditional model taking account different macroeconomic variables and earnings growth over expansion and recession periods such as dividend yield, term structure and default spread to examine time-series of stock returns. Sin stocks provide excess return during recession periods but not during expansion period, implying higher risk premium

during contraction than expansion period due to consumption smoothing. Salaber also found that sin products seem to be insensitive to economic conditions, concluding that SRI pay financial cost avoiding sin stocks because of social and ethical criteria, but these characteristics are not unique just for sin stocks and can be attained with other non-cyclical stocks. In Salaber's previous study (2007) on the topic, she examined effect of countries religious preferences, level of excise taxation on sin products and the degree of litigation risk which occurs from the country specific legislation. Salaber's study covers 18 European countries between 1975-2006 and found that all variables affect on expected return of sin stocks. Sin stocks delivered excess return in Protestant countries compared to overall market due to sin aversion of these countries. Also, countries with higher litigation risk provided excess return for sin stocks because of the high level of external costs. Countries with high excise taxation, sin stocks outperformed other stocks significantly. These results imply that abnormal return of sin stocks are due to negligence and investor avoiding these stocks pay financial cost for their ethical principles.

Kim and Venkatachalam (2011) hypothesised that recorded abnormal return of sin stocks in the literature is due to higher information risk investors carry in form of poor financial reporting quality of these firms. Authors compared sin stocks financial reports predictability of earnings for future cash flows and timely loss recognition to control firms with same two-digit SIC code as the benchmark. They found evidence that sin firms have better predictability of future cash flow for earnings and recognize losses in a more timely fashion. Kim and Venkatachalam predicts that this may be due to nature of the products they sell and receive high degree of scrutiny from lawyers, politicians and public opinion. And by using better financial reporting quality sin firms attempts to attract a wider investor base and reduce information asymmetry by analyst coverage. Paper covered period between 1988-2006 including 117 unique firms from US. Furthermore, Leventis et al. (2013) investigated auditing and consulting fees for sin companies and compared these with prices with control sample in US between 2003-2009. They found that sin industry companies are invoiced significantly higher than the control companies and the sin companies are charged based on their relative levels of sinfulness and on the prevailing political ideology. Result enchase

earlier results that sin stocks abnormal return is due to agents will to neglect ethically questionable stocks and investors are bearing financial cost without economical rationality which is further in line with Beckers (1957) theory of discrimination.

Literature on the sin stocks show evidence of negligence of sin stocks by institutional and morally guided investors implying lower liquidity than stocks with comparable other stocks with same characteristics. Amihud (2002) find evidence of illiquidity premium in US markets between 1964-1997. Paper show evidence of positive and significant effect on excess return with expected market illiquidity and negative and significant effect with unexpected illiquidity. He suggests that negative effect of unexpected illiquidity is due to higher realized illiquidity and significant effect remains after adding two known variables affecting expected return of stock; default yield premium on low rated corporate bonds and the term yield premium on long-term Treasury bonds. Result present stronger effect on small firm stocks, explaining time series variations in their premiums over time. Pastor and Stambaugh (2003) conclude to similar findings, while observing US markets through 1966-1999. They conclude that stock that are sensitive to liquidity earn excess return of 7.5% annually compare to stocks that are insensitive to liquidity when know risk factors are controlled, market return, size, value and momentum. They argue that liquidity risk factor accounts for 50% of the profits to a momentum strategy over the research period.

Additionally, to listed favourable research results of sin stocks abnormal returns over the market in US and Europe (Hong & Kacperczyk, 2009; Salaber 2007), smaller dependence to external funding (Baun and Larrain, 2005), are recession proof (Salaber 2009) and have superior financial report (Kim and Venkatachalam, 2011). Sin company literature extend to provide evidence of sin stocks are stable over time (Chong et al., 2006), offer excellent dividends compare to markets (Ahrens, 2004) and are cash rich (Beneish et al., 2008). These proven characteristics of sin companies are essential for any investor to take in concern while optimizing their portfolio.

3.2. Addiction and consumption of sin products

Addiction is a condition in which a person engages in the use of a substance or in a behaviour for which the rewarding effects provide a compelling incentive to repeatedly pursue the behaviour despite detrimental consequences.

Triumvirate of sin, alcohol, smoking and gambling, are all proven to be addicted by nature and lack close substitute, suggesting demand inelasticity (Baltagi and Griffin, 2002; Becker et al., 1994; Parke and Griffiths, 2004). In US during financial crises of 2008, people who lost their jobs, retirement or faced problem paying mortgage/rent consumed 41-70% more alcohol compare to people unaffected by the economic situation (Mulia et al., 2013). Dom et al. (2016) reviewed existing literature on 2008 financial crises affect on consumption of alcohol, drugs and cigarette smoking in Europe. Out of 11 original research articles on alcohol, six studies conclude positive correlation on economic crisis and increase in alcohol consumption which are in association with unemployment in majority of cases. Two of the studies reported decrease in alcohol consumption in the general population during crises periods and three papers provided mixed results where heavy drinking was reduced but binge drinking increased.

Studies on smoking provided similar results, although only one study was evaluated by Mulia et al. (2013). Study on Italy presented clear increase in smoking among men and women when smoking prevalence was compared from 2009 to 2008. Smoking prevalence increased significantly from 22-25.4% among both men and women, while number of never smokers remained constant suggesting that economically uncertain times doesn't trigger people to start ill habits but relapse former smokers to take on their old habits. Studies on different European countries present controversial results. In Germany, economic downturn increased the propensity to become a smoker significantly but decreased cigarette consumption on the individual level, by 0.7 and 0.8 percentage point for each one percentage point rise in the unemployment rate, respectively (Reutter et al., 2017). In Island McClure et al. (2012) found that change of income correlated with the risk of relapse of former smokers among men, i.e. decrease in income lowered the risk of relapse. Female smokers were less likely to quit

smoking over time. Study in UK also conclude that financial strain increases the risk of relapse of former smokers and reduce the probability of quitting smoking (McKenna et al., 2017).

Horváth and Paap (2011) examined the influence of business cycles on expenditures of three major types of legalized gambling activities, Casino, lottery and pari-mutual wagering between 1959-2010 in US using time series analysis. Authors compared the consumption of gambling expenditure to other economic consumption series, such as consumption of recreational activities, services and nondurable goods. Among the investigated sectors lottery consumption appears to be only recession proof sector showing independence from business cycles and shocks to income. While casino expenditure demonstrates significant positive growth during both expansion and recession, providing excess growth overgrowth in income during economic expansion and flowing income growth closely during recession. In Island, where the 2008 financial crises hit the fastest and deepest when all three major banks went bankrupt in less than two weeks had similar outcome. There was considerable increase in gambling from 2007 to 2011, overall increase of 10% among all participants which was mostly due to increase in participation of lottery, but also bingo and other scratch tickets. Increase was steeper among people who experienced financial difficulties during the time period. Only EMGs participation declined between the timeframe and proportion of problematic gambling remained unaffected (Olasson et al., 2017).

Inelasticity or low elasticity on alcohol, smoking and gambling products on different business cycles provide triumvirate of sin recession proof investing opportunities. Additionally, Messinis (1999) studied habit formations association to addictions which is divided into two subcategories, rational and myopic addiction, and can be also commodity-specific or generalised. He concludes that addiction is a strong form of habit formation, implying high and time-varying risk aversion on consumers, i.e. risk averse consumers smooth their consumption by saving in good times and dissaving in recessions. Furthermore, Deaton (1992) found out that consumption correlates with changes in anticipated income but is insensitive to unanticipated change of income. These finding together with sin products not

having close substance imply low change in demand during economic downturn and defensive characteristics on the sin stocks.

3.3. Socially Responsible Investing

Research results on SRI returns and performance vary from edge to edge and is an ongoing debate since the academic literature present contradictory results. Are investors paying a financial cost for social responsibility and norm-constrain in their portfolio allocation? Gil-Bazo et al. (2010) investigate US SRI funds from 1995 to 2005 applying matching estimator methodology. They found that SRI funds outperformed their comparables by 0.96-1.83% annually before expenses and SRI funds run by specialised managers up to 2.6% annually. However, authors emphasis that this performance of excess return is dependent on whether the fund is run by management company specialised in SRI. Nofsinger and Varma (2014) present similar outcome providing evidence through three different methodologies, CAPM, Fama-French three-factor and Carhart four-factor model that socially responsible mutual funds outperform conventional mutual funds during periods of market crises. This risk reduction comes at the cost of underperformance during non-crisis periods. Authors examined US domestic equity funds for the period 2000-2011 and found that alphas for SRI and conventional funds are insignificantly negative and do not differ from each other. Nonetheless, during non-crisis periods conventional mutual funds outperforms by 0.67-1.7% annually depending on the factor model. In contrast, during crises period, SRI funds outperformed conventional funds by 1.61-1.7% annually. Additionally, ESG funds using positive rather than negative screening drove the asymmetric return pattern.

Paper by Halbritter and Dorfleitner (2015) present contradictory result compared to previous researches on the topic. Authors conducted research taking a critical approach to the different ESG-data providers and previous papers done on these data. Halbritter and Dorfleitner use Carhart four-factor model to observe closer the link between social and financial performance based on different ESG-ratings. Authors provide evidence that long-short strategy does not yield excess return when maintaining portfolios based on ESG-ratings. Research investigated US market from 1991 to 2012 and included ESG data from 3 major databases; ASSET4,

Bloomberg and KLD. Mollet and Ziegler (2014) speculate the possibility of market participants anticipating corporate sustainability performance and thus mispricing of SRI stocks has existed before their research period of 1998 since result show insignificant abnormal returns for SRI stocks in US and Europe. Using Carhart four-factor model between 1998-2009, authors conclude that SRI stocks are correctly priced by the market. They also point out that in both regions, US and European stock markets, SRI is associated with large market capitalization firms. As Banz (1981) has proven and later integrated into asset multifactor asset pricing models, small market capitalization firms outperform large capitalization firms. Also, Mollet and Ziegler's research provide empirical evidence of SMB factor being negative which could be the proportion of the explanation of the result.

Academics have also reviewed, not solely ethical stocks performance, but SRI funds' performance to conventional mutual funds. Bauer et al. (2005) examined 103 German, UK and US ethical mutual funds and compared their return over the period of 1990-2001 using Carhart four-factor asset pricing model. After controlling for investment style of the fund, authors found no evidence of statistically significant abnormal risk-adjusted return for ethical funds over conventional mutual funds. Result is in line with research done by Gil-Bazo et al. (2010) where they emphasise the role of fund manager for SRI funds excess return. Furthermore, when the time period was divided into sub-periods, paper found out that ethical funds underperformed comparable mutual funds significantly in the beginning of the 1990s and caught up on the return from 1998, which authors called "catch-up phase". This finding is contradictory to Mollet and Ziegler's (2014) speculation of pricing error before 1998 in Europe.

Brammer et al. (2006) investigated CSR relation to stock returns in UK stock markets using aggregate performance measures for community, environmental and employee performance activities. Authors find that stocks with higher corporate social performance (CSP) underperforms the market, while stocks with lowest possible CSP score significantly outperforms the market. When CSP score is distinguished to observe the impact of individual factor, they fund that environmental and employment factors are negatively correlated with

returns, while community factor is weakly positively correlated. They conclude that removing stocks, sectors or countries on ethical ground from investment universe reduces portfolio efficiency. This finding implies that investor pay financial cost of companies' expenditure on corporate social activities. Also, the result of lowest possible CSP score (0) stocks, stocks that are socially least desirable, outperforms the market suggest that these stocks might be stocks from sin industries which are often neglected by investors and have shown abnormal return in academic literature. Similar finding was made by Borgers et al. (2015) when they observed and analysed the holdings of US equity mutual funds over the period 2004-2012. Authors found that funds reporting low ESG scores and containing socially sensitive (sin) stocks reported statistically significant positive returns. Results was for the smallest subset of sensitive stocks, triumvirate of sin, and when broader classification on sensitive stocks (weapon, nuclear) were observed the risk-adjusted return became non-significant.

Auer and Schuhmacher (2016) took their research deeper from fund level to ESG-ratings of the stocks and observed all major markets, US, Europe and Asian- Pacific, from 2004 to 2012 breaking the research to single ESG sub-score and country level. Similar to Halbritter and Dorfleitner's (2015) paper, authors did not record any evidence of statistically significant abnormal return compared to passive non-ESG investments in international equity markets during the time period. Authors add that in Europe, investor even pay financial cost for being socially responsible in their stock selection. Clarifying that in certain industries and ESG criteria's, SRI risk-adjusted returns are significantly lower than benchmark and the result is statistically significant.

As the academic literature present contradictory results on SRI returns in both major stock markets, US and Europe, more research in the area is required. Although taking account the ethicality of the investment subject is not new, the rapid growth in the institutional and retail investors preference and require has re-positioned the SRI market. When abnormal return in recorded, literature seems to emphasise the role of the fund manager and the strategy (Gil Bazo et al., 2010). Additionally, the excess return is obtained during the crises period and

during expansion period the SRI tend to lose to the overall market (Nofsinger and Varma, 2014). Most of the papers conclude that SRI returns does not statistically distinct from market return (Bauer et al., 2005; Brammer et al., 2006; Mollet and Ziegler, 2014; Halbritter and Dorfleitner, 2015), but also some evidence of investors paying financial cost when applying SRI can be recorded as well as low ESG rating providing positive return (Auer and Schuhmacher, 2016; Borgers et al., 2015)

4. METHODOLOGY & DATA

To investigate research hypothesis, thesis will utilise Fama-French five-factor asset pricing model (5F) and six-factor model (Fama & French, 2015; Fama & French, 2018). In order to test the primary hypothesis of the research, will construct long-short portfolio of European sin and ESG stocks, long on sin stocks and short on ESG stocks. Portfolios will be formed equally weighted every 12-month according to the number of the sin stocks available in the market, so that number of ESG stocks will be equal. Portfolios will be formed from year t-12 data and held for 12-months from time t to t12 and reformed again. This will be reapplied every 12- months for 15-years to obtain full observation of the portfolio return.

4.1. Data

Thesis will use data from 18 European countries stock markets, time period between 2003-2018. All the sin stocks listed at that time of the portfolio construction in the market will be used to form a sin long portfolio in order to avoid survival bias in this research. Sin stocks will be determined by Thomson Reuters Business Classification (TRBC) code, which is divided to 10 economic sectors, 28 business sectors, 54 industry groups, 136 industries and 837 activities. By using TRBC code this thesis will provide new insight to the literature contrast to most papers using SIC code to divide sin stocks (see e.g. Hong and Kacperczyk, 2009; Salaber, 2009). ESG short portfolio will be formed according to the highest overall ESG-rated stocks at time t-12, so that the number of the stocks in the portfolio equals to the number of the stocks in sin portfolio at any given year of reformation in order to avoid diversification advantage of either portfolio. Research will use Thomas Reuters Datastream as source of data for stocks annual and monthly stock prices to calculate portfolio holding period return. Additionally, overall ESG-scores will be obtained in order to list companies according to their overall annual ESG-score for ESG short portfolio. 5F and FF6F factor loadings will be gathered from Kenneth R French database (Kenneth R. French, 2019).

4.2. Methodology

During the research period, there were 25,895 independent stocks in our stock universe consisting of monthly closing price for 15-years. In case company had multiple classes of stocks, only most liquid stock was taken into consideration in order to evade excess weight on singular company and to have similar amount of unique companies presented in both long and short portfolio. Two distinctive sin portfolios was constructed for the research; 1) *Triumvirate of Sin* (TS) portfolio including tobacco, alcohol and gambling industries and 2) *Sin All* portfolio including additionally defence, oil and coal industries. These portfolios were composed according to stocks TRBC code which are presented table below in more detail.

Table 2. Industry distribution by Thompson Reuters Business Classification code

			Portfolios	
Industry	**Sector**	**TRBC-code**	**Triumvirate of Sin**	**Sin All**
Tobacco	Tobacco	54102030	X	X
Alcohol	Brewers	54101010	X	X
	Distillers & Wineries	54101020	X	X
Gambling	Gambling	53301030	X	X
Defence	Aerospace & Defense	52101010		X
Coal	Coal	50101010		X
Oil	Integrated Oil & Gas	50102010		X
	Oil & Gas Exploration and Production	50102020		X
	Oil & Gas Refining and Marketing	50102030		X
	Oil & Gas Drilling	50103010		X
	Oil Related Services and Equipment	50103020		X
	Oil & Gas Transportation Services	50103030		X

Addition to new insight with composing portfolios by TRBC code brings, it also enables to differentiate gambling from Travel & Entertainment stocks which was not possible with SIC code (NAICS, 2019) and distinguish alcohol stocks from other beverages. TRBC still has some shortcomings unlike unable to distinguish Aerospace & Defence from each other, but with ongoing concern of ecology of flying I find it reasonable to assume it may be considered as sin stock in near future (The New York Times, 2017). Also, gas industry was unable to

separate from oil industry, but renewable energy was left out. After constructing two sin portfolios according to instructions above, following yearly portfolios were assembled:

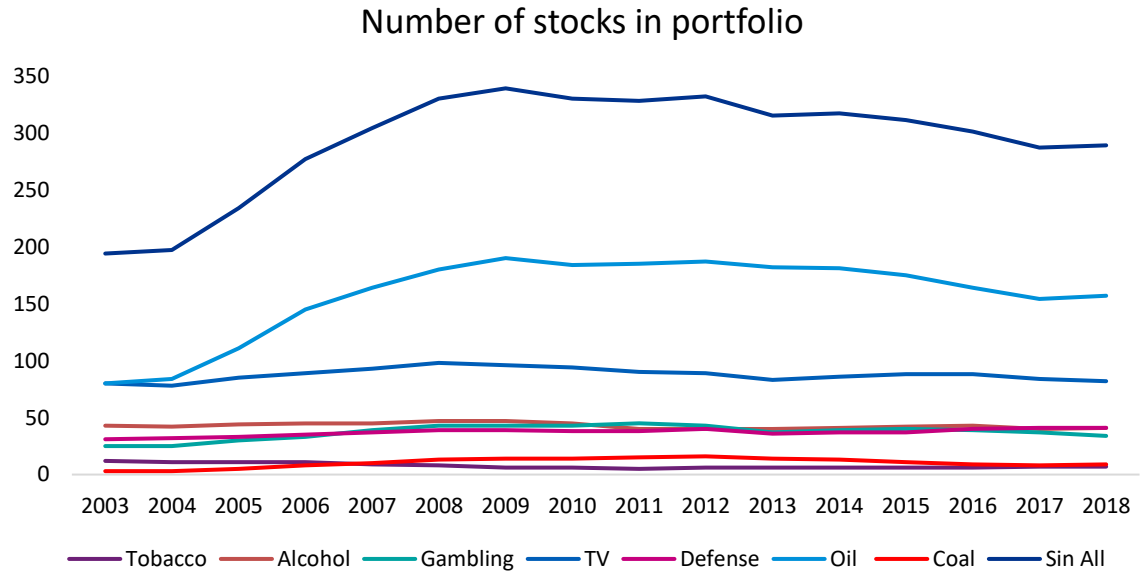
Table 3. Yearly industry allocation in Sin portfolios

	(a)	(b)	(c)	(a)+(b)+(c)=(d)	(e)	(f)	(g)	(d)+(e)+(f)+(g)=(h)
	Tobacco	**Alcohol**	**Gambling**	**Trium. of Sin**	**Defense**	**Oil**	**Coal**	**Sin All**
2003	12	43	25	**80**	31	80	3	**194**
2004	11	42	25	**78**	32	84	3	**197**
2005	11	44	30	**85**	33	111	5	**234**
2006	11	45	33	**89**	35	145	8	**277**
2007	9	45	39	**93**	37	164	10	**304**
2008	8	47	43	**98**	39	180	13	**330**
2009	6	47	43	**96**	39	190	14	**339**
2010	6	45	43	**94**	38	184	14	**330**
2011	5	40	45	**90**	38	185	15	**328**
2012	6	40	43	**89**	40	187	16	**332**
2013	6	40	37	**83**	36	182	14	**315**
2014	6	41	39	**86**	37	181	13	**317**
2015	6	42	40	**88**	37	175	11	**311**
2016	6	43	39	**88**	40	164	9	**301**
2017	7	40	37	**84**	41	154	8	**287**
2018	7	41	34	**82**	41	157	9	**289**

Increasing trend in both portfolios can be observed from 2003 to 2008-2009 in the quantity of stocks, after which the trend reverses and quantity declines. It can be observed that TV portfolio reached its peak in quantity of stocks in 2008 including 98 unique stocks in the portfolio and its bottom in the start of the research period in 2004 with 78 unique stocks. On average the portfolio consisted of 88 stocks during the research period. TV portfolio is dominated with stocks from alcohol industry representing on average 49% of the stocks in the portfolio and at highest having a weight of 54% in the portfolio in 2003. Gambling stocks has also strong representation in the portfolio with 42% of the stocks on average during the research period. Gambling industry has the strongest representation during 2011 and 2012 when the contribution to the portfolio increases to 50% in 2011. Tobacco industry is

underweighted during the research period with 9% of the portfolio on average. Tobacco industry stocks sees trend-like decrease during the whole research period in quantity of the stocks, decreasing from 15 at start to 7 in the end. Do to the fact that this research utilizes equal-weight methodology in portfolio construction, performance of the TV portfolio is dominated by both alcohol and gambling industry stocks and tobacco stocks contribute on average less the 10% of the return of the portfolio. Development of the quantity of stocks in each class and overall portfolio presented below in the figure 7.

Figure 7. Development of number of stocks in each portfolio and allocation in industry



While observing Sin All portfolio that includes all the stocks from TS portfolio and additionally stocks from Defence, Oil and Coal industry, similar trend can be detected. Sin All portfolio reached its peak in quantity of stocks during 2009, year later than TS portfolio, with 339 unique stocks in the portfolio and its bottom in the start of the research period in 2003, year earlier than TS portfolio, with 194 unique stocks. On average the portfolio consisted of 293 stocks during the research period. Sin All portfolio is dominated by Oil industry stocks representing on average 53% of the stocks in the portfolio and at highest, having a weight of 58% in the portfolio during 2013. Stocks from TS portfolio represent on average 29% of the Sin All portfolio during the time period. TS portfolio stocks has strongest

weight on the start of the research period with 41% of the weight of the whole Sin All portfolio. Weight of TS portfolio decrease from there gradually and reached its bottom during 2013 when the weight is only 26%. Defence industry has on average similar weight on the portfolio as Gambling, 13% during the period. In Sin All portfolio, smallest weight is in Tobacco industry, like in TS portfolio, and additionally Coal industry with both on average of 3% weight. While interpreting returns of Sin All portfolio, Oil industry stocks returns has on average over 50% of the effect of the portfolio returns and thus dominate the portfolio performance strongly. Comprehensive statistics of the portfolio presented below in the table 4.

Table 4. Comprehensive statistics of each sin industrys' weight in both of the sin portfolios presented in the table below. $\bar{x}$ (average), Median, Min and Max present the weight of the industry in the portfolio during the sample period

Triumvivate of Sin-portfolio

	Tobacco	Alcohol	Gambling	TV
$\bar{x}$	8.9 %	48.9 %	42.2 %	100 %
Median	7.7 %	48.3 %	44.2 %	100 %
Min	5.6 %	44.4 %	31.3 %	100 %
Max	15.0 %	53.8 %	50.0 %	100 %

Sin All-portfolio

	Tobacco	Alcohol	Gambling	TV	Defense	Oil	Coal	Sin All
$\bar{x}$	2.8 %	15.1 %	12.7 %	30.6 %	12.9 %	53.1 %	3.4 %	100 %
Median	2.2 %	14.1 %	12.8 %	28.9 %	12.1 %	54.5 %	3.4 %	100 %
Min	1.5 %	12.0 %	11.7 %	26.3 %	11.4 %	41.2 %	1.5 %	100 %
Max	6.2 %	22.2 %	13.7 %	41.2 %	16.2 %	57.8 %	4.8 %	100 %

Similarly, two SRI portfolios were constructed to match two individual Sin portfolios. Since current years ESG scores are not published until end of the year, SRI portfolios were assembled according to previous years overall ESG score from top to bottom until same amount of unique stocks were included yearly. Portfolios are held for 12 months, similar to Sin portfolios, until new portfolios are formed according to new ESG scores. No transaction costs or taxes are taken account after calculating HPR for the portfolios. Descriptive data of

the portfolios are presented below in table 5. Excess return is calculated using the Kenneth R. French risk-free rate. Table provides information on portfolio mean, median, maximum, minimum, standard deviation as well as kurtosis and skewness of both the portfolio and excess returns.

Table 5. Descriptive statistics of the portfolios presented below in the table. Mean, Median, Standard deviation, Sample variance are calculated from portfolios monthly returns. Min. and Max present the minimum and maximum monthly return during the sample period. Kurtosis and Skewness also presented in the table. T-test calculated from portfolio return and portfolio excess return and presented in Panel B. Annualized excess return per portfolio is calculated by deducting risk-free rate from portfolio monthly return and compounding the monthly return to obtain annual return. -Panel C of the table on the next page-

Variable	Mean	Median	S.D.	Var.	Min.	Max	Kurtosis	Skewness	T-test
Panel A: Portfolio Monthly Returns									
TV Sin	0.012	0.012	0.040	0.002	-0.148	0.214	4.033	0.415	
Sin All	0.014	0.017	0.051	0.003	-0.169	0.186	1.099	-0.171	
SRI (TV)	0.006	0.009	0.044	0.002	-0.110	0.155	0.462	-0.159	
SRI (All)	0.008	0.012	0.044	0.002	-0.110	0.172	0.721	-0.118	
Panel B: Portfolio Excess Returns									
TV Sin	0.011	0.011	0.040	0.002	-0.149	0.214	4.062	0.414	0.234
Sin All	0.013	0.016	0.051	0.003	-0.170	0.186	1.135	-0.169	0.189
SRI (TV)	0.005	0.009	0.044	0.002	-0.111	0.155	0.497	-0.146	0.223
SRI (All)	0.007	0.010	0.044	0.002	-0.111	0.171	0.756	-0.106	0.219

Panel C: Annualized Excess Returns of the Portfolios 2003- 2018

	TV Sin	Sin All	SRI (TV)	SRI (All)
2003	52.59 %	64.31 %	19.96 %	22.08 %
2004	13.62 %	31.20 %	13.74 %	17.99 %
2005	44.66 %	49.11 %	23.93 %	24.51 %
2006	1.02 %	8.98 %	17.03 %	21.63 %
2007	4.82 %	5.92 %	-1.46 %	-3.73 %
2008	-33.34 %	-44.88 %	-43.02 %	-43.36 %
2009	21.08 %	54.90 %	31.16 %	36.57 %
2010	2.39 %	34.68 %	2.89 %	10.13 %
2011	0.69 %	-11.91 %	-16.85 %	-15.12 %
2012	3.22 %	20.29 %	16.53 %	18.15 %
2013	14.69 %	11.47 %	32.15 %	28.27 %
2014	4.58 %	-9.54 %	1.28 %	2.44 %
2015	56.75 %	5.82 %	8.48 %	7.65 %
2016	13.42 %	15.52 %	7.92 %	4.93 %
2017	29.28 %	24.71 %	6.95 %	10.97 %
2018	-13.31 %	-10.80 %	-16.40 %	-17.31 %

Among the portfolios, *Sin All* portfolio has the highest monthly mean and median return with 1.4% and 1.7% monthly returns, respectively. Opposingly SRI (TV) portfolio had the lowest monthly mean and median return of all the portfolios with 0.6% and 0.9% monthly return, respectively. All portfolios except *TV Sin* portfolio have larger median return than mean return, implying that during the research period portfolios had more positive return months than negative return months. Standard deviation and variance were largest in *Sin All* portfolio, implying that the portfolio's return was most volatile among the portfolios. *Sin All* portfolio had the lowest individual monthly return with -16.9% opposing to *TV Sin* portfolio which had the highest individual monthly return with 21.4% return. Sin portfolios have higher kurtosis than SRI portfolios implying wider spread among the monthly returns in the portfolios. All except *TV Sin* portfolio has negative skewness, suggesting that all except TV Sin portfolio's returns are distributed to lower side of the mean.

5. EMIPIRICAL RESULTS

This chapter will present the results of the conducted regression analyses. Research utilized one of most widely used asset pricing models nowadays in financial economics, 5F model and latest improvement of it, FF6F model. The presented results in the tables are generated by applying Ordinary Least Square (OLS) regression analysis using the additional five and six factors included in Fama and French asset pricing models. Beside to 5F and FF6f model, also CAPM will be presented for comparison.

The generated portfolio alpha's (α) captures the betas of the portfolio return which are unexplainable by other factors (loadings). The factors Mkt, SMB, HML, RMW and CMA represent the five Fama and French factors and WML represent the additional factor in FF6F model, as described in the theoretical background. R^2 (R squared), presents the degree of the model's capability of explaining the results.

5.1. Fama French Five-Factor Model

Table below present the result of 5F model used to interpret both long-short portfolios of TV Sin and Sin All with the corresponding SRI portfolios, SRI TV and SRI All:

Table 6. Representation of the OLS regression data for the whole sample period, using the five-factor model as specified by Fama and French (2015), an extension of their original 3-factor model (1993) developed from the Capital Asset Pricing Model (CAPM). The 15 yearly revised stock portfolios consist of 192 monthly return observations lasting from January 2003 to December 2018, where the regression consists of 15 years, accounting all the sin stocks screened in the European stock markets with the relevant TRBC and revising the SRI portfolio once per year using previous year end ESG data from December 2002 to December 2018. "TV Sin – SRI (TV)" and "Sin All – TV (All)" stand for long-short portfolios also referred as "TV portfolio" and "All portfolio" latter in the research. Alpha indicates the estimated coefficient intercept. The results for Mkt, SMB, HML, RMW and CMA indicate the various factor loadings. R^2 represents the goodness-of-fit. T-value of the factor loadings are presented below the value in brackets. -Table on the next page-

Fama French 5 Factor Model

	Alpha	Mkt	SMB	HML	RMW	CMA	R2
TV Sin	0.785***	0.379***	0.810***	-0.088	-0.263	-0.282	0.42
	(3.18)	(6.76)	(6.24)	(-0.46)	(-1.04)	(-1.35)	
SRI (TV)	0.153	0.605***	-0.245**	0.436***	0.062	-0.182	0.71
	(0.80)	(13.95)	(-2.43)	(2.99)	(0.32)	(-1.13)	
TV Sin - SRI (TV)	0.632**	-0.226***	1.055***	-0.524***	-0.325	-0.100	0.38
TV portfolio	(2.37)	(-3.76)	(7.61)	(-2.59)	(-1.21)	(-0.44)	
Sin All	0.700***	0.611***	1.003***	0.295	-0.145	-0.442	0.66
	(2.83)	(10.99)	(7.80)	(1.57)	(-0.58)	(-2.14)	
SRI (All)	0.214	0.638***	-0.080	0.368**	0.047	-0.177	0.71
	(1.10)	(14.53)	(-0.78)	(2.48)	(0.24)	(-1.08)	
Sin All - SRI (All)	0.486*	-0.027	1.084***	-0.072	-0.193	-0.266	0.29
All portfolio	(1.86)	(-0.45)	(7.98)	(-0.36)	(-0.73)	(-1.21)	

*t- value indicate statistically significance at the 1%, 2.5% and 5% level showing: ***, ** and **

Observing at the result in table 6 and analysing the results regarding to the first hypothesis H1 ”Betting against moral provides statistically significant excess return on European stock markets”, we can accept the hypothesis. Both TV and All portfolios’ alphas are positive and statistically significant on 5% and 2.5% level, respectively. While observing the follow-up hypothesis, since the first hypothesis can be accepted, H1.1 “Sin stocks provide excess return on European stock markets” and H1.2 “Shorting ESG stocks provide excess return on European stock markets”, another of them can be accepted. Both TV Sin and Sin All portfolios’ alphas are positive and statistically significant at 1% level, thus the first follow-up (H1.1) can be accepted. While the first follow-up hypothesis can be accepted another follow-up hypothesis (H1.2) is denied. Both SRI (TV) and SRI (All) portfolios record positive alphas, thus shorting these portfolios provide negative return, the result is not statistically significant.

Going forward with the results of table 6, 5F model presents that during the sample period of 15 years, the market factor Mkt (Rm-Rf) is negative in both TV and All portfolios due to the higher value of Mkt in both SRI (TV) and SRI (All), the result is statistically significant in TV portfolio at 1% level. The result is curious since all the portfolios individually have highly statistically significant Mkt at 1% level, but All portfolio's Mkt is not statistically significant. This can be interpreted as the portfolios expected return has negative correlation with the overall market return and the returns are driven by other factors. Moreover, the size factor SMB (small minus big) is significant at 1% level and positive in both TV and All portfolios. This can be interpreted as small market capitalization companies are outperforming big market capitalization companies. Curiously, both SRI portfolios SMB loading is negative from which SRI (TV) is significant, meaning big companies in ESG stocks are outperforming smaller companies. Furthermore, value factor HML (high minus low) is statistically significant in TV portfolio and negative in both TV and All portfolios, meaning low value stocks, in another word's growth stocks, drive the return of the portfolio. For both SRI portfolios the value loading is statistically significant at 1% level and positive, suggesting that high value ESG stocks are overperforming growth ESG stocks. In the ends, both profitability factor RMW (robust minus weak) and investment factor CMA (conservative minus aggressive) are not statistically significant in any portfolio.

5.2. Fama French Six-Factor Model

Table below present the result of FF6F model used to interpret both long-short portfolios of TV Sin and Sin All with the corresponding SRI portfolios, SRI TV and SRI All:

Table 7. Representation of the OLS regression data for the whole sample period, using the six-factor model as specified by Fama and French (2018), an extension of their original 3-factor model (1993) and Carthart's four-factor model (2003), developed from the Capital Asset Pricing Model (CAPM). The 15 yearly revised stock portfolios consist of 192 monthly return observations lasting from January 2003 to December 2018, where the regression consists of 15 years, accounting all the sin stocks screened in the European stock markets with the relevant TRBC and revising the SRI portfolio once per year using previous year end ESG data from December 2002 to December 2018. "TV Sin – SRI (TV)" and "Sin All – TV (All)" stand for long-short portfolios also referred as "TV portfolio" and "All portfolio" latter in the research. Alpha indicates the estimated coefficient intercept. The results

for Mkt, SMB, HML, RMW, CMA and WML indicate the various factor loadings. R^2 represents the goodness-of-fit. T-value of the factor loadings are presented below the value in brackets

Fama French 6 Factor Model

	Alpha	Mkt	SMB	HML	RMW	CMA	WML	R2
TV Sin	0.761***	0.383***	0.802***	-0.063	-0.289	-0.324	0.047	0.43
	(3.01)	(6.78)	(6.14)	(-0.32)	(-1.13)	(-1.47)	(0.64)	
SRI (TV)	0.193	0.599***	-0.232**	0.396***	0.105	-0.114	-0.077	0.71
	(0.99)	(13.77)	(-2.30)	(2.66)	(0.54)	(-0.67)	(-1.36)	
TV Sin - SRI (TV)	0.568**	-0.216***	1.034***	-0.459**	-0.394	-0.210	0.124	0.39
TV portfolio	(2.12)	(-3.60)	(7.45)	(-2.23)	(-1.45)	(-0.90)	(1.59)	
Sin All	0.730***	0.607***	1.013***	0.264	-0.113	-0.390*	-0.058	0.66
	(2.92)	(10.84)	(7.83)	(1.38)	(-0.44)	(-1.79)	(-0.80)	
SRI (All)	0.266	0.630***	-0.063	0.313*	0.105	-0.085	-0.103*	0.66
	(1.36)	(14.35)	(-0.61)	(2.08)	(0.53)	(-0.49)	(-1.80)	
Sin All - SRI (All)	0.463*	-0.023	1.076***	-0.049	-0.217	-0.305	0.044	0.29
All portfolio	(1.75)	(-0.39)	(7.88)	(-0.24)	(-0.81)	(-1.33)	(0.58)	

*t- value indicate statistically significance at the 1%, 2.5% and 5% level showing: ***, ** and **

Observing at the result in table 7 and analysing the results regarding to the first hypothesis H1 ”Betting against moral provides statistically significant excess return on European stock markets”, we can accept the hypothesis. Both TV and All portfolios’ alphas are positive and statistically significant on 5% and 2.5% level, respectively. While observing the follow-up hypothesis, since the first hypothesis can be accepted, H1.1 “Sin stocks provide excess return on European stock markets” and H1.2 “Shorting ESG stocks provide excess return on European stock markets”, another of them can be accepted. Both TV Sin and Sin All portfolios’ alphas are positive and statistically significant at 1% level, thus the first follow-up (H1.1) can be accepted. While the first follow-up hypothesis can be accepted another follow-up hypothesis (H1.2) is denied. Both SRI (TV) and SRI (All) portfolios record

positive alphas, thus shorting these portfolios provide negative return, the result is not statistically significant. The results are in line with the finding in 5F model.

Going forward with the results of table 7, 5F model presents that during the sample period of 15 years, the market factor Mkt (Rm-Rf) is negative in both TV and All portfolios due to the higher value of Mkt in both SRI (TV) and SRI (All), the result is statistically significant in TV portfolio at 1% level. The result present similar results as in 5F model and similarly all the portfolios have individually highly statistically significant Mkt at 1% level, but All portfolio's Mkt is not statistically significant. This can be interpreted as the portfolios expected return has negative correlation with the overall market return and the returns are driven by other factors. Moreover, the size factor SMB (small minus big) is significant at 1% level and positive in both TV and All portfolios. This can be interpreted as small market capitalization companies are outperforming big market capitalization companies. The result is in line with 5F model. As in 5F model, both SRI portfolios SMB loading is negative from which SRI (TV) is significant, meaning big companies in ESG stocks are outperforming smaller companies. Furthermore, value factor HML (high minus low) is statistically significant in TV portfolio and negative in both TV and All portfolios, meaning low value stocks, in another word's growth stocks, drive the return of the portfolio. For both SRI portfolios the value loading is statistically significant and positive at 1% level for SRI (TV) and 5% level for SRI (All), suggesting that high value ESG stocks are overperforming growth ESG stocks. Similarly to 5F model, profitability factor RMW (robust minus weak) is not statistically significant in any portfolio. Unlike in 5F model where there was no statistically significant result for investment factor CMA (conservative minus aggressive), FF6F has statistically significant negative result at 5% level in Sin All portfolio but does not provide significant result in any other portfolio. This can interpret as aggressively investing companies outperform conservatively investing companies. Also, all the other portfolios are also negative, but are not statistically significant. The sixth factor loading in FF6F model, momentum factor WML (winners minus losers, which was not included in 5F model, provided statistically significant result for only one portfolio. SRI (All) had statistically significant negative result, implying past losers outperformed past winners.

5.3. Capital Asset Pricing Model

The thesis will observe the portfolios with classic Capital Asset Pricing Model (CAPM) from which both FF5F and 6F model has been developed to provide further comparison for the results.

Table 8. Representation of the OLS regression data for the whole sample period, using the Capital Asset Pricing Model (CAPM). The 15 yearly revised stock portfolios consist of 192 monthly return observations lasting from January 2003 to December 2018, where the regression consists of 15 years, accounting all the sin stocks screened in the European stock markets with the relevant TRBC and revising the SRI portfolio once per year using previous year end ESG data from December 2002 to December 2018. "TV Sin – SRI (TV)" and "Sin All – TV (All)" stand for long-short portfolios also referred as "TV portfolio" and "All portfolio" latter in the research. Alpha indicates the estimated coefficient intercept. The results for Mkt indicate the market factor loadings Rm-Rf. R^2 represents the goodness-of-fit. T-value of the factor loadings are presented below the value in brackets.

Capital Asset Pricing Model			
	Alpha	Mkt	R2
TV Sin	0.855***	0.405***	0.27
	(3.430)	(8.472)	
SRI (TV)	0.079	0.695***	0.68
	(0.436)	(20.130)	
TV Sin - SRI (TV)	0.777***	-0.291***	0.13
TV portfolio	(2.777)	(-5.422)	
Sin All	0.830***	0.706***	0.51
	(3.144)	(13.955)	
SRI (All)	0.177	0.715***	0.70
	(0.994)	(20.904)	
Sin All - SRI (All)	0.652**	-0.009	0.07
All portfolio	(2.376)	-(0.180)	

*t- value indicate statistically significance at the 1%, 2.5% and 5% level showing: ***, ** and **

Observing at the result in table 8 and analysing the results regarding to the first hypothesis H1 "Betting against moral provides statistically significant excess return on European stock

markets", we can accept the hypothesis. Both TV and All portfolios' alphas are positive and statistically significant on 5% and 2.5% level, respectively. While observing the follow-up hypothesis, since the first hypothesis can be accepted, H1.1 "Sin stocks provide excess return on European stock markets" and H1.2 "Shorting ESG stocks provide excess return on European stock markets", another of them can be accepted. Both TV Sin and Sin All portfolios' alphas are positive and statistically significant at 1% level, thus the first follow-up (H1.1) can be accepted. While the first follow-up hypothesis can be accepted another follow-up hypothesis (H1.2) is denied. Both SRI (TV) and SRI (All) portfolios record positive alphas, thus shorting these portfolios provide negative return, the result is not statistically significant. The results are in line with the finding in 5F model and FF6F model.

Going forward with the results of table 8, CAPM presents that during the sample period of 15 years, the market factor Mkt (Rm-Rf) is negative in both TV and All portfolios due to the higher value of Mkt in both SRI (TV) and SRI (All), the result is statistically significant in TV portfolio at 1% level. The result is in line with the findings in 5F model and FF6F and similarly all the portfolios have individually highly statistically significant Mkt at 1% level, but All portfolio's Mkt is not statistically significant. This can be interpreted as the portfolios expected return has negative correlation with the overall market return and the returns are driven by other factors. Also, R^2 is lower in every portfolio compared to more comprehensive asset pricing models 5F and FF6F model. This is with the literature that adding more factors will increase R^2 since the additional factors will capture more of the portfolio return and thus increase goodness of the fit (Fama and French, 1993 & 2015).

Table 8, in addition to table 6 and 7, concludes thesis' first hypothesis H1: "Betting against moral provides statistically significant excess return on European stock markets". However, for the follow-up hypothesis; H1.1: "Sin stocks individually provide excess return on European stock markets" and H1.2: "Shorting ESG stocks provide excess return on European stock markets", only first can be accepted and second must be rejected under the results presented above. Both of the long-short portfolios, TV portfolio and Sin All portfolio, lead to statistically significant abnormal return with all the methods used in this research thesis.

But the results show proof that both of the follow-up hypothesis does not hold. All of the portfolios; TV Sin, Sin All, SRI (TV) and SRI All present positive alpha from which, Sin portfolios are statistically significant at 1% level with all the methods used in the thesis. This can be interpreted that the value drivers in the portfolios are the Sin portfolios, TV Sin and Sin All, which are long in long-short portfolio and for this reason the H1.1 can be accepted. Although, SRI portfolios are not statistically significant, they are positive, meaning shorting these will not provide excess return, thus H1.2 has to be rejected.

For the long-short TV portfolio the result is mainly driven by Mkt, SMB and HML factors which are all statistically significant at 1% level in used research methodologies except HML in FF6F at 2.5% level. The results indicate that return of the portfolio is driven by the overall market, size and value of the company. While Mkt and HML are negative, indicating that the portfolio is negatively correlated with the overall market and abnormal return is driven by the low value companies over the high value companies. Contradictory, SMB is positive, indicating that the portfolios abnormal return is also driven by small market capitalization companies over larger market capitalization companies. For our another long-short portfolio, All portfolio, the result is driven only by SMB factor which is statistically significant at both FF5F and 6F models. Size factor SMG is positive, similarly to our another long-short portfolio TV portfolio, meaning that the abnormal return is driven by small market cap. companies over large market cap. companies. Mkt is not statistically significant, thus the portfolio return is not driven by the overall market return.

6. CONCLUSION

The final chapter focusses on answering the main research question and will describe the limitation and scope of the research, completed with suggestions for possible follow-up research in the field of Sin stocks and socially responsible investing.

The thesis researched returns of the sin stocks and returns of SRI between 2003-2018 in 18 European countries. The thesis hypothesised that investor can benefit from investors value-based decision of favouring socially and environmentally responsible companies stocks over socially and environmentally irresponsible companies stocks. The research question was stated in the 1st chapter of this thesis as *"Can investor profit from global trend of ethical responsibility in corporate, environmental and governance responsibility by investing into the sin stocks and shorting the ESG stocks?*"

This research hypothesis' that the investors can take an advantage of the stock market by betting against moral, which is executed by constructing zero-cost long-short portfolio with sin stocks and ESG stocks. By going long with the neglected sin stocks and going short with the overbought ESG stocks, which are also bought for other reasons than financial motive, investors have better expected return. Numerous researches provide support for higher expected return for sin stocks because stocks are 1) neglected by institutional investors, 2) have less analyst cover and 3) defensive nature (Hong and Kacperczyk, 2009). Previous papers and market research provide evidence and suggests that the investors pay financial cost for SRI and SRI funds have increased 34% in two years reaching$ 30.7 trillion at the start of 2018 (Gil-Bazo et al., 2010, GSIA, 2018). Supporting the hypothesis that the SRI has lower expected return and investors have other motive investing in these stocks.

The thesis utilized most modern and nowadays most widely used asset pricing models F5 model and FF6F model, and for comparison CAPM results were provided. For the research two different long-short portfolios were constructed. First portfolio included Triumvirate of

sin stocks, including stocks from tobacco, alcohol and gambling industries, and corresponding amount of ESG stocks. Second portfolio included all the stocks of companies which can be interpret as sinful business, adding oil, coal and defence industries. Similarly, corresponding amount of ESG stocks were shorted. Results suggest that investors are able to obtain abnormal return by constructing zero-cost long-short portfolio of sin stocks and ESG stocks but are not compensated for shorting the ESG stocks. Mainly portfolio including TV stocks are driven by market, size and value factors. Portfolio present negative market and value loading suggesting that the portfolio is uncorrelated with the overall market and low value stocks are driving the abnormal return. Contradictory, size factor is positive suggesting that small companies overperform big companies. Portfolio with all the sin stocks does not present as statistically significant results as TV portfolio, as only size factor is positively statistically significant.

With these findings the thesis can accept the first hypothesis of the thesis but has to reject another one of the follow-up hypotheses. The results suggest that the abnormal return is driven by sin stocks and not by shorting the ESG stocks. The findings of this thesis are in line with the previous research where higher expected return has been recorded from sin stocks and contradictory results from SRI stocks.

The research was able to provide new insight by constructing the sin portfolios using TRBC compared to SIC codes. SIC codes cannot differentiate travel & entertainment stocks from gabling stocks and alcohol stocks from other beverages stocks, which is possible with TRBC. Although TRBC can be differentiate these industries it is not able to differentiate aerospace from defence stocks. For the future research, these two industries could be differentiated to increase the focus in the most sinful stocks and observe the results. Additionally, the thesis did not take into account transaction fees and taxes which have affect on the HPR. One could conduct research where these factors are taken into account to provide more realistic result.

To conclude, this thesis proves to show that there is evidence of risk-adjusted abnormal return in the financial performance of sin stocks as opposed to conventional investment strategies,

applying Fama and French (2015, 2018) five and six-factor asset pricing model. This conclusion can be seen as beneficial for both researchers and investors that are driven by expected return of the stock market. The result is also beneficial for investors and researchers that prefer to focus on a portfolio that is constructed upon ethical motivation as SRI portfolios provided abnormal return, although the result was not statistically significant. Betting against moral can be seen as investing strategy that is driven by return of the sin stocks, but is not driven by shorting ESG stocks. Shorting ESG stocks can still provide opportunities to construct zero-cost portfolio.

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