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Are investors losing their ethics in times of a crisis?

A compare study of "good" stocks versus "bad" stocks over the business cycle

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Abstract

The majority of institutional investors exclude sin stocks, i.e. "bad" stocks from their investment portfolio, in line with new social responsibility standards. This neglected stock effect leads to limited risk-sharing and undervaluation of sin stocks. In contrast, the demand for social responsible stocks, i.e. "good" stocks, is increasing, leading to overvaluation. But do investors stick to their social values when times get rough and the economy is in a downturn? A paper by Bundy and Pfarrer (2015) explain how individuals, and even organizations, take less social responsibility in times of a crisis. Furthermore, Geels (2013) explains how firms focus on economic problems and delay ethical considerations in an economic downturn. Therefore, this thesis suspects that investors drop their ethics and focus on financial returns. Leading to increased demand for sin stocks, no undervaluation and thus similar performance as opposed to social responsible stocks in times of a crisis.

Using U.S. data between 1965 and 2018, this thesis confirms the outperformance of sin stocks as opposed to a portfolio social responsible stocks. Furthermore, it finds evidence that the outperformance almost disappears in times of an economic crisis. Although, it is suspected that this is due to the disappearance of the neglect effect, as investors are less focused on ethic in times of a crisis, it is not proven by a significant result. Above all, this research adds to the understanding of the performance of "bad" stocks as opposed to "good" stocks in times of a recession.

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1. Introduction

Corporate social responsibility (CSR) started to gain attention during the late 1900s. An article by Milton Friedman attempted to debunk the notion by stating that the social responsibility of business is to enhance its profits (Friedman, 1970). Although this article is cited by many researchers it did not reduce the demand for CSR. Firms and even institutional investors started to invest actively in socially responsibility. But, is it possible to consider social issues without sacrificing financial performance?

Today, a subset of investors is focused on "good", i.e. social responsible, companies and thus on making socially responsible investments (SRIs) (Adler & Kritzman, 2008). Due to the social awareness of themes such as environment and human rights, SRI has increased by 38% from 2016 to 2017 (Social Investment Forum, 2018). Current moral standards do not approve of the products made by sin companies and therefore investors who profit from activities that exploit others' bad habits might not be accepted either. Here, sin firms are identified as firms that are active in the production or distribution of addictive products like alcohol, tobacco, gambling and marijuana. These sin companies willingly provide the market with products and services that are harmful to consumers. Consequently, a firm making a bad product is generally presumed to be a "bad" firm. (Ma, Fabozzi, & Oliphant, 2008). To some investors their moral standards are more important than making money, and they therefore avoid investing in sin stocks, as they conflict with their value system. Similarly, institutional portfolios generally exclude sin stocks, because they operate under investment guidelines or policy statements and are simply not allowed to invest in these controversial stocks. As a result, the demand for sin stocks is restricted to a unique subset of investors who are willing to bear the social costs. These stocks might therefore be under-priced, due to limited risk-sharing. Although social costs might be too high under normal market conditions, moral standards might lose their value during an economic downturn.

Several papers have found evidence that irresponsible stocks outperform the general market under normal market conditions due to the neglected stock effect. However, little is known about the return and investor demand of sin stocks during an economic downturn. This thesis aims to shed light on the performance of sin stocks as opposed to social responsible stocks over the business cycle. Furthermore, the institutional ownership of sin stocks is observed under differing market conditions. Investors might not be willing to pay the social costs of investing in controversial firms in normal market circumstances, however in times of a crisis they might

drop their morals and focus on financial returns instead. This could lead to increased demand for sin stocks, which might decrease the undervaluation and thus lead to similar returns for sin stocks as opposed to social responsible stocks. Therefore, it is expected that sin stocks lose their outperformance in times of a crisis.

Using US data over the period 1965-2018 and allowing for time-varying risk premiums, the behavior of sin stocks relative to social responsible stocks is tested over the business cycle. Besides using the well-known sin groups, alcohol, tobacco, and gambling, this thesis will also include a relatively new sin group, namely, cannabis. Moreover, institutional ownership data will be used to check if sin stocks are indeed less neglected by social norms during economic downturns. Eventually, a robustness check will be performed to see if the outperformance of sin stocks in the recent years is dominated by the relatively new sin group: cannabis stocks.

The remainder of the paper is divided into seven sections, which will expose a literature review, explain the hypotheses formulation and methodology, describe the data sample, present empirical results, perform a robustness check, discuss the results and draw the conclusion, respectively.

2. Theoretical framework

2.1. Social responsible investment (SRI)

2.1.1. Defining SRI

An increasing number of investors incorporate screening for social responsibility into their investment decisions. According to the Forum for Sustainable and Responsible Investment (2011), which represents SRI in the US, SRI can be defined as 'an investment process that considers the social and environmental consequences of investments, both positive and negative'. The scope of SRI varies from basing investments on social norms and ethics to avoiding investments in unethical firms. The three most commonly used screening types are 'negative screening', 'green focus', and 'best in class'. First, negative screening excludes from the investment opportunity set all those companies that are involved in perceived controversial business areas, such as alcohol, tobacco and gambling, often referred to as sin stocks. Second, in terms of the green focus, institutional investors focus on firms that do not harm the environment. Last, there is the best in class screening, which identifies firms that are among the best performers in corporate social responsibility (CSR). Overall, negative screening is used most often as it is the least time-consuming type of screening (Kempf & Osthoff, 2007).

2.1.2. The rise of SRI

Screening processes to incorporate social responsibility into the investment strategies of mostly institutional investors are gaining in popularity. According to the Social Investment Forum (2010), more than one in every ten dollars from institutional investors in the US is invested according to socially responsible principles. This growth is stimulated by both regulations and increased demand for CSR and SRI. These social investors take non-financial dimensions in account in addition to a stock's financial performance. They aim to align their investments with ethical beliefs and social values and thus pursue the two goals of wealth maximization and social responsibility. This multi-dimensional nature of corporate performance raises the question whether a trade-off exists between the financial dimensions of performance and the non-financial dimensions.

As mentioned earlier, the growth of the SRI industry can be partly attributed to the changes in regulation regarding the disclosure of the investment strategy of pension funds and listed companies. The 1995 Pensions Act requires pension funds to have a Statement of Investment Principles (SIP) which encapsulates their strategy and ethical considerations. But, forcing

institutions to make their investment strategy public does not oblige them to invest in a socially responsible manner. However, although the SIP requirement should theoretically not change their strategy, the opposite is in fact true: pension funds are basing their investment strategies on ethics. They face dissatisfaction from their investors if the latter find out that their pension money is invested in sin stocks; investors may even demand that their money be invested in green or ethically friendly investments. This makes it quite impossible for pension funds to include sin stocks in their portfolio, and it is likely that they will increase their funds in SRI instead in order to keep their investors satisfied (Sparkes, 2001).

2.1.3. Performance of SRI

The various types of social responsible investors all have something in common, namely increased screening costs and under diversification. Investors that use labour-intensive screens that limit full diversification are likely to suffer from diversification losses based on the portfolio theory (Markowitz, 1952). Over and above the costs of screening, neglecting financially favourable but irresponsible stocks will negatively influence the returns of SRI funds. Moreover, the rising demand for shares of SRI firms may cause these firms to be priced above their fundamental value and hence to underperform (Renneboog et al., 2008).

Moskowitze (1972) was the first researcher to prove that SRI does not provide positive returns, and was followed by many others including Schroder (2007), Hamilton et al. (1993), and Statman (2002). The results found in the literature might disappoint investors who aimed to do well while doing good. However, actively pursuing an investment strategy that prevents capital maximization implies that utility might not be gained by financial returns alone, but also by social considerations (Bollen, 2007) (Hamilton and Statman, 1993). Therefore, socially responsible investors who derive non-financial utility from investing in companies that meet high ethical/social standards may have to be content with a lower rate of return (Renneboog et al., 2008). This could be explained by recent experimental evidence indicating that altruism or selflessness is a powerful human characteristic (Fehr & Fischbacher, 2003). Thus, their utility function can be multi-attribute, as an individual's utility depends largely on the utility of other members of the community. This means that ethical and social considerations can become important determinants of economic behaviour. Akerlof (1980) and Romer (1984) find that individuals might even pursue investments that are financially costly to maximize their self-interest, as the loss of reputation might arise when they do not take ethics into consideration.

In conclusion, institutional investors might be pressured by their investor base or even society to exclude sin stocks from their portfolios. Moreover, socially responsible investors are often willing to accept lower returns, as their utility is partly focused on the utility they receive from complying with social norms or the loss of reputation that they avoid by neglecting unethical stocks. Lower returns are a result of under diversification – neglecting stocks that are financially profitable and screening costs. Furthermore, the rising demand for shares of SRI firms might increase the price above their fundamental value, thus further reducing the expected returns (Renneboog et al., 2008).

2.2. Irresponsible investing

2.2.1. Introduction to sin stocks

In contrast to the abundance of literature about social responsible investments and ethics, the literature on irresponsible investing falls somewhat short. The amount of research dedicated to 'sin investing' remains limited in both quantity and theoretical relevance. While investors in vice claim that the defensive nature of these stocks provides risk-adjusted abnormal returns, the lack of mutual funds that invest in sin stocks makes it harder to exploit the opportunity and achieve abnormal returns (Richey, 2014).

Like Hong and Kacperczyk (2009), this paper focuses on the triumvirate of sins: alcohol, tobacco, and gambling, while extending it with cannabis stocks. All four of these products are regarded as sinful nowadays. They are viewed negatively by many people in the US, especially because of their addictive nature, health effects, and undesirable consequences when consumed in extreme quantities. The fact that there is a social norm against investing in these stocks has been established, as roughly 12% of the assets under management undergo a screening to prevent investors from buying these stocks **(**Hong & Kacperczyk, 2009). In contrast to the well-known triumvirate of sins and the extension with cannabis stocks in this paper, some researchers include adult entertainment, weapons, and nuclear power as sin stocks. These stocks are not included in this research for different reasons. First, the sex industry and nuclear power are not included because there are only a few public companies based in the US that focus their business on these industries and they are hard to identify. Second, the defence industry is not included because weapons are legal in the US and might not be regarded as a sin by the majority of people living and investing in the US.

2.2.2. Defining the included sin types

Alcohol

Alcohol stocks are defined as companies that are involved in the production and/or distribution of alcoholic products. Alcohol is defined as a sin because of its negative healthy effects when consumed heavily. Heavy alcohol use is associated with alcohol problems, including dependence, premature death and diminished work capacity (Room et al., 2005). Negative health effects are especially pronounced by young people and pregnant women, therefore, alcohol use is prohibited for people under 21 in the US and alcohol use by pregnant women is heavily discouraged (Marshall, 2014) (Room et al., 2005). As alcohol is viewed negatively by both society and the literature, when consumed heavily, alcohol firms are included as sin firms in this thesis.

Gambling

The current rapid expansion of gambling, which is partly related to the increased availability, has increased public health costs. Similar to alcohol, gambling is known for its addictiveness and effects on mental health (Shaffer and Korn, 2002). Gambling stocks are identified as stocks of companies that manufacture, own, or operate gambling machines, casinos or lotteries.

Tobacco

While the negative outcomes of alcohol and gambling were known by society for a long time, tobacco has only been subject of negative social norms for the past five decades. Individual and public health consequences were only known since the mid 1960s, however, many people were already in the habit of smoking or even addicted. Today, tobacco is heavily related to long cancer and other health problems. Tobacco products even come with health warnings and smoking is prohibited in most public areas (Hong and Kacperenczyk, 2009). Due to the negative health effects and addictive nature, tobacco is viewed negatively by society and therefore included as a sin in this thesis. Stocks are selected as tobacco stocks if the underlying company is involved in the production, processing, and distribution of tobacco products.

Cannabis

Similar to the previously mentioned sins, cannabis or marijuana is especially harmful if consumed heavily and has several negative health effects. However, nowadays, recreational cannabis has become almost as common as alcohol and tobacco. Since its existence in the United States, recreational marijuana use is more several and widespread than ever, according to the latest World Drug Report, released by the United Nations Office on Drugs and Crime (UNODC) (2019). This is partly due to the changes in legislation of recreational marijuana use. As of 1996, marijuana use was already permitted for medical purposes, however several states have legalized recreational use as well. In 2012, citizens in Colorado and Washington State voted to legalize recreational cannabis use and its commercial sale to adults and many states followed, including California, Maine, Massachusetts, and Nevada in 2016 (Hall and Weier, 2015).

For over 20 year, the literature shows that cannabis use increases the risk of accidents, mental health problems, addiction, early school drop-out, and transitions to hard drugs, among heavy users (Hall, 2015). These 'heavy' or 'regular' cannabis users are usually defined as daily or near-daily users (Hall and Pacula, 2003). Although multiple studies have reported negative health effects, others have shed light about its medical power, therefore, the question of whether marijuana should be legal remains the subject of heated debate (Volkow et al., 2014). The benefits of medical marijuana use are acknowledged by the Institute of Medicine, as they explain the benefits of smoking marijuana in stimulating appetite during illness, combating chemotherapy-induced nausea and vomiting, severe pain, and some forms of spasticity (Joy et al., 1999). Although the medical effects are positive, they are more than outweighed by the negative effects for heavy recreational users. The addictive nature is proven, as about 10% of those who ever use cannabis become daily users, and 20% to 30% become weekly users (Hall and Degenhardt, 2009). The long term health effects, including addiction and mental health problems, are similar to the previously described sins and therefore, cannabis is included as a sin in this thesis. As cannabis is still illegal in most of the US states, there is no doubt that cannabis stocks must be viewed just as controversial as alcohol, gambling, and tobacco, if not more. A Cannabis stock is identified as a stock of a firm that is in any way involved in the distribution or production of cannabis products.

2.2.3. Performance of sin stocks

As mentioned before, sin stocks are neglected by several institutional investors who strive to invest in a socially responsible manner. If a significant proportion of investors exhibit an aversion to unethical behaviour, it would be interesting to investigate whether investors require an additional return for investing in non-CSR firms and neglecting social norms. One way to investigate this is to examine the financial performance of the Vice Fund, a fund that limits its investments to sin stocks. Chong et al. (2006) identify significant outperformance on the part of the Vice Fund, but as this fund only started in 2001 their research is limited to only five years of trading. The Vice Fund refers to its outperformance in its annual report, and even reports that outstanding returns might be achieved during economic downturns as well. However, this effect is likely to disappear due to increased demand during economic downturns, as will be explained later on.

Other researchers investigated the performance of sin stocks by examining the individual stock returns instead of dedicated funds. Hong and Kacperczyk (2009) find that sin stocks outperform the market, and similar results are found by Berman (2002), Durant et al., (2013) and Fabozzi et al. (2008). Although Fauver and McDonald (2014) claim that sin stocks are treated unequally among different countries, since social norms differ around the globe, they confirm that sin stocks do outperform comparable stocks on average. By contrast, some researchers such as Salaber (2009) and Lobe and Walkshäusl (2011) did not find any evidence of abnormal returns. Several reasons for the potential outperformance are suggested by the literature, including the neglected stock effect (by norms, litigation risk, or legislation), lower analyst coverage, and higher accounting standards,

Neglected stock theory

Institutions account for approximately 70% of the total trading volume in stocks. Thus, the performance of sin stocks is likely to be influenced if these type of investors decide to neglect "Bad" stocks. Failure to share the risk of those stocks with institutional investors will lead to lower stock prices and abnormal returns (Heikel et al., 2001). Merton (1987) explains that neglected stocks have a smaller investor base and are thus followed by fewer analysts, which decreases the demand even more. Research confirms that stocks neglected by institutions significantly outperform the general market due to undervaluation. More importantly, the neglected firm effect is robust to adjustments, including systematic risk, unsystematic risk,

volatility, and firm size (Arbel et al., 1983). Hong and Kacperczyk (2009) find that sin stocks are indeed neglected as they have, on average, 18% lower institutional ownership. According to Merton (1987), this means that the price of these stocks will be below their fundamental value due to limited risk sharing, which will result in higher expected returns than comparable stocks. Similarly, Durand et al. (2013) find that sin stocks are underpriced compared to socially responsible stocks, due to lower fund interest.

Litigation risk

Some researchers such as Salaber (2009) and Hong and Kacperczyk (2009) examine litigation risk, which is predicted to be higher for sin stocks. Due to the nature of their business, sin firms face higher litigation exposure in their product markets than non-sin firms. Legal experts generally agree that higher litigation risk goes hand in hand with high expenses. The costs and risks of lawsuits that might result from health problems experienced by consumers reduces the price and reputation of sin stocks. Although Hong and Kacperczyk (2009) find that the litigation risk does not explain outperformance, it could be another reason to neglect the stocks.

Accounting standards

In their research, Kim and Venkatachalam (2011) anticipated that the accounting standards of sin stocks might be lower and that this could explain why they are neglected. However, their findings indicated the contrary: sin stocks have better accounting standards. Even though regulatory scrutiny is not directly related to financial reporting, such stocks might want to avoid heightened attention and exposure resulting from poor quality financial reporting. Furthermore, they suggest that sin firms may want to attract a wider investor base and analyst following by ensuring that their financial reporting is of a high standard. They also find that sin stocks have accruals that predict future cash flows more accurately and recognize losses in time. Berman (2002) finds similar results and concludes that in addition to being undervalued, sin stocks have other advantages such as high dividend payments and higher accounting standards. Moreover, the price-to-book ratios of sin firms are higher than those of a control group, which confirms the underpriced nature of these stocks **(**Hong & Kacperczyk, 2009).

Analyst coverage

Hong and Kacperczyk (2009) argue that sin firms receive less coverage from analysts, which might be because analysts aim to inform institutional investors. They find that analyst coverage

of sin stocks is 21% lower than the general market. If institutional investors neglect sin stocks, analysts will do the same. This lack of analyst coverage and media attention is also likely to drive investors away. Findings by Bowen et al. (2008) suggest that the lack of qualitative analyst coverage increases the cost of raising equity. Consequently, sin stocks might experience problems raising equity and might therefore rely more on debt.

Equity dependence

This is substantiated by Hong and Kacperczyk (2009) and Durand et al. (2013), who find that sin firms have higher debt levels and are less likely to issue equity than debt. Once again, this demonstrates that the lack of analyst coverage influences sin stocks. However, there are more reasons why sin firms might be reluctant to issue equity. For example, El Ghoul et al. (2011) explain that the cost of raising equity is higher for sin industries, as one of the most important considerations for raising equity is the share price. Managers who view their share price as undervalued are not willing to raise equity. This is most likely the case for sin stocks, as their share price is expected to be undervalued. Overvaluation or undervaluation of stock plays a major role when deciding to issue equity or debt (Chang et al., 2006) (Graham and Harvey, 2001). As sin stocks depend less on equity, and therefore less on financial markets, some researchers hint that they might be recession-proof. Leading to increased popularity of sin stocks during economic downturns.

2.3. Stock performance in an economic downturn

Previous research provides several reasons why investors might invest in sin stocks during a recession. First, they are less dependent on the state of financial markets, as they are financed less by equity and more by debt. Moreover, the consumption of products of sin firms is likely to increase in economic downturns, as the products have an addictive nature and might be used to reduce stress, depression, and boredom or just to have fun in view of the increased unemployment level. The stable performance of sin firms during economic downturns might be attracting investors who were reluctant to buy sin stocks during normal market conditions.

Institutions and individuals are likely to throw their norms out of the window, and even governments might drop their focus on responsible investments as they have more serious problems to solve. The decrease in ethical standards in combination with the increased attractiveness of sin stocks during economic downturns, might be reason enough for institutional investors to change their investment behaviour in bad times. This significant drop

in the neglect effect of sin stocks, might eventually decrease their outperformance, which could make the sin stocks less "recession-proof" as expected in the literature. Increased demand and popularity eliminates the number one reason for outperformance: the neglected stock theory. Eventually leading to a decrease or even disappearance of the outperformance of sin stocks as opposed to social responsible stocks.

2.3.1. Equity vs debt

To begin with, Braun and Larrain (2005) find that industries that depend primarily on external funds are the biggest losers during recessions. As mentioned earlier, several researchers have established that sin stocks use relatively more debt than equity. Raising equity is relatively costly for sin firms due to their undervalued stocks, and therefore they do not rely on equity. Sin firms should thus be less sensitive than other stocks to economic downturns as they are relying on debt instead of equity, making these stocks extremely popular in times of a crisis.

2.3.2. Countercyclical consumption patterns

The consumption of sin products is not likely to decrease during recession, and might even increase. The addictive nature of alcohol, tobacco, marijuana and gambling makes their consumers likely to keep drinking, smoking and gambling no matter what. Unfortunately, the literature is somewhat lacking in research into the levels of gambling and smoking (marijuana) during recessions. However, the complementary nature of these sin products, as pointed out by Becker, Grossman, and Murphy (1994), makes it possible to shed some light on the consumer patterns of all three by using the literature about alcohol.

For example, Dee (2001) finds that the consumption of extremely large amounts of alcohol is countercyclical. Even people who get to keep their jobs during recessions are likely to drink more due to increased level of stress. Similarly, Dávos et al. (2012) conclude that changes in the overall unemployment rates have a direct effect on changes in alcohol abuse or dependence. The increased amount of free time might be filled with 'having a drink', which sometimes goes hand in hand with smoking and gambling. Moreover, according to Brenner and Mooney (1983) and Winton et al. (1986), the increase in alcohol use can be attributed to a form of self-medication to cope with the financial crisis. Certain individuals might use alcohol to ease the pain of stress, depression, anxiety, or boredom. These negative emotional states do not influence drinking behaviour alone; problematic gamblers are more likely to relapse in times

of crisis (Blaszczynski et al., 1990). Contradictory literature argues that any stress-induced increases in alcohol use are more than offset by income effects and that alcohol consumption is therefore procyclical (Ruhm, 2000). However, most of the literature does believe that this effect exists, and even argues that the income effect is reflected in a switch to cheaper alcohol or cigarettes (Dávos et al., 2012). Nevertheless, the performance of sin firms is expected to be stable in times of a crisis, attracting more and more investors.

2.3.3. Losing ethics in times of crisis

Finally, the literature hints that investors might throw their social norms out of the window and shift their priorities during economic downturns. They might care more about being able to pay their bills next month than neglecting socially unacceptable stocks. Institutions are not the only ones shifting their responsibilities; governments are also likely to focus on improving economic conditions than to regulate socially responsible investment. For example, the political concerns and social debates are likely to be dominated by the foreseeable future and employment rates. Economic problems will be the main focus and ethical considerations and sustainability might be delayed (Geels, 2013). Bundy and Pfarrer (2015) confirm that organizations with a focus on social approval can be motivated to take on less responsibility in times of crisis.

As ethical and environmental standards drop during recessions, firms, and even institutional investors, might change their behaviour. The focus on social responsibility is reduced and the demand for financial returns increases. This is likely to positively influence the demand for sin stocks, as they are expected to outperform the market, but are neglected due to social norms. The steady demand of sin product makes the financial performance of sin firms more stable during a crisis and thus draws the attention of institutional investors. In addition, the reduced focus of legislators and the media on social responsibility makes it easier for (institutional) investors to switch to irresponsible investments in times of crisis.

2.3.4. Increased demand

As previous literature showed that sin stocks are outperforming due to the neglected stock effect, an increase in the demand of sin stocks diminishes the outperformance. The demand of sin stocks is likely to increase in times of a crisis, as these firms are popular because of their stable performance in times of a crisis and the low equity dependence. Furthermore, investors are expected to attach less value to their social norms in times of a crisis, as financial troubles

require their attention. Even the media and governments are likely to drop their focus on SRI as they have bigger fish to catch. This makes it, even for institutional investors, easy to switch their strategy without serious investor complaints. The increased demand from (institutional) investors, as explained above, will decrease the neglect effect and thus diminish the outperformance. As explained by Merton (1987), stocks that are neglected will trade below their fundamental value due to limited risk sharing, which will result in higher expected returns than comparable stocks. Thus, a noticeable demand increase in sin stocks will drive the price up to their fundamental value and thus result in similar expected returns as comparable stocks.

3. Methodology

The majority of the literature argues that sin stocks are outperforming other stocks resulting in higher returns for investors who are not constrained by norms. However, the goal of this thesis is to extent the existing literature in the field of sin stock performance with a more recent research, a comparison to social responsible stocks, and an inclusion of the relatively new sin group: marijuana stocks. Moreover, this paper aims to provide clarity about the returns and institutional ownership of sin stocks during times of an economic downturn.

3.1. Hypothesis 1: Performance of sin stocks relative to other stocks

Although Hong and Kacperczyk (2009) have already clearly demonstrated that "sin" stocks historically outperform comparable stocks, they do not compare the performance of "bad" stocks to social responsible, i.e. "good", stocks. Therefore, the first major step in this thesis is to compare the sin firms with selected social responsible firms, with a more recent data range from 1965-2018. This first hypothesis will provide some clarity whether investing against social norms is indeed leading to higher investment returns. By validating this result, further analysis can be conducted to answer the research questions related to economic downturns.

As mentioned in the theoretical framework, sin stocks are expected to have an abnormal return for several reasons including, the neglected firm effect, the lower analyst coverage, and the higher accounting standards. Moreover, the increased awareness of SRI might increase the social norms against sin stocks and increases the demand for social responsible investments. While sin stocks are known to be priced under fundamental value because of the neglect effect, social responsible firms might be overpriced due to their popularity.

The possible reasons for the expected outperformance of sin stocks, as found in previous literature, are shown visually in the conceptual framework below. It aims to show some clarity for the reasoning behind the first research question: *Are US-based sin stocks outperforming social responsible stocks between 1965 and 2018?*

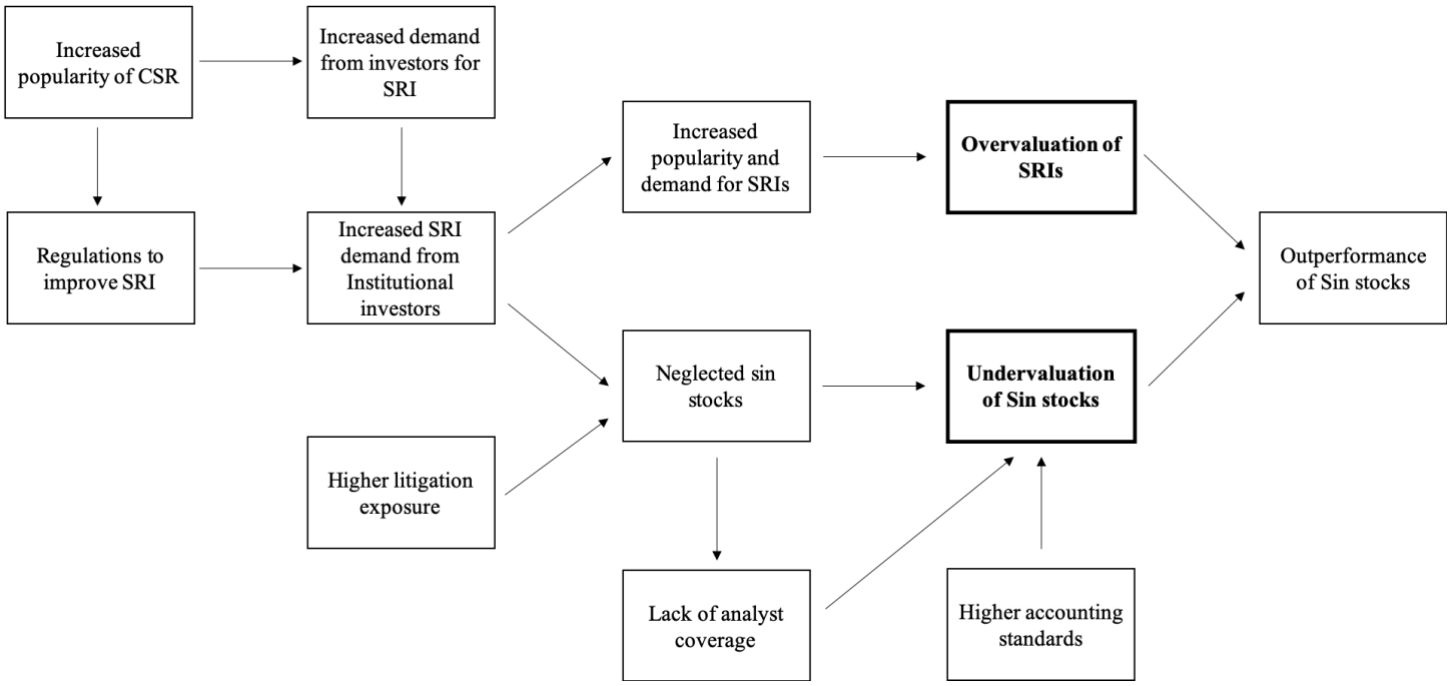

Figure 1: Conceptual framework regarding research question 1

The first hypothesis examines if sin stocks are indeed outperforming social responsible stocks in the United States between 1965 and 2018.

H_{01}: Sin stocks are significantly outperforming social responsible stocks in the United States between 1965 and 2018.
H_{a1}: Sin stocks are not significantly outperforming social responsible stocks in the United States between 1965 and 2018.

The null hypothesis cannot be rejected if the statistical regression shows significant results for the outperformance of sin stocks. If there is no significant relation, the null hypothesis will be rejected.

The Carhart four factor model will be used to estimate the abnormal return. This model is an extension of the well-known Fama-French three factor model. Fama and French introduced the Fama-French three factor model in 1993 to improve the CAPM model. The CAPM model only contains the market risk premium, it describes the relationship between the expected return and risk of an investment. In which the expected return is equal to the risk free rate plus a risk premium to account for the sensitivity of a stock to non-diversifiable risk. The Fama-French

three factor model extended the CAPM model by adding the factors size and value to the market model. The size effect entails that small firms, firms with a low market capitalization, on average earn higher abnormal returns as opposed to large firms. The value effect states that firms with a low book-to-market ratio are outperformed by firms with a high book-to-market ratio. Eventually, M.M. Carhart incorporated the momentum factor and created the Carhart four-factor model. This factor states that on average stocks that performed relatively well over the last 12 months ("winners") will continue to outperform stocks that performed relatively badly over the past 12 months ("losers").

The first hypothesis will be tested using the previously explained Carhart four factor model and is carried out by the following equation:

$$\boldsymbol{exsinsri_t = \alpha_s + \beta_1 * MKTRF_t + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * UMD_t + \varepsilon_{it}}$$

In which: *exsinsri* is the average excess monthly return net of the risk free rate of an equal weighted portfolio long sin stocks and short social responsible stocks. *MKTRF* is the excess monthly return of the value-weighted return of the CRSP index. *SMB* is the return of a portfolio long small stocks and short large stocks to adjust for the size effect. *HML* is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks to adjust for the outperformance of value stocks relative to growth stocks. *UMD* is the return of a portfolio long past 12-month return winners and short past 12-month return losers, to control for the tendency for the stock price to continue rising if it is going up and to continue declining if it is going down. Alpha is the excess return of sin stocks as opposed to social responsible stocks, βi's are loadings on the other portfolios that are used to predict *exsinsri* specifically. ε is the error term that is uncorrelated with all the other independent variables.

The Carhart four factor model helps understand if the excess returns are consistent with the neglect theory, or just an anomaly that should disappear when controlling for time-varying expected returns, consistent with the rational pricing theory. Market inefficiency is suggested if the outperformance exists after controlling for the four factors, which could indicate the non-financial tastes of investors.

A linear model with robust standard errors will be used to adjust for autocorrelation and heteroskedasticity of the error-terms. For H_{01} to not be rejected, the α_s (abnormal return) of sin

stocks as opposed to social responsible stocks should be significantly greater than zero. This would imply an excess return that cannot be fully explained by the market risk premium, nor the outperformance of small stocks, value stocks and winner stocks. The null hypothesis will be rejected if α_s is not significantly greater than zero, indicating that sin stocks are not significantly outperforming social responsible stocks.

3.2. Hypothesis 2: Performance of sin stocks during a recession

Although the Vice fund claims that their portfolio is "recession-proof", the increased attractiveness of sin stocks during an economic downturn is likely to decrease the neglect effect and thus decrease the undervaluation of sin stocks and its outperformance. The first reason for increased demand is the attractive low equity dependence of sin stocks as found by Hong and Kazperenzcyk (2009). Therefore, their stock prices might be less influenced by the state of the financial market. Second, several researchers find prove for increased consumption of sin products in times of crisis, because of the increased stress and leisure time, and addictions that are more pronounced during stressful periods. Final, Geels (2013) and Bundy and Pfarrer (2015) explain that governments as well as firms and people might lose their ethical values during a recession. Paying bills and getting the economy back in shape are just more important than social norms. These factors are likely to improve the popularity and demand of sin stocks and thus nullify the neglect effect, which is, according to the literature, the main cause of the outperformance. As the neglect effect might disappear during an economic downturn, the outperformance of sin stocks as opposed to social responsible stocks might disappear as well. The potential increase in demand of sin stocks during an economic downturn is the driving force of the second research question.

The possible reasons are summarized visually in the conceptual framework below. They explain the background of research question 2: *Has a recession a negative effect on the performance of sin stocks as opposed to social responsible stocks?*

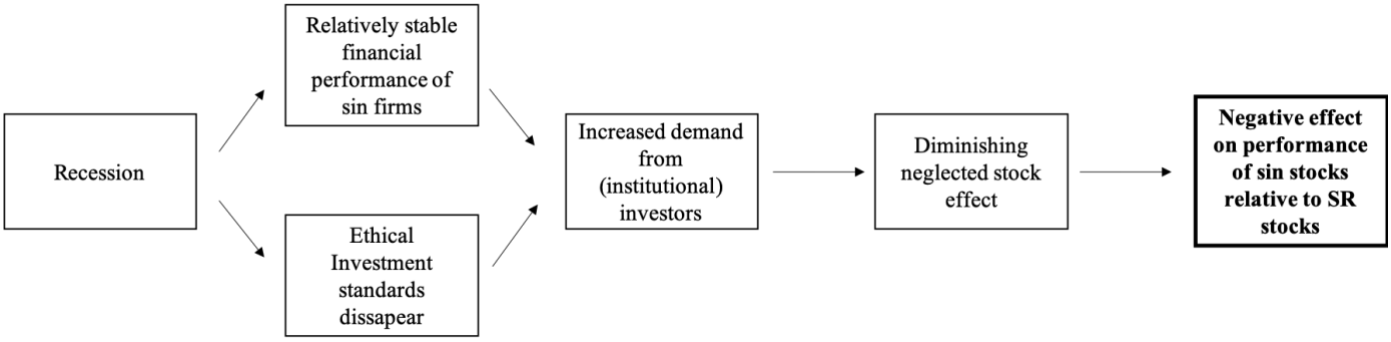

Figure 2: Conceptual framework regarding research question 2

A second hypothesis is formulated to help answer the research question.

H_{02}: A recession has a significant negative effect on the performance of sin stocks as opposed to social responsible stocks.
H_{a2}: A recession has no significant negative effect on the performance of sin stocks as opposed to social responsible stocks.

The null hypothesis cannot be rejected if the statistical regressions show a significant negative effect of the recession on the performance of sin stocks as opposed to social responsible stocks. Again, the Carhart four factor model will be used to estimate this and is given by the following model:

$$\boldsymbol{exsinsri_t = \alpha_s + \beta_1 * recession_t + \beta_2 * MKTRF_t + \beta_3 * SMB_t + \beta_4 * HML_t + \beta_5 * UMD_t + \varepsilon}$$

The equation is similar to the model of the first hypothesis. However, the model is now extended with a recession dummy to test the influence of an economic downturn on the stock performance. *Recession* is a dummy which is equal to one in times of a recession and equal to zero if there is no recession.

Again, a linear regression with robust standard errors will be performed. For H_{01} to not be rejected, β_1, which indicates a period of economic downturn, should be significantly lower than

zero. This would imply that a recession has a negative effect on the performance of sin stocks as opposed to social responsible stocks. Accepting the null hypothesis is inextricably linked to the conclusion that the performance of sin stocks as opposed to social responsible stocks is lower in times of a recession. The null hypothesis will be rejected if there is no significant effect of a recession on the performance of sin stocks as opposed to social responsible stocks. This would indicate that there is no significant prove that sin stocks perform poorly in contrast to social responsible stocks during an economic downturn.

3.3. Hypothesis 3: Institutional ownership of sin stocks over the business cycle

As mentioned in the literature review, several researchers proved that sin stocks have abnormal returns. The reason that is most often given to this effect is the neglected stock theory. This theory explains that stocks that are neglected by institutional investors are underpriced and thus outperform. However, there is limited evidence on how this neglect effect may vary in light of differing market conditions. The second hypothesis of this thesis argues that sin stock returns might be worse during economic downturns. This argument is based on the suspicion that sin stocks are less neglected by institutional investors during an economic downturn. This theory will be tested in the third hypothesis, regardless of the answer on the second research question.

The possible reasons of an increase in institutional ownership of sin stocks are already summarized visually in the methodology of the second hypothesis (see figure 2). These reasons explain the background of research question 3: *Is the institutional ownership of sin stocks higher in times of an economic downturn?*

A third hypothesis is formulated to help answer the third research question:

H_{03}: Institutional ownership of sin stocks is significantly higher in times of a recession
H_{a3}: Institutional ownership of sin stocks is not significantly higher in times of a recession.

The null hypothesis will not be rejected if the statistical regressions show significant results for the increased institutional ownership of sin stocks during a recession. If there is no significant relation, the null hypothesis will be rejected. The hypothesis will be tested with the following equation:

$$inst\_own_{it} = \alpha_s + \beta_1 * recession_t + \beta_2 * sin_i + \beta_3 * rec\_sin_{it} + \beta_4 * Log_{ni} + \beta_5 * Log_{size} + \beta_6 * profit_{it} + \beta_7 * age_{it} + \varepsilon$$

The dependent variable is *inst_own,* which is the percentage of shares outstanding that is owned by institutional investors. Besides the dependent variable, there are several independent variables and some independent control variables, as the percentage of institutional ownership is depending on firm specific factors as well. First of all, *recession* is added as a dummy variable, which is equal to one in times of a recession and equal to zero otherwise. Second, *SIN* is added, again a dummy variable which identifies if the firm is a sin firm. Third, the interaction effect between *recession* and *sin* is added as the variable *rec_sin.* This interaction effect is equal to one if the firm is a sin firm and the date is in times of a recession. Last, *Log_ni*, *Log_size* and the variables *age* and *profit* are added as control variables. Net income is the amount of sales net of the costs of goods sold and size is the market capital which is equal to the amount of shares outstanding multiplied by the share price. *Age* is the number of years that the firm is public and *profit* is the earnings before interest divided by total assets. Alpha explains the percentage of institutional ownership, βi's are loadings on the other variables that are used to predict *inst_own* specifically. ε is the error term that is uncorrelated with all the other independent variables.

A linear regression model with robust standard errors at the firm level will be used to test the hypothesis. Using robust standard errors is important as violating the assumption of independence might lead to biased results. For example, standard errors of one year of firm data might be correlated with the standard errors of the next year of firm data. The null hypothesis will not be rejected if β_3 is significantly greater than zero. This would indicate that the institutional ownership of sin stocks is significantly higher in times of a recession. The null hypothesis will be rejected if there β_3 is not significantly higher than zero.

4. Data

The analysis throughout the paper will be based on data from several sources; CRSP, Thomson Reuters, KLD, Compustat, NBER and Ken French's website. Data for the first and second hypothesis is on a monthly base, similar to previous studies. The data will be selected for a long period of time to extent earlier researches about sin stock performances and get a better understanding of the performance over the years. The data for the third hypothesis is on an annual basis and contains a shorter data range due to limited data availability.

4.1. Hypothesis 1

To statistically test the first hypothesis, my research analyzes the financial performance of 433 publicly listed sin stocks in the U.S. market as opposed to the financial performance of 329 publicly listed social responsible stocks in the U.S. market for the period ranging between 1965 and 2018. The data period start in 1965 as tobacco was not clearly identified as sinful before 1965 and ends in 2018 as this is the latest calendar year for which data is available. As the Carhart four factor model will be used to test the hypothesis, the market factor, size factor, book to market factor and momentum factor are obtained to complete the model.

Sin stocks

Since 1965, an overwhelming majority of the population on the globe, and in the United States in specific, has viewed alcohol, tobacco, gambling and marijuana as "sinful" products or services. Therefore, firms that are involved in the production or facilitation of alcohol, tobacco, and gambling are typically referred to as "sin" companies in the literature. As mentioned in the literature review, several papers are published in the field of sin stocks and they all define the concept of "sin" somewhat differently. The most common identification of sin stocks is the triumvirate of sin stocks, which includes alcohol, tobacco and gambling stocks. However, some articles expand this group of sin stocks with weapons, nuclear power and adult services. But, not all Americans view weapons as sinful, as it is one of the few countries where weapons are legal. Moreover, weapons do not have the addictive nature and health issues in contrast to the triumvirate of sins. Additionally, nuclear power and adult services are not included as sin firms in this paper, due to identification problems. Besides the triumvirate of sins, the recently public cannabis firms are included as sin firms in this thesis to expand the previous characterization of sin stocks, and include the recently partly-legal sin. To my knowledge including cannabis stocks is new to the field of research, but important as cannabis is influencing individual health

as well. Therefore, the group of sin stocks in this thesis includes alcohol, tobacco, gambling and cannabis stocks, as all four products entail addictive behavior and have limited substitutes.

After determining the definition of sin stocks for this particular research, the stocks are identified in the main dataset and a dummy variable named "sin" is created which equals one if the firm is a sin firm and zero otherwise. The main dataset consists of monthly closing prices of U.S. listed firms and is obtained from the CRSP Compustat merged database. Fama and French (1997) industry groups are used to identify the alcohol and tobacco stocks. Alcohol stocks are subject to group 4 and can thus be identified with *Standard Industrial Classification (SIC)* codes 2100-2199. Tobacco stocks are subject to Fama and French industry group 5 and can thus be identified with SIC codes 2080-2085. As gambling stocks are not grouped in a specific Fama French industry group, they need to be identified using *North American Industry Classification System (NAICS)* codes. The NAICS classification identifies gaming stocks as stocks with NAICS codes: 7132, 71312, 713210, 71329, 713290, 72112 and 721120. As most cannabis firms are only public since 2014, identifying these stocks is cumbersome. For this thesis a list of US public cannabis firms is created from stocks that are part of the Marijuana Index and obtained from its website (Marijuana Index, 2019). However, they are only included in the sample if (i) the price of the stock is higher than 1$, (ii) the firm has a market capitalization above 1 million USD, (iii) the trading volume is higher than zero, and (iv) the stock trades on a US stock exchange. These screenings are included as many cannabis stocks are penny stocks and, or, immature companies. Finally, the PERMNO for the cannabis stocks is searched manually by company name to identify the cannabis stock in the main dataset.

This list of sin stocks is extended by searching companies at the segment level, in line with the identification methods in the paper of Hong and Kacperczyk. The Compustat segments data contains information of SIC and NAICS codes of the different parts of a firm. Thus, companies are identified as sin firms if any of its business segments has a SIC or NAICS code of the beer, alcohol or tobacco group. Unfortunately, this method is could not be applied to the cannabis stock due to the lack of clear industry codes. The Compustat Segments database is only available from 1985 onwards, however, if a firm is identified as a sin firm in one year, it is identified as a sin firm throughout its history. Using the above mentioned identification methods, a sin dummy variable is created which is equal to one if the stock is a sin stock, and equal to zero otherwise. A summary table indicating the number of sin firms each year can be found in table A1 of the Appendix.

Social responsible stocks

As mentioned in the literature review, there are different screening processes for social responsible investors to base their investment decisions on. On the one hand, there is negative screening which excludes all stocks that are viewed as socially irresponsible, such as sin stocks. On the other hand, there is positive screening which focuses on selecting stocks with high levels of corporate social responsibility. In this thesis, stocks are identified as socially responsible if they have above average CSR ratings for at least 3 years, and are thus identified as "good" firms. The negative screening is not applied as otherwise sin stocks would be compared with every other stock, while we want to focus on the difference between "good firms" and "bad firms".

Starting in 1991, KLD research and Analytics Inc. rates companies' corporate social responsibility on an annual basis using environmental, social and governmental performances. CSR ratings are collected from all U.S. listed firms between 1991 and 2018, as the rating only started in 1991. The KLD rates the companies in seven main qualitative areas, including: corporate governance, diversity, employee relations, environment, human rights and product. In addition, KLD specifies whether companies are involved in controversial business areas, e.g. alcohol, tobacco, gambling or firearms. Stocks with concerns about involvement in alcohol, tobacco and gambling are deleted from the sample as they might be part of the sin stocks selection. Secondly, the total strengths for each firm in each year are summed and compared to the average number of strengths in that year. A high number of strengths indicates a good CSR company and a low total number of strengths indicates a bad CSR company. The average scores differ throughout the period due to difference in the number of indicators under observation. Therefore, stocks are only identified as socially responsible stocks if they score above average for at least 3 year. If a firm is identified as socially responsible between 1991-2018, it is identified as socially responsible throughout its whole life[1].

Matching the KLD database to the main dataset, which contains data from CRSP and Compustat, is a challenge. The main dataset has as identification variables: Company name, cusip, ticker and LPERMNO. The KLD database uses company name, ticker and cusip to identify stocks, therefore, matches are made by ticker and cusip. Afterwards, the matches are

[1] This bold statement is made as there is no CSR data available before 1991.

checked manually by company name. All matched firms are marked by creating an SRI dummy (*sri)* which is one if the stock is a social responsible stock. A list of the identified Social responsible firms can be found in table A1 of the Appendix. Social responsible firms of the KLD dataset that are not matched by ticker or by cusip with the main dataset are dropped. Firms in the main dataset that are not identified as a sin stock nor as a social responsible stock are dropped.

Stock performance

Monthly closing prices of the identified sin stocks and social responsible stocks are present in the main dataset and obtained from the CSRP Compustat merged database. The monthly stock return is constructed by sorting the database by date and name and generating the monthly return by subtracting the previous closing price from the current closing price and dividing it by the previous closing price[2]. Stocks with missing closing prices are dropped. For both social responsible firms and sin firms, a weighted average portfolio is created and the average monthly return of this portfolio is obtained by taking the mean monthly return of the stocks included in the portfolio for each month.

Sin outperformance

The dependent variable *exsinsri* measures the excess monthly return of the weighted average portfolio of sin stocks as opposed to the weighted average portfolio of social responsible stocks. *Exsinsri* is a the return of long sin stock portfolio and short social responsible stock portfolio. *Exsinsri* thus measures the excess monthly return of a sin stock portfolio as opposed to social responsible stock portfolio.

Carhart four Factors

Monthly data for the four factors of the Carhart four factor model is obtained from the website of Kenneth French, the co-developer of the Fama French three factor model (French, 2019). This database consists of the risk free rate (*Rf*), the market factor (*MKTRF*), the size factor (*SMB*), the value factor (*HML*) and the momentum factor (*UMD*). The data of the four factors is included in the main dataset by merging the dataset with the main dataset on a one-to-many setting by month.

[2] Mathematically by the following equation: $\frac{closing\ price\ (t) - closing\ price\ (t-1)}{closing\ price\ (t-1)}$

Final dataset Hypothesis 1

Eventually the final dataset is constructed and consists of monthly data for each sin or social responsible stock that is listed between 1965 and 2018. The dataset includes several variables. First of all, the dummy: *sin* which is equal to one if the firm is a sin firm, and equal to zero otherwise. Second, the dummy: *sri* which is equal to one if the firm is a social responsible firm and equal to zero otherwise. Third, *closing* which is the monthly closing price for each stock and the resulting *monthly_return* indicating the monthly return of each individual stock. Resulting from this monthly return is *sri_return*, which is the monthly return for the weighted average SRI portfolio and *sin_return*, which is the monthly return for the weighted average sin portfolio. Both *sri_return* and *sin_return* are used to identify *exsinsri*, as this is equal to *sin_return* minus *sri_return*. Last, there are some identification variables: *Lpermno*, *Ticker*, *Cusip*, and *Company_name* and the Carhart four factors (*MKTRF*, *SMB*, *HML*, and *UMD*).

There are a couple of things that stand out while observing the data in STATA. First of all, there are some outliers in monthly return, as shown in Graph 1 in the Appendix. This is also observed by the high level of skewness, which means that the monthly return is extremely skewed to the right. Moreover, the high kurtosis level is an indicator that data has heavy tails or outliers (See Appendix table A2). Therefore, the monthly return is winsorized by the 1st and 99th percentile, to replace the outliers with less extreme values and the variable *monthly_return_w* is constructed and used to generate the *exsinsri*, *sin_return* and *sri_return* instead. Second, *exsinsri* has a positive mean, which is consistent with the first hypothesis (see appendix table A3).

4.2. Hypothesis 2

Economic state

For the second hypothesis the dataset of hypothesis 1 can be used, but a dummy variable for the state of the business cycle should be added. A business cycle has four particular stages: contraction, recession, expansion, and through. During a contraction, the economy demonstrates clear signs of slowing down and the business cycle is identified as a recession at through (NBER, 2012). The National Bureau of Economic Research (NBER) analyzes key economic indicators to determine the state of the business cycle. Quarterly GDP growth rates are considered as the primary indicator, while taking into account factors like employment,

interest rates and household income. According to the NBER data, there have been seven contractions in the United States over the period ranging from 1965 until 2018, however they are only identified as a recession in this thesis if they last more than 12 months. Consequently, the three resulting sub-periods include November 1973 until March 1975, July 1981 until November 1982, and December 2007 until June 2009 (NBER, 2012). Subsequently, a dummy variable is added to the main dataset to identify the recessions. The dummy is equal to one if the corresponding month falls in one of the three previously mentioned data ranges of recessions and zero otherwise.

Final dataset hypothesis 2

The final dataset of hypothesis 2 is similar as the dataset of hypothesis 1, however the dummy variable *recession* is added to identify periods of economic downturn. The final dataset thus includes the following variables: *recession, sin, sri, exsinsri, Lpermno, cusip, ticker, date, year, SMB, HML, MKTRF,* and *UMD*. Similar to the final dataset of hypothesis 1, but extended with a recession dummy.

4.3. Hypothesis 3

The third hypothesis states that the institutional ownership of sin firms is lower during recessions. Several variables are included in the dataset namely: institutional ownership, which is the percentage of stocks outstanding that are owned by institutional investors, the sin indicator (*sin*), the recession indicator (*recession*) and the interaction effect (*rec_sin)*. Additionally, some control variables, which are predicted to have an effect on the institutional ownership as well, are included in the regression model. The control variables include: *Log_ni, Log_size, age,* and *profit.* The data range is from 1980 until 2018, as there is no data available on institutional ownership before 1980.

Institutional ownership

The data for institutional ownership is collected form the Thomson Reuters Institutional Ownership database. This database tracks institutional ownership since 1980, therefore the data range of this hypothesis is smaller compared to the first and second hypothesis and ranges from 1980 until 2018. The institutional ownership variable indicates the percentage of total stocks outstanding that is owned by institutional investors. Matching this database to the main dataset that is used in the first and second hypothesis again gave some difficulties. The

Thomson Reuters database uses Ticker and Cusip to identify stocks, however the Cusip and Ticker were often different between the datasets. First of all, the CRSP Compustat database uses a Cusip of 9 digits, while the KLD dataset had a Cusip of 8 digits. After a manual check it became clear that the last digit of the CRSP Compustat database should be deleted in order to match the datasets. However, matching by Cusip and year did not find all the firms that could be matched. Therefore, a second merge by ticker and year is performed. Matching by ticker is hazardous, as tickers are not always reliable. For example, one ticker can be used as an abbreviation for different companies. Therefore, all matches are checked manually by comparing the company name.

Interaction effect sin and recession dummies

Similarly to the second hypothesis, the recession dummy (*recession)* is added to identify the economic state. The dummy is equal to one in times of a recession and equal to zero otherwise. Additionally the sin dummy (*sin),* which was already present in the dataset, is added to the model. Both dummies are used to create the interaction effect (*rec_sin)* this interaction effect is equal to one if the firm is a sin firm and the observation is in times of a recession. The stock return data is dropped from the dataset, as these variables were only required for the first and second hypothesis

Control variables

Annual financial data is downloaded from CRSP and merged using *Lpermno* and *year* with the final database of the second hypothesis. The first control variable is net income and is equal to the sales minus the costs of goods sold. Second, a size variable is constructed, which is equal to the market value of a firm and thus constructed by multiplying the total shares outstanding with the share price. Third, a profit variable is constructed by obtaining earnings before interest and total assets from CRSP, and dividing it by each other. Eventually, the age is constructed by counting the years since the IPO date until the current date.

Final dataset hypothesis 3

Consequently, the final dataset of hypothesis 3 is constructed as an extension of the dataset of hypothesis 2, but without the stock return variables and with the mentioned firm specific variables. When observing the data of the variables in STATA, a couple of things stand out.

First of all, there might be some outliers in the dataset. Shown in the table A4 in the Appendix, the maximum institutional ownership is above 1, which is impossible as institutional investors cannot own more than the number of shares that exist. Therefore, *inst_own* will be winsorized by the 1st and 99th percentile, to get rid of the outliers. Likewise, profit might have some outliers as well, recognized by the extremely high kurtosis (See table A4 in the Appendix). To confirm this, a histogram of the *profit* variable is shown as graph 2 in the Appendix. The histogram confirms the expectation of some extreme outliers. Therefore, *profit* is also winsorized at the 1st and 99th percentile. Both variables are used as the winsorized variables in the model. Moreover, high levels of kurtosis and skewness of the *net income* and *size* variable, suggest that the variables should be transformed to log variables to meet normal distribution (See Appendix table A5). Therefore, both variables are transformed to log variables.

Another concern in the data set is correlation of the independent variables. Correlation between independent variables is a problem because independent variables should be independent. The correlation table indicates high correlation between the sales variable and the net income variable (see Appendix table A6). This correlation can be explained, as net income is calculated using the sales variable, while subtracting the costs of goods sold. Thus, high levels of sales are often related to high levels of net income. The sales variable will thus not be used in the final model to test the third hypothesis.

The final dataset of hypothesis 3 is again an addition to the dataset of hypothesis 2. Institutional ownership is added as a percentage of the shares outstanding that are owned by institutional investors, the interaction effect of *sin* and *recession* is added, and several firm specific control variables are included. The dataset has annual data of 351 different firms between 1980 and 2018, leading to 7112 observations. The summarized variables indicate that indeed the percentage of institutional ownership is on average lower during recessions, as well as most firm financials (see Appendix table A7). Eventually, the final dataset consists of the following variables: *inst_own_w, recession, sin, rec_sin, CompanyName Lpermno, cusip, ticker, date, year, ni, Log_ni, size, Log_size, profit_w, and age.*

5. Results

5.1. Hypothesis 1

A linear regression with robust standard errors is used to test the outperformance of sin stocks as opposed to social responsible stocks. The OLS regression is performed with *exsinsri* as the dependent variable and the Carhart four factors as independent control variables to control for market effects. This model is tested using 1294 observations. The constant term, α_s, indicates the outperformance of sin stocks as opposed to social responsible stocks. The results, as shown in table 1, indicate that indeed sin stocks outperform the constructed portfolio of social responsible stocks. These results are significant at a 1% level for the CAPM model (1), the Fama French three factor model (2), and for the extensive Carhart four factor model (3).

Table 1: This table reports the average coefficients obtained from the linear regressions of a portfolio (*exsinsri*) that is long monthly return of an equal-weighted portfolio of sin stocks and short monthly return of an equal-weighted portfolio of social responsible stocks on well-known market factors from the CAPM, FF and Carhart Model. Each regression estimates the return with robust standard error. These robust standard errors control for heteroskedasticity and autocorrelation of the error terms. The regressions are estimated for the period of 1965-2018. *MKTRF* is the excess monthly return of the value weighted CRSP index and controls for market risk. *SMB* is the return of a portfolio long small stocks and short large stocks to control for the outperformance of small stocks. *HML* is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks, to control for the outperformance of value stocks. *UMD* is the return of a portfolio long past 12-month return winners and short past 12-month return losers, to control for momentum. *** 1%; ** 5%; and * 10% significance.

Linear return regression	(1)	(2)	(3)
	exsinsri	**exsinsri**	**exsinsri**
mktrf	-0.138***	-0.187***	-0.201***
	(0.004)	(0.004)	(0.004)
smb		0.454***	0.456***
		(0.004)	(0.004)
hml		0.197***	0.174***
		(0.006)	(0.006)
umd			-0.066***
			(0.004)
Constant	0.010***	0.009***	0.010***
	(0.000)	(0.000)	(0.000)
Observations	1294	1294	1294
R-Squared	0.008	0.050	0.052

Table 1: Linear regression results hypothesis 1

Therefore, the first hypothesis cannot be rejected at the 1% level:

H_{01}: Sin stocks are significantly outperforming social responsible stocks in the United States between 1965 and 2018.

To further explain the effect, the constant term has a value of 0.010 in the most extensive model indicating that sin stocks significantly outperform social responsible stocks with 1%.

Resulting in the following equation:

$$\boldsymbol{exsinsri_t = 0.010 - 0.201 * MKTRF_t + 0.456 * SMB_t + 0.174 * HML_t - 0.066 * UMD_t + \varepsilon_{it}}$$

Which means that investing in sin stocks instead of social responsible stocks will on average generate an excess monthly return of 1%, when controlled for well-known market factors. Although the significant results indicate real effects in this model, the low R-squared indicates that the model is not a perfect fit to explain the dependent variable.

5.2. Hypothesis 2

For the second hypothesis, again a linear return regression with robust standard errors is used to test the outperformance of sin stocks as opposed to social responsible stocks. The regression is performed with *exsinsri* as the dependent variable, and *recession* and the Carhart four factors as independent variables. This model is tested using 1294 observations. The constant term, α_s, indicates the outperformance of sin stocks as opposed to social responsible stocks. β_1 is the loading of the *recession* and explains the effect of a recession on *exsinsri*. Again, the CAPM model and Fama French three factor model are performed as well for completeness.

The results, as shown in table 2, indicate that indeed sin stocks outperform the constructed portfolio of social responsible stocks to a lesser extent in times of a recession. These results are significant at a 10% level for the CAPM model (1), the Fama French three factor model (2) , and the Carhart four factor model (3).

Table 2: This table reports the average coefficients obtained from the linear regressions of a portfolio (*exsinsri*) that is long monthly return of an equal-weighted portfolio of sin stocks and short monthly return of an equal-weighted portfolio of social responsible stocks on a *recession dummy* while controlling for well-known market factors from the CAPM, FF and Carhart Model. Each regression estimates the return during normal market conditions, as well as economic downturns, with robust standard. The regressions are estimated for the period of 1965-2018. *Recession* is equal to one in times of a recession and equal to zero otherwise. *MKTRF* is the excess monthly return of the value weighted CRSP index and controls for market risk. *SMB* is the return of a portfolio long small stocks and short large stocks to control for the outperformance of small stocks. *HML* is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks, to control for the outperformance of value stocks. *UMD* is the return of a portfolio long past 12-month return winners and short past 12-month return losers, to control for momentum. *** 1%; ** 5%; and * 10% significance.

Linear return regression	(1)	(2)	(3)
	exsinsri	**exsinsri**	**exsinsri**
mktrf	-0.145***	-0.197***	-0.212***
	(0.005)	(0.004)	(0.004)
smb		0.458***	0.460***
		(0.004)	(0.004)
hml		0.196***	0.171***
		(0.006)	(0.006)
umd			-0.070***
			(0.004)
recession	-0.008***	-0.009***	-0.010***
	(0.000)	(0.000)	(0.000)
Constant	0.011***	0.010***	0.010***
	(0.000)	(0.000)	(0.000)
Observations	1294	1294	1294
R-Squared	0.009	0.052	0.054

Table 2: Linear regression results hypothesis 2

Therefore, the second hypothesis cannot be rejected at the 1% level:

H_{02}: A recession has a significant negative effect on the performance of sin stocks as opposed to social responsible stocks.

To further explain the effect, the constant term has a value of 0.010 indicating that sin stocks significantly outperform social responsible stocks with 1%. Furthermore, *recession* has an effect of -0.010 meaning that if the dummy is equal to one, thus in times of a recession, the outperformance of sin stocks decreases with 1%. This means that the outperformance of sin stocks as opposed to social responsible stocks does not exists in times of a recession.

Resulting in the following equation:

$$\boldsymbol{exsinsri_{it} = 0.010 - 0.010 * recession_t - 0.188 * MKTRF_t + 0.474 * SMB_t + 0.138 * HML_t - 0.101 * UMD_t + \varepsilon_{it}}$$

Which means that investing in sin stocks instead of social responsible stocks will generate an excess return of 1% in normal times and an excess return of 0% in times of a recession. Thus, the performance of sin stocks relative to social responsible stocks decreases in an economic downturn. The outperformance of sin stocks, which is proven in the first hypothesis, disappears in times of a crisis. However, similar to the first hypothesis, it should be kept in mind that the low R-sqaured indicates that the model is not really good in explaining the dependent variable.

5.3. Hypothesis 3

For the third hypothesis, a time series regression with standard errors clustered at the firm level is used to test the institutional ownership of sin stocks in times of a recession. The OLS regression is performed with *inst_own* as the dependent variable, and *recession, sin, rec_sin, Log_ni, Log_size, age,* and *profit* as independent variables. This model is tested using 6190 observations. The constant term, α_s, indicates the institutional ownership. $\beta_i s$ are the loadings of the independent variables. The null hypothesis will not be rejected if β_3, the loading of the interaction effect, is negative and significant. The results, as shown in table 3, indicate that the interaction effect has no significant positive effect. Still, the model is a good indicator of institutional ownership, as an R-squared of 0.323 means that the chosen independent variables explain 32.2% of the institutional ownership.

Table 3: This table reports the average coefficients obtained from the time series regressions of the percentage of institutional ownership on a sin dummy, a recession dummy, and the interaction effect, as well as some firm financials. Each regression estimates the influence of various independent variables on the institutional ownership, with the third model as the most comprehensive model. The standard errors are clustered on a firm level and control for heteroskedasticity and autocorrelation of the error terms. As the standard errors of one year of firm data might be correlated with the standard errors of the previous year of firm data. The regressions are estimated for the period of 1980-2018. *Inst_own_w* is the percentage of total shares outstanding that are owned by institutional investors. *Log_ni* is the natural logarithm of the sales minus the cost of goods sold. *Log_size* is the natural logarithm of the market value, which is the total shares outstanding times the share price. *Profit_w* is the earnings before interest divided by total assets. *Age* is the amount of years that the company is public. *Recession* indicates a recession if the dummy is equal to one and zero otherwise. *Sin* indicates a sin firm if the dummy is equal to one and zero otherwise. *rec_sin* is the interaction effect and identifies a sin firm in times of a recession if the interaction effect is equal to one. *** 1%; ** 5%; and * 10% significance.

	(1)	(2)	(3)
	Inst_own_w	**Inst_own_w**	**Inst_own_w**
log_ni	0.040***	0.033***	0.033***
	(0.002)	(0.002)	(0.002)
log_size	-0.014***	-0.018***	-0.018***
	(0.001)	(0.001)	(0.001)
profit_w	0.079***	0.058**	0.058*
	(0.030)	(0.030)	(0.030)
age	0.005***	0.004***	0.004***
	(0.000)	(0.000)	(0.000)
recession		-0.011	-0.013*
		(0.007)	(0.007)
sin		-0.144***	-0.146***
		(0.008)	(0.009)
rec_sin			0.009
			(0.021)
Constant	0.392***	0.523***	0.523***
	(0.014)	(0.015)	(0.015)
Observations	6190	6190	6190

R-squared	0.271	0.323	0.323

Table 3: Time series regression with robust standard errors results hypothesis 3

Therefore, the third hypothesis will be rejected at the 10% level:

H_{03}: Institutional ownership of sin stocks is significantly higher in times of a recession

Meaning that there is no significant evidence for the positive effect of a recession on the institutional ownership of sin stocks.

Type one error

Although, no significant effect is found for an increase in institutional ownership for sin stocks in times of a recession, it does not automatically imply that the effect does not exist. The null hypothesis might be rejected when it is actually true. This is referred to as a type 1 error and is a common problem in smaller datasets. The variable measuring the interaction effect is restricted to only the data of moments when there was a recession. As the institutional and financial data of firms is on an annual basis, it means that for each sin firm only 5 observations can be included of economic downturns, if they existed during the complete sample period. Although the total number of observations is high, there are only 319 observations of sin firms in times of a recession (See Table A8 in Appendix). The limited data is critical to answering the hypothesis, as there is always the risk of reaching the wrong conclusion (Pallant, 2013). The significance level is the criterion used for rejecting the null hypothesis; it indicates how much confidence there is in the obtained results. It is harder to reach the significance level if a small data set is used; while, in a large dataset, a very small correlation might reach significance (Pallant, 2013). Therefore, rejecting the third hypothesis might be subject to the type one error, as only 5 years of a recession were indicated within the time range of the research. However, this does not imply that the hypothesis should not be rejected.

6. Robustness check

Smoking, alcohol and gambling are viewed as unhealthy and addictive, however, they are part of the daily lives of many Americans for decades. In contrast, cannabis was illegal for a long period and is still illegal in most American states. Therefore, cannabis might be observed as more sinful as opposed to completely legal sin categories. Also, the literature about recreational marijuana stocks is lacking, when compared with other sin topics, which might indicate just how controversial the subject of cannabis is. Although the first pure marijuana company was only listed in the beginning of 2018, some firms were already entering the cannabis market, as medical marijuana was already legal in most states and legalized recreational marijuana was predicted. In contrast to the motivation why cannabis should be more sinful, the opposite could also be argued. As the market for medical marijuana is already legal for a long period and in contrast to the other sin products, marijuana can be beneficial for the health of medical users. Both motivations, why marijuana might be more sinful or less sinful, make it clear that the sinful nature of marijuana is indistinct and requires extensive further research.

However, the extreme media attention that comes from the recreational legalization discussion, puts (institutional) investors under pressure. Today these investors are reluctant to invest in sin firms that are legal for a decade due to social norms. This indicates that a sin stock selling a product that is not even legal for recreational use in most states of the US yet, should be especially neglected. Furthermore, the market for medical cannabis is nihil in contrast to the recreational market, which is addressed to every individual above a certain age, and not only to people with a specific illness.

As explained above, it is expected that the illegal nature of cannabis stocks creates an even bigger neglect effect for these type of stocks in contrast to the other sin stocks. Therefore, a robustness check should be performed to see if the outperformance is dominated by cannabis stocks. The marijuana dummy identifies the cannabis stocks in the dataset and is equal to one if the firm is involved in the production or wholesale of cannabis and zero otherwise. As observed in table A1 in the Appendix, the number of marijuana stocks in the used dataset is increasing from 2013 onwards. Although, adding these stocks to the portfolio of sin stocks is an addition to the literature, it should be ruled out that the outperformance of sin stocks in the recent years is dominated by the outperformance of marijuana. A robustness check should therefore be performed to see if these stocks are not dominating the excess returns.

The following hypothesis is constructed for the robustness check:

H_{0R}: The outperformance of sin stocks in the period of 2013-2018 is significantly dominated by cannabis stocks.

H_{aR}: The outperformance of sin stocks in the period of 2013-2018 is not significantly dominated by cannabis stocks.

Not being able to reject this hypothesis implies that the results of hypothesis one and two, at least in the recent years, are dominated by the performance of marijuana stocks. This should be ruled out in order to draw a clear conclusion of the outperformance of sin stocks.

The following equation will be used to perform the robustness check:

$$\boldsymbol{exmarjsin_t = \alpha_s + \beta_1 * MKTRF_t + \beta_2 * SMB_t + \beta_3 * HML_t + \beta_4 * UMD_t + \varepsilon}$$

In which: *exmarjsin* is the dependent variable and is constructed as long an average weighted marijuana portfolio and short the average monthly return of a weighted sin portfolio. *MKTRF, SMB, HML,* and *UMD* are the Carhart four factors, similar to hypothesis one and two. Alpha is the excess return of marijuana stocks, βi's are loadings on the other portfolios that are used to predict *exmarjsin* specifically. ε is the error term that is uncorrelated with all the other independent variables. The first hypothesis will not be rejected if α_s is significantly greater than zero.

Similar to hypothesis one and two, a linear return regression with robust standard errors will be used to perform the robustness check. Table 4 below shows the results of the regression. The regression is performed using 520 observations. The results of the Carhart four factor model (3), as well as the CAPM model (1) and the Fama French model (2) find no significant outperformance of a portfolio of marijuana stocks as opposed to the general portfolio of all sin stocks.

Table 4: This table reports the average coefficients obtained from the return regressions of *exmarjsin* that is long monthly return of an equal-weighted portfolio of cannabis stock return and short monthly return of an equal-weighted portfolio of sin stocks on some well-known market factors from the CAPM, FF and Carhart Four factor model. Each regression estimates the return with robust standard errors. The regressions are estimated for the period of 2013-2018. *MKTRF* is the excess monthly return of the value weighted CRSP index and controls for market risk. *SMB* is the return of a portfolio long small stocks and short large stocks to control for the outperformance of small stocks. *HML* is the return of a portfolio long high book-to-market stocks and short low book-to-market stocks, to control for the outperformance of value stocks. *UMD* is the return of a portfolio long past 12-month return winners and short past 12-month return losers, to control for momentum. *** 1%; ** 5%; and * 10% significance.

	(1)	(2)	(3)
	exmarjsin	**exmarjsin**	**exmarjsin**
mktrf	0.775***	0.699***	0.732***
	(0.169)	(0.168)	(0.168)
smb		0.256	0.234
		(0.209)	(0.213)
hml		-0.202	-0.134
		(0.216)	(0.207)
umd			0.192
			(0.154)
Constant	-0.003	-0.003	-0.004
	(0.009)	(0.009)	(0.009)
Observations	520	520	520
R-Squared	0.028	0.030	0.032

Table 4: Linear regression results robustness check

Therefore, the hypothesis of the robustness check will be rejected at the 10% level:

H_{0R}: The outperformance of sin stocks in the period of 2013-2018 is significantly dominated by cannabis stocks.

Meaning that the monthly return of the sin stocks, in this data sample, is not dominated by the performance of cannabis stocks. Therefore, the recent results are robust to excluding the cannabis stocks form the dataset.

7. Conclusion and Discussion

This thesis analysed the performance of sin stocks, as opposed to social responsible stocks, in times of an economic recession. As explained in the literature, and confirmed by this thesis, sin stocks outperform social responsible stocks under normal market conditions. However, little was known about the performance of sin stocks during an economic downturn. The literature did provide some proof that the financial performance of sin stocks is less effected by the state of the market. Which is explained by the inelastic demand of sin products, partly due to their addictiveness, and the low equity levels, which makes the firms less dependent on raising equity. However, they did not provide any insights in the stock returns of sin stocks during a recession. This thesis explained that the recession-proof performance of sin stocks might attract (institutional) investors, who would have neglected the stock under normal market conditions. Investors might lower their ethical standards, to obtain positive returns even if the market goes down. However, low demand is the main reason for the undervaluation and outperformance of sin stocks. This neglected stock effect might thus disappear as investors lose their ethics during a recession.

Two hypotheses are tested to provide insights in the outperformance of sin stocks as opposed to social responsible stocks in normal market times, as well as during an economic downturn. Furthermore, a third hypothesis is tested to understand the institutional ownership of sin stocks under differing market conditions and thus the neglected stock effect.

The first hypothesis finds significant results for the outperformance of sin stocks relative to a weighted average portfolio of social responsible stocks between 1965 and 2018. The Carhart four factor model is used to calculate the excess monthly return of sin stocks, while correcting for some well-known market factors. The results indicate that sin stocks generate an excess monthly return of 1% in contrast to a portfolio of social responsible stocks at a 1% significance level. This is in line with the literature, but adds relevance as this thesis includes cannabis stocks as a fourth group of sin stocks, as well as more recent data.

The second hypothesis finds significant results for the decreased outperformance of sin stocks in times of an economic crisis. Again the Carhart four factor model is used to calculate the excess monthly return of sin stocks, while adding a recession dummy and correcting for well-known market factors. The results indicate that the outperformance of sin stocks dissapears in

times of an economic recession. A recession has a negative effect on the performance of sin stocks relative to social responsible stocks. This result is in line with the expectations and is again significant at a 1% level. This finding is an addition to the literature, as only little was known about the performance of sin stocks under different market conditions.

The third hypothesis finds no significant results for an increase in the percentage of sin stocks owned by institutional investors. A time series regression model was used with an interaction term of the sin dummy and the recession dummy, and some regularly used firm specific control variables including: net income, profit, firm age and size. Although the model did find a significant effect for lower institutional ownership for sin stocks in general, and the R-squared indicated that the model was good in estimating the institutional ownership, it did not confirm the hypothesis. Nevertheless, the small dataset, due to the few years of recession between 1980 and 2018, might be subject to a type one error, indicating that the hypothesis might be rejected while it is actually true. Therefore, further research in understanding the decreased outperformance in times of an economic downturn is required.

Additionally, a robustness check is performed, to rule out that the outperformance of sin stocks in the recent years is dominated by the inclusion of cannabis stocks. This might be the case as cannabis can be seen as the "biggest sin" as the use of recreational cannabis is still illegal in most states of the U.S. However, this robustness check did not provide any significant proof that cannabis was indeed dominating the outperformance of the group of sin stocks. Therefore, the inclusion of cannabis stocks did not bias the obtained results in this thesis.

To conclude, investing in sin stocks seems interesting in an economic downturn, as the financial performance of sin firms is predicted to be recession-proof, however the excess return almost disappears in times of a crisis. Therefore, I would recommend institutional investors to either drop there ethics under normal market conditions, and benefit from the excess returns, or keep their ethics high under all market conditions. Letting go of social norms during a crisis by investing in "bad" firms instead of "good" firms will not provide excess returns.

8. Limitations and recommendations

It is worthwhile to mention that the findings are limited to certain restrictions. The first restriction is the lack of previous studies in this research area. In particular, the research about cannabis stocks is lacking, as the cannabis trend has only recently emerged. The second restriction is due to the limited scope of this research in two levels. First, only the United States is researched, and therefore the results cannot be generalized on a global level without further research. Second, other sin stocks, including: adult sex industry, weapons, and nuclear power, are not considered because of identification problems. Therefore, the results cannot be generalized on the complete sin level. The third restriction is the lack of CSR data, as the KLD database only provides CSR scores from 1991 onwards. Hence, a firm is classified as social responsible throughout its whole life if it was classified as social responsible after 1991. The final restriction is the lack of clear industry codes to identify cannabis stocks. In this thesis, cannabis stocks are selected using a list of stocks on the Marijuana Index and applying several requirements. There is no clear SIC or NAICS code to identify the firms and thus important cannabis stocks might be missing from the dataset.

There are several directions for future research that would undoubtedly have a scientific impact. Most importantly there is the need for a feasible global research on this topic, as the social responsibility trend, and thus neglecting sin stocks, is emerging on a global level as well. This would increase the possibility of finding meaningful and significant results because of a larger dataset. Furthermore, there is a demand for more research related to the performance of cannabis stocks and the ethical view of society related to cannabis.

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10. Appendix

10.1. Tables

Table A1: Number of stocks by category and year
This table reports year-by-year the total number of stocks in the dataset, as well as the number social responsible stocks, the number of sin stocks and the number of sin stocks that are marijuana stocks.

Year	All	Sri	Sin	Sin=Marijuana
1965	110	69	41	0
1966	110	69	41	0
1967	113	72	41	0
1968	115	72	43	0
1969	117	76	41	0
1970	120	79	41	0
1971	123	80	43	0
1972	157	102	55	0
1973	165	104	61	0
1974	160	104	56	0
1975	155	103	52	1
1976	161	108	53	1
1977	155	106	49	1
1978	158	108	50	1
1979	164	110	54	2
1980	169	113	56	1
1981	176	117	59	1
1982	188	123	65	1
1983	192	127	65	1
1984	198	129	69	1
1985	203	134	69	1
1986	209	140	69	2
1987	217	144	73	2
1988	219	151	68	2
1989	216	150	66	1
1990	222	151	71	1
1991	225	151	74	1
1992	240	157	83	2
1993	266	160	106	2
1994	277	161	116	2
1995	288	164	124	3
1996	304	168	136	4
1997	318	173	145	4
1998	307	177	130	4
1999	303	178	125	4
2000	285	175	110	5
2001	267	169	98	5

2002	265	172	93	5
2003	255	170	85	5
2004	256	169	87	5
2005	254	168	86	6
2006	249	165	84	7
2007	240	160	80	10

Table A1 (*continued)*

Year	All	Sri	Sin	Sin=Marijuana
2008	233	154	79	8
2009	227	153	74	8
2010	225	151	74	6
2011	222	150	72	6
2012	215	146	69	6
2013	216	144	72	10
2014	217	145	72	12
2015	218	147	71	16
2016	213	146	67	17
2017	208	139	69	19
2018	210	140	70	22

Table A1: Number of stocks by category and year

Table A2: statistics of monthly return

This table shows the number of observations, minimum, maximum, skewness and kurtosis of the *monthly_return* variable and the winsorized *monthly_return_w* variable. The high level of skewness, means that the monthly return is extremely skewed to the right. The high kurtosis level is an indicator that data has heavy tails or outliers. The maximum of 47 already indicates that there is at least one outlier. Therefore, the *monthly_return* variable is winsorized at the 1st and 99th percentile, to account for the outliers. As shown in this table, the kurtosis level and skewness are decreased after adjustment for outliers.

Variable	N	min	max	skewness	Kurtosis
Monthly_return	129233	-.974	47	94.648	14204.51
Monthly_return_w	129233	-.365	.393	0.113	5.562

Table A2: Statistics of the monthly return variable

Table A3: Descriptive statistics of the data of the first hypothesis
This table shows the number of observations, average observation and the standard deviation of the variables used in the first hypothesis.

variable	N	mean	sd
exsinsri	1294	.009	.417
mktrf	1294	.005	.044
smb	1294	.002	.032
hml	1294	.003	.029
umd	1294	.007	.044

Table A3: Descriptive statistics

Table A4: Statistics of institutional ownership and profit variable

This table shows the number of observations, minimum, maximum, skewness and kurtosis of the *inst_own* variable and the *profit* variable before and after winsorizing. As shown in this table, the kurtosis level and skewness of the *profit* variable are decreased after adjustment for outliers. Also, the maximum of 12.809 for the *inst_own* variable is an outlier, as the percentage of shares owned by institutional investors cannot be higher than 100% and thus 1.

variable	N	min	max	skewness	kurtosis
Inst_own	7161	1.19e-06	12.809	-.396	2.320
Inst_own_w	7161	.001	.991	-.431	2.264
profit	7066	-2.004	1.984	-2.225	44.945
profit_w	7066	-.239	.430	-.182	4.939

Table A4: Statistics of the institutional ownership and profit variable

Table A5: Transforming log variables
This table shows the number of observations, minimum, maximum, skewness, and kurtosis of several variables. The high levels of kurtosis for the net income, size, and sales variables disappear after transforming the variables to log variables.

variable	N	min	max	skewness	kurtosis
ni	7161	-27684	59531	6.471	71.269
log_ni	6318	-6.907	10.994	-.491	3.277
size	7210	0	2.40e+08	8.295	90.321
log_size	7170	.230	19.296	-.155	2.392
sales	7161	-1527.815	496785	7.278	76.890
log_sales	7139	-4.509	13.116	-.640	3.646
age	7214	0	38	.494	2.185

Table A5: Transforming log variables

Table A6: Correlation matrix
This table shows the correlations between the independent variable. The correlation between the log of sales and the log of net income is highly correlated. The net income is constructed by subtracting the cost of goods sold from the sales. Therefore, an increase in sales leads to an increase of net income.

	Inst_own	**log_ni**	**log_size**	**log_sales**	**profit_w**	**age**
Inst_own	1.000					
log_ni	0.403	1.000				
log_size	0.029	0.359	1.000			
log_sales	0.463	0.909	0.403	1.000		
profit_w	0.098	0.031	0.223	0.128	1.000	
age	0.464	0.488	0.184	0.496	0.023	1.000

Table A6: Correlation table independent variables hypothesis 3

Table A7: Summary statistics by recession

This table shows the summary statistics of net income, age, size, sales, profit_w and inst_own_w in times of a recession and under normal market conditions. The institutional ownership is lower in times of a recession, as well as most financial variables.

	Obs	**Mean**	**Std.**	**Min**	**Max**
Recession = 0					
ni	5,944	1217.529	3578.036	-22355	59531
age	5,985	14.592	10.627	0	38
size	5,981	3794557	1.50e+07	0	2.40e+08
sales	5,944	13347.08	34192.11	-1408	496785
profit_w	5,868	.143	.101	-.239	.430
Inst_own_w	5,939	.523	.257	.001	.991
	Obs	**Mean**	**Std.**	**Min**	**Max**
Recession = 1					
ni	1,217	664.954	2741	-27684	45220
age	1,229	11.805	9.582	0	29
size	1,229	2867278	1.17e+07	0	1.88e+08
sales	1,217	11039.47	29661.9	-1527.815	425071
profit_w	1,198	.142	.104	-.239	.430
Inst_own_w	1,222	.494	.257	.001	.990

Table A7: Summary statistics by recession

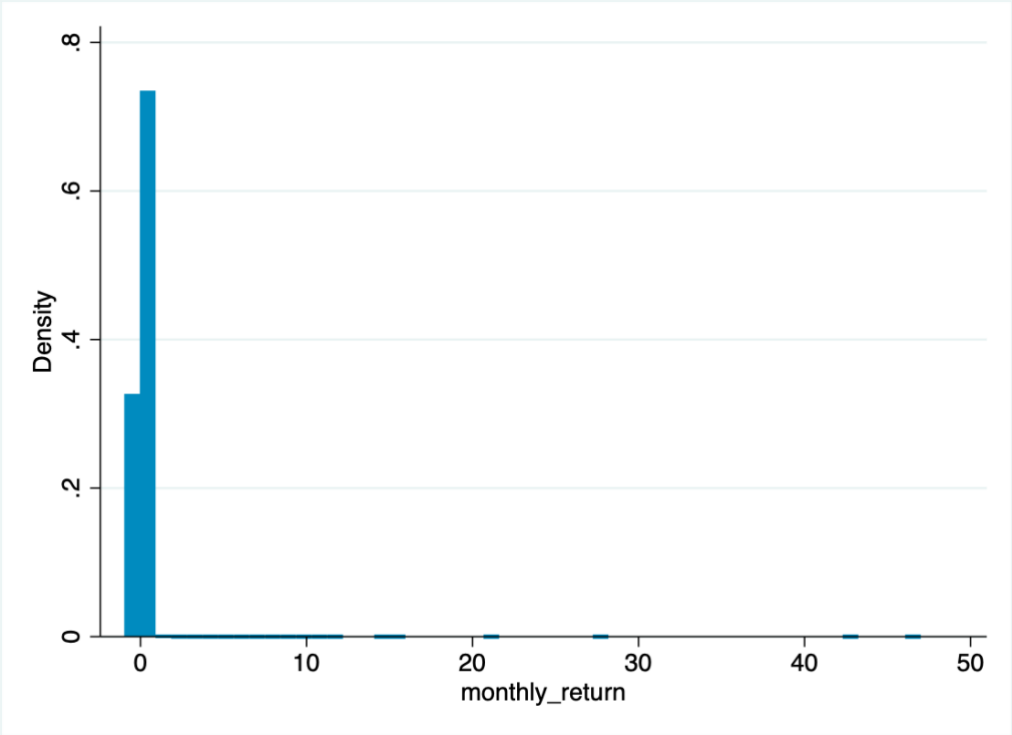
Table A8: Institutional ownership by rec_sin dummy

This table shows the number of observations and institutional ownership for sin firms in times of a recession, as well as for sin and social responsible firms under normal market conditions. The institutional ownership is lower for sin firms in times of a recession. Furthermore, the number of observations is small if rec_sin =1, as it is limited to sin firms in the years when there was a recession.

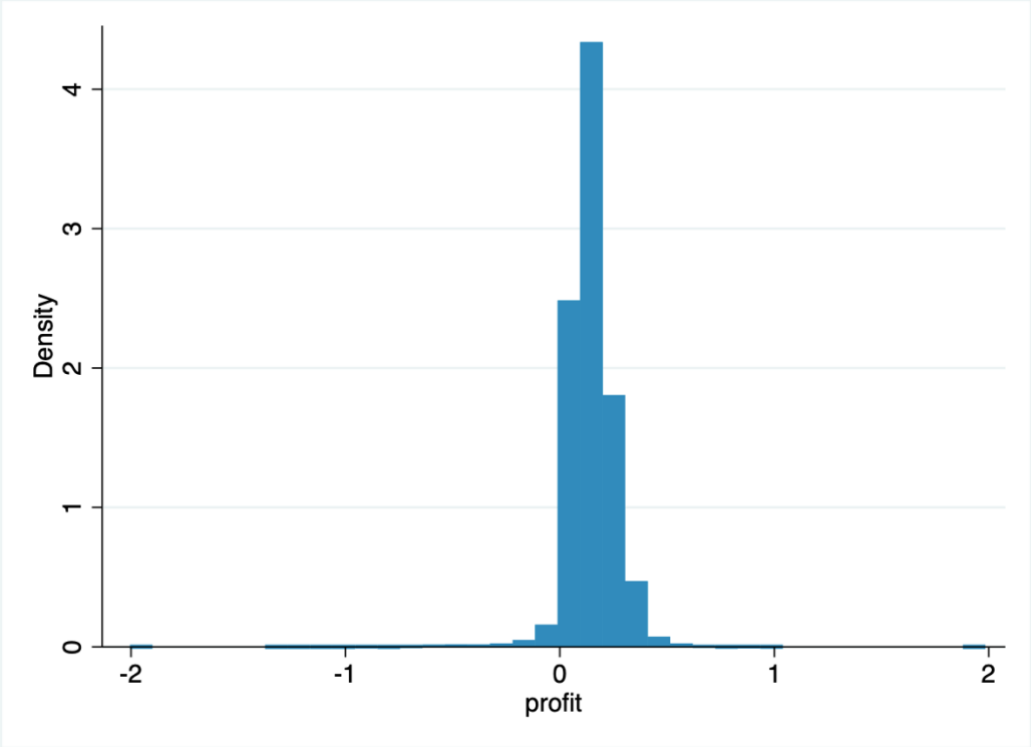
Inst_own_w	**Obs**	**Mean**	**Std.**	**Min**	**Max**
if Rec_sin = 0	6839	.526	.252	.001	.991
If Rec_sin = 1	319	.346	.300	.001	.991

Table A8: Institutional ownership by rec_sin dummy

10.2. Graphs



Graph 1: Histogram monthly_return



Graph 2: Histogram profit