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Socially Irresponsible Investment In The United States

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Abstract

In this thesis, we provide evidence on the performance of an unethical investment strategy during the 21st-century. We examine publicly traded US companies engage in one of these five industries; gambling, oil/gas, alcohol, tobacco, and defense. Using a sample of approximately 200 unethical stocks from 2001-2016, we hypothesize that the unethical portfolio does not outperform the market and SRI comparables and that there is a clear trend before and after the global financial crisis in 2008. Consistent with the first hypothesis and contrary to previous research, we could not prove that the unethical portfolio generated any excess return over the market. Meanwhile, there is a clear trend before and after the financial crisis, whereas the unethical portfolio overperforms prior and underperforms the market and comparables post, due to the inclusion of oil/gas industry.

Keywords: Abnormal Returns, Ethical, Sin Stock, SRI, Unethical, Unethical Investment.

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Chapter 1

Introduction

Whats prelude the first chapter is a background of investment responsibility and a problem definition followed by the definitions of unethical- and ethical investments. After that the purpose of comparing unethical and ethical investment strategies from 2001-2016 is clarified and lastly, a study outline presented.

1.1 Background and Problem Definition

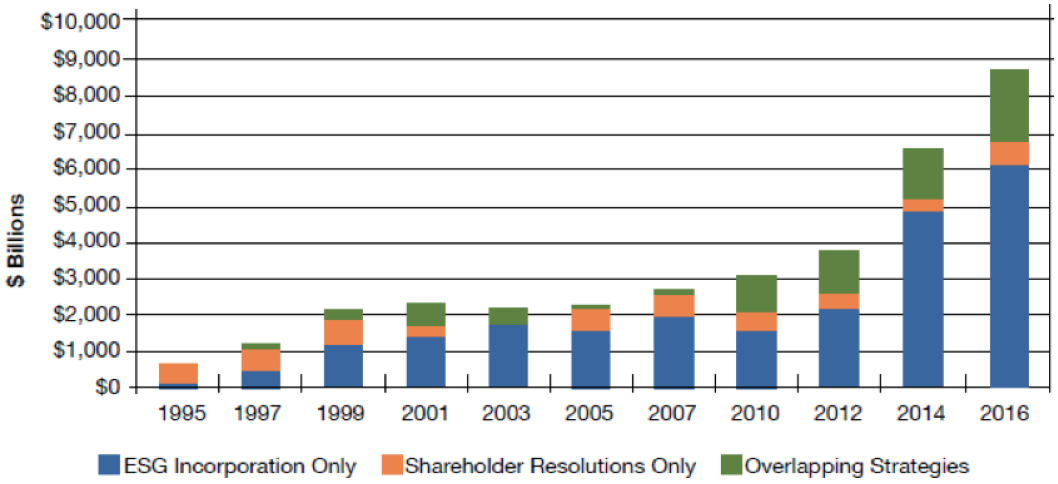
"There is one and only one social responsibility of business to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game".

(Friedman, 1970)

Ever since the Nobel-winning professor, Milton Friedman, expressed his strong position on the fiduciary duty of businesses in 1970, it has been debated among academics, for example, DesJardins & McCall (1990) and Buono & Nichols (1990). In addition to fiduciary duty, there is also a citizen's responsibility to act in the best interest of the society. Friedman's article sparked questions if businesses have a responsibility beyond generating the best risk-adjusted return for its shareholders, and consequently, the role of the investors. Those who oppose Friedman's theory and advocate for social responsibility argue that business has a wider set of duties to more than just the shareholders (Garriga, & Mel, 2004). The debate extends to the paradigm of economic rationalism and theoretical models used by investors.

Theoretical models pioneered by prominent academics, like Friedman, try to explain the different spectrum's of reality with scientific accuracy. To be applied, the economic models are based on mathematical predictions and assumptions, hence seen as both static and rigid (Woolley, 2010). Two common assumptions the financial theories are often based on is rational behavior and perfect capital markets (Markowitz, 1991). Nevertheless, while modern financial theories progressed, so did the ethical awareness among investors and the consequence of their investments. Thereupon a movement of ethical investing emerged, also called Socially Responsible Investing (SRI), which has grown in popularity during the 21st-century (Figure 1.1) and created friction between SRI and investment theory.

Figure 1.1. Capital Invested in SRI Capital Markets in U.S (US SIF Foundation)



The friction becomes apparent when examining the Nobel-winning work of the US economist Harry Markowitz (Peylo, 2012). He presented a commonly used tactic for investors to optimize their portfolios by diversification, which is strictly based on risk and returns according to modern portfolio theory (Markowitz, 1952). However, SRI takes another aspect in consideration, the ethical aspect beyond what affects the valuation. By screening to exclude the unethical companies engaging in immoral businesses, and finding those who support Corporate Social Responsibility (CSR), it narrows the investment spectrum of high-yielding stocks. Thus, complicate the optimal risk-return relationship and creating a clear problem with modern portfolio theory and an ethical investing approach. It also calls the assumption of rational agents into question, which solely acts in their self-

interest. More importantly, making "sin-averse" investors miss out on potential profits and diversification opportunities. Today's typical "sin-averse" investors that prefer companies with strong CSR policy are institutional investors due to their exposition to public pressures (Salabler, 2007). Given the large amount of public capital the institutional investors manage, their investment strategy has large implications on both the public's (shareholder's) optimal return and the financial sector. Some examples are banks, insurance companies, pension funds, and religious organizations (Hong & Kacperczyk, 2009).

In this thesis, we explore the problem that arises between fiduciary duty and the citizen's responsibility in the world of finance from an investor's perspective.

1.2 Unethical Definition

What is perceived as unethical depends on the period examined. Today, there are a handful of industries that are considered unethical by numerous social groups and individuals around the world due to their addictive properties, and undesirable environmental and social consequences. Unethical stocks, also described by the term "sin stocks", are those firms in industries that traditionally engaged in the business of alcohol, defense, tobacco, gambling and pornography (Statman 2000, p. 31; Carlsson Reich et al. 2001, p. 14). However, most of the companies engaged in the pornographic industry are not publicly traded and are therefore excluded in this paper due to the lack of available data. In addition to these traditionally unethical industries, we added the oil/gas industry. Leaving us with these five unethical industries; alcohol, defense, tobacco, gambling, and oil/gas.

The inclusion of oil/gas industry as unethical is due to the imminent threat of global warming and other environmental harm it imposes (UNFCCC, 2017). There are many other industries and different greenhouse gasses that contribute to global warming and therefore could be included, for example, the meat industry. However, these industries may be hard to justify as strictly unethical, and in some cases, there is a blurred line of what constitutes as an ethical or unethical activity. Therefore to not end up splitting hairs in this complex discussion, we chose to only extend our research to the oil/gas industry in this regard.

1.3 Ethical Definition

The term "ethical investments" is widely defined as the integration of social considerations, personal values, and economic factor when making an investment decision (Michelson & Wailes & Van Der Laan & Frost, 2004). Common practice for SRI is the avoidance of companies that sell or produce fossil fuel, armament and addictive substances, e.g. alcohol, gambling, fast food, and tobacco, while seeking out those companies engaged in environmental sustainability, human rights, and diversity (Logue, 2009).

Depending on the country of domicile and religion, different expressions for ethical investments tend to be preferred. Thus, what constitutes as ethical is highly subjective leading to that SRI indexes and funds defines their ethical guidelines differently.

Today we have an abundance of acronyms for the ethical approach to investing - socially responsible investing (SRI), economically targeted investing (ETI), ethical investing (EI), impact investing (II), environmental, social and governance (ESG). All these acronyms state the same concept of ethical investing and can also be seen as synonyms (Gray, 2012). Thus, to keep the coherence, we will hereinafter use one acronym for the ethical investing approach, and refer to it as SRI.

1.4 Unethical Investment Decisions

Imagine that you have the option to either invest in two different companies, one yields a low return and the other a high return, at the same risk exposure. According to the rational behavior assumption, everyone would invest in the company yielding the highest return. Now imagine that this high-yielding company is conducting unethical business and investing in businesses like alcohol, tobacco and pornography production whereas the low-yielding company conducts SRI and supports the environment. According to the assumption of rational agents in economic theories, the obvious choice would be the high-yielding unethical company. As Friedman expressed (1970), "in finance, it is all about the profits generated by the business that is of interest for most investors."

The SRI performance has, during the 21st-century, been studied extensively.

Hamilton et al. (1993), Statman (2000), Schröder (2004, 2007), Kreander et al. (2005), Bello (2005), all show that SRI neither out- or underperform conventional investing. Despite this, the capital invested in SRI-oriented capital markets has more than doubled since 2007 (Figure 1.1). If the theory of rational agents holds, the increased SRI would be financially motivated due to an increased return of ethical stocks. If no such indication exists, and the unethical stocks outperform the SRI strategy, it shows that the utility maximum is affected by more factors than profit maximization.

To determine if there is a possible disadvantage for sin-averse investors, caused by a narrowed investment spectrum, we investigate the profitability of the excluded unethical stocks. Previous research (discussed in chapter 3) on the subject have proved that unethical stocks have outperformed the market, up until 2007 (Table 2.1).

The question remains if there is a superiority of an unethical investments strategy, and moreover if it remains beyond the time frame of previous research.

1.5 Objective

The objective of the paper is to answer the question if an unethical investment strategy is a superior strategy in the 21st-century, compared to the market and SRI regarding the risk-adjusted return. At the same time, we do not want to discredit the SRI movement, rather examine if the increased influx of SRI is financially driven from an investor's perspective.

The continued incline of social and environmental awareness is crucial due to the environmental threat and harm some industries imposes and how this SRI growth will affect the financial markets for unethical stocks is yet unclear for the 21st-century. According to Hong's & Kacperczyk's (2009) neglection theory, the increase of SRI will render a higher abnormal return for unethical stocks.

By looking at the performance of an unethical investment strategy before and after a specific point in time, we hope to clarify a contrast and trend between the two-time periods due to the heightened awareness of SRI (Figure 1.1). The period examined in this study includes the global financial crises 2008 which was the worst recession in 80 years (The Economist, 2013). Making it an abnormality of

what constitutes a normal fiscal year. Therefore we will also examine the financial performance and risk prior and post the global financial crises. To exclude the full extent of the financial crises, we will exclude the years 2007-2009.

If the unethical stocks do not outperform the market nor SRI, there are no advantages of an unethical investment strategy and no loss for "sin-averse" investors in neglecting them.

However, if it turns out that the unethical stocks do outperform the market and SRI, it will challenge the notion of purely rational agents. The motivation for SRI has to be greater since the rational choice will be to do otherwise, making the investment decision depending more heavily on individual preferences. Investors, reluctant to miss out on the opportunity and only interested in maximizing their return, will invest in these businesses nevertheless. It will also highlight the fact that the SRI has gained much traction among investors despite having a lower return on investment than an unethical investment strategy and consequently neglecting profitable stocks.

1.6 Thesis Outline

The remainder of this paper continues as follows: Chapter 2, presents the hypotheses for this study and in chapter 3, previous literature and its impact are brought up together with the theoretical foundation of this research. The next chapter, chapter 4, portrays the data set and methodology and chapter 5 describes the result, which later is discussed in chapter 6. At last, the conclusion is drawn in chapter 7.

Chapter 2

Previous Research

In chapter two, a description of the previous studies regarding unethical stock performance and their implication is presented.

2.1 Previous Research

Merton (1987) published a study where he provided two possible reasons why unethical stocks often are undervalued. First, he showed that the assumptions of the Capital Asset Pricing Model (CAPM) no longer holds, thus leading to that not only systematic risk matters for pricing. Therefore, an increased litigation risk should raise the expected return. Second, that institutional investor and other prominent investors choose to neglect unethical stocks, which will depress their value compared to the fundamental value due to limited risk sharing. Unethical investments are, according to most studies, a superior investment strategy when it comes to expected returns within the industries of gambling, tobacco, and alcohol (Waxler, 2004).

Heinkel et al. (2001) researched the possibility of how norm-constrained investors can influence the market. They exhibit this with the development of a theoretical model. If enough constrained investors exist, the lack of risk-sharing opportunities will generate a higher cost of equity capital for polluting firms and the opposite for non-polluting companies.

This was further studied and developed by Hong and Kacperczyk (2009) which classified unethical stocks as "publicly traded companies involved in the business

of alcohol, tobacco, and gambling." They released maybe one of the most influential research papers in this field of discussion and presented that the investors neglect unethical stocks because of social norms, litigation risk, and regulatory scrutiny, consequently, leading to a higher expected and risk-adjusted return for unethical stocks. During the period 1926 to 2006, they found that portfolios with equal-weighted long unethical stocks and short comparable stocks resulted in a significant average abnormal return of 3.5% per year in the US stock market. Hong and Kacperczyk (2009) also hypothesized that there is a force within the societal norm against funding unethical companies. In line with their hypothesis, they see that unethical stocks are less covered by analysts and less included in norm-constrained investors portfolios. Thus, explaining the abnormal risk-adjusted return and supported theories created by Merton in 1987. Hong's and Kacperczyk's (2009) research became a springboard for further discussion and analyses about SRI and unethical stocks.

During the same period, a couple of other studies were posted, for example, Statman and Glushkov (2009); Perez Liston and Soydemir (2010) and Salaber (2009) all investigated the impact of constructing a portfolio containing unethical stocks, but all with a different approach and focus. According to all these studies, the result was similar. The tobacco industry tended to outperform the expected return of the market; however, the uncertainty remains for the other sectors. Statman and Glushkov (2009) used CAPM framework and received that the unethical stocks outperformed the market by 3.3% per year. Perez Liston and Soydemir (2010) used conventional factor models, and acknowledge that the Sharpe ratio, reward-to-risk measure, was higher for the unethical stocks. Salaber (2009) constructed the study with mixed logit models during a recession in Europe and saw that unethical stock, on average, outperformed the SRI stocks with 1.4% per year.

2.1.1 Implications of Previous Research

When evaluating the previous stream of studies, it becomes clear that unethical stocks have managed to generate positive abnormal returns in most cases (Table 2.1). Some studies found no significant alphas, like Lobe and Walkshusl (2011), but otherwise, the alphas vary from a high 13.7% (Fabozzi et al., 2008) to low a 2.62% annually (Statman and Glushkov, 2009). The different results depend on the investment strategy, unethical industry definition and performance measures. Findings by Hong and Kacperczyk (2009) and Salaber (2007) showed that other factors than those included in the multi-factor models affect the unethical stocks, confirmed by studying the R-squared of the regressions. Their results also suggest that the market is not fully efficient. However, something yet to research is the compared performance of SRI and unethical stocks in modern time with the same constraints as in this paper. To clarify, we constructed a table of the previous results presented in this section.

Table 2.1. Previous Results

Author	Region	Sample Size	Observed Period	Weighting	CAPM (%)	3-Factor (%)	4-Factor (%)
Salaber (2007)	EU	158	1926-2005	Value	0.33*	0.30	-
Fabozzi et al. (2008)	21 Countries	267	1970-2007	Equal	0.96*	-	-
Salaber (2009)	US	183	1991-2007	Equal	-	-	0.30***
Statman& Glushkov (2009)	US	198	1991-2007	Equal	0.278**	0.218*	0.189
Hong & Kacperczyk (2009)	US	193	1926-2006	Equal	0.30**	0.28**	0.31**
Liston& Soydemir(2010)	US	NA	2001-2007	Equal	0.082***	0.071***	0.07***
Lobe & Walkshusl (2011)	51 Countries	755	1995-2007	Value	0.18	-	0.13

Chapter 3

Hypotheses and Theoretical Foundation

In the third chapter, the two hypotheses are set accordingly. The first hypothesis is for the whole examined period and the second is divided into two sub-periods. Included in chapter three is also a description of the efficient market hypothesis and portfolio theory, which are the main theoretical framework applied in this study.

In line with our objective, we construct a portfolio of unethical stocks to compare with the SRI strategy and the US market. The SRI strategy is represented by an SRI Fund, Parnassus Core Equity Fund, and an SRI index, Vanguard FTSE Social Index US. The period of this research is from 2001-2016. Two hypotheses have been constructed below to test our objective.

3.1 Hypothesis I

Based on the results from previous studies we set the hypothesis that our unethical portfolio yields a higher risk-adjusted total return than the market (S&P 500), Vanguard FTSE Social Index US and Parnassus Core Equity Fund. To make a legitimate comparison to the market, we will also include S&P 500 equal weight index (S&P 500 EWI) in addition to the standard market capitalization weighted index. If the unethical portfolio performs better than the market, it will render a positive and significant abnormal return, represented by alpha, according to the

factor models discussed in chapter 4.

H0, a: Unethical portfolio does not outperform the market index, Vanguard FTSE Social Index US and Parnassus Core Equity Fund regarding return and risk for years 2001-2016.

HA, a: Unethical portfolio does outperform the market index, Vanguard FTSE Social Index US and Parnassus Core Equity Fund concerning return and risk for years 2001-2016.

3.2 Hypothesis II

The second hypothesis we want to examine is the trend of the unethical portfolio. Specifically, if the unethical portfolio yields a persistent average abnormal return through time; by studying the periods prior and post to the global financial crisis 2008. If the performance is persistent over time, the abnormal return of the first period should be similar to the abnormal return in the second period. If not, is there a negative or a positive trend? The same performance measurement as in hypothesis I will be conducted for the two periods 2001-2006 and 2010-2016. According to previous studies, the heightened SRI will lead to an even higher abnormal return on unethical stocks.

H0, b: The unethical portfolio yields the same abnormal return post-crisis, i.e., period 2010-2016, as before the global financial crisis, i.e., 2001-2006.

HA, b: The unethical portfolio yields a lower or higher abnormal return post to the global financial crisis than prior.

3.3 Theoretical Framework

3.3.1 The Efficient Market Hypothesis

If the stock market is efficient, the stock price should reflect and incorporate all available information and respond immediately when new information arises (Fama, 1970). The implication of the efficient market hypothesis is that all stocks are already traded at their fair value and therefore there are no over- or under-valued stocks. There are three degrees of the Efficient Market Hypothesis: Weak form, Semi-strong form and Strong form (Table 3.1)

Weak form: Stock prices already reflect all information that can be derived by examining market trading data, such as, short interest, trading volume, and history of past prices, etc. which means that a technical analysis of past trading information is pointless.

Semi-strong form: All publicly available information, regarding the prospects of a firm, is already reflected in the stock prices. For example, fundamental analysis, quality of management, earnings forecast, and dividends, etc. Indicating that technical and fundamental analysis are pointless and that one needs to act on insider information to obtain an abnormal return.

Strong form: Stock prices reflect all information relevant to the firm, including insider information which indicates that technical, fundamental analysis and insider trading are pointless.

Table 3.1. Market Efficiency (authors interpretation of Fama, 1970)

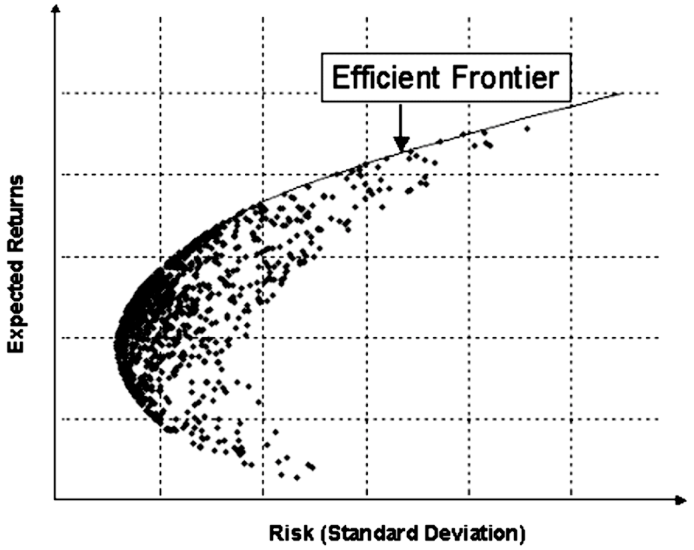
Type of Efficiency	Assumption	Implications for Abnormal Returns
Weak Market Efficiency	Current price reflects all historical data	Possible
Semi-strong Market Efficiency	Current price reflects all historical data and publicly available information	Possible
Strong Market Efficiency	Current prices reflects all information	Not Possible

3.3.2 Portfolio Theory

It has now been over sixty years since the publication of Harry Markowitzs groundbreaking hypothesis about portfolio selection (Markowitz, 1952). Its vast impact is best represented by the fact that it is now referred to as Modern Portfolio Theory (MPT). Markowitz provided a framework for portfolio theory as a mathematical problem regarding economic agents who act under uncertainty. His theory focuses on how optimizing investors would behave, which are assumed to be risk-averse and how to maximize the expected return of an asset-portfolio for a given level of risk (standard deviation). Furthermore, it underlines the importance of diversification and that an individual assets risk and return should be evaluated by its contribution to the whole portfolio and not by itself. The implication of the risk-averse assumption is that investors will always prefer a portfolio containing less risk over a riskier one given the same expected return.

This leads us to the efficient frontier; if all possible combinations of assets are plotted in a graph with expected return on the vertical axis and risk (standard deviation) on the horizontal axis, there would be an upper edge of the plotted asset combinations called the efficient frontier. Portfolios on the efficient frontier represent the maximum return for a given risk level; i.e. most effective, thus the combination of assets all investors would choose from.

Figure 3.1. Efficient Frontier (Finance Train)



Chapter 4

Methodology and Data

Whats preludes the fourth chapter is which performance measurement to be used, followed by a thorough description of how we constructed the unethical portfolio and how the data was collected. Thereafter, a summary of the comparables, a discussion about the portfolios weighting scheme and the phenomena called survivorship bias are presented.

4.1 Methodology

The unethical portfolio was compared with Vanguard FTSE Social Index Fund US, Parnassus Core Equity Fund, representing the SRI strategy and different proxies for the market (S&P 500, S&P 500 EWI, CRSP database). All total returns calculations includes dividends reinvested.

To test our hypotheses, we measured the financial performance of the unethical portfolio and the comparables using mainly OLS-regression analysis and Sharpe ratio. The ratio is a widely used statistical measurement of risk-adjusted return based on the average return in excess of the risk-free rate and standard deviation (Sharpe, 1966). The linear factor models used in this paper try to divide the return of assets into explainable and unexplained parts. Though the actual relationship may be different, it gives a statistical guess of the reality. The p-value determine the statistical significance of the estimates.

4.1.1 Linear Factor Models

4.1.1.1 Capital Asset Pricing Model- CAPM

The CAPM is building on the earlier work of Harry Markowitz (Markowitz, 1952) on diversification and modern portfolio theory. It was introduced by William F. Sharpe (1964), John Lintner (1965) and Jan Mossin (1966) independently, and is widely used in finance to determine the required rate of return of assets. Intuitively in the CAPM, investors want compensation for the time-value of money i.e. the risk-free rate and non-diversifiable risk i.e. systematic risk. A US Treasury bill and a proxy index of the market is often used to estimate the risk-free rate and market return. The market beta reflects the sensitivity of the assets returns to the market return in excess of the risk-free rate, thus its exposure to systematic risk. The alpha is the excess return, also called abnormal return, i.e. the return over/under the required rate of return. Both the alpha and beta are estimated using the ordinary least squared (OLS) regression model where alpha is the intercept and beta are the coefficients. Though the CAPM could not sufficiently withstand empirical testing, it is still commonly used due to its simplicity and intuitive power; it provides a benchmark rate of return for evaluating investments.

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT} \times MKT_i + \epsilon_{i,t}$$

where,

$r_{i,t} - r_{f,t}$ = The monthly total return of a portfolio, i, at time t, in excess of the risk-free rate at time t (one-month US Treasury bill).

MKT_i = The monthly total return of the market portfolio at time t, in excess of the risk-free rate at time t.

$\epsilon_{i,t}$ = An error term with zero mean that represents the variation not explained by the variables in the regression model.

4.1.1.2 Fama-French Three-Factor Model

By using multifactor models and allowing for several systemic factors, it can provide a better description of security returns because the systematic risk is not always due to one source. Eugene Fama and Kenneth French found that value and small-cap stocks outperformed their counterpart growth stocks and large-cap stocks; thus, they developed their multifactor model. The Fama-French three-factor model is an extension of the CAPM by adding value and size factors in the regression (Fama & French, 1993). The value factor is represented by high minus low (HML), which is the difference in returns between high book-to-market stock portfolios and low book-to-market stock portfolios. The size factor represented by small-minus-big (SMB) is the difference in returns between a portfolio of large stocks and a portfolio of small stocks.

$$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT} \times MKT_i + \beta_{i,SMB} \times SMB_t + \beta_{i,HML} \times HML_t + \epsilon_{i,t}$$

where,

SMB_t = The monthly total return difference, at time t, between a portfolio of the 10 per cent smallest US stocks and a portfolio of the 90 per cent largest US stocks.

HML_t = The monthly total return difference, at time t, between a portfolio of the 30 per cent highest US book-to market ratio stocks and a portfolio of the 30 per cent lowest US book-to-market ratio stocks.

4.1.1.3 Carhart Four-Factor Model

The Carhart four-factor model is a further extension of the Fama-French three-factor model by including a monthly momentum factor (MOM). It captures the tendency of stocks to continue to rise if it has already gone up and vice versa. This factor is included in our study due to investors tend to use momentum strategies; buy winners and sell losers from the previous period, thus giving it a momentum effect. The MOM factor is the difference between the equal weighted average of the highest and the lowest performing companies, lagged one month (Carhart,

1997). Similar to the Fama-French three-factor model, the momentum factor is also defined as a self-financing portfolio but is long previous 12-month return winners and short previous 12-month loser stocks.

$r_{i,t} - r_{f,t} = \alpha_i + \beta_{i,MKT} \times MKT_i + \beta_{i,SMB} \times SMB_t + \beta_{i,HML} \times HML_t +$
$\beta_{i,MOM} \times MOM_t + \epsilon_{i,t}$

where,

MOM_t = The total return difference between a portfolio of 12-month return winner stocks and a portfolio of 12-month return loser stock, at time t-1.

4.2 Data

4.2.1 Construction Of The Unethical Portfolio

All data for the unethical portfolio were screened and retrieved through the Bloomberg Terminal. The selection process is initiated to exclude non-useful and erroneous or missing data from the database. The goal is to include a large part of the US stock market while concurrently reassuring that all stocks fulfill the following criteria. All the companies we include in the screening process are from the US and traded on the US stock market, and engaged in the unethical activity of either gambling, defense, alcohol, tobacco, and oil/gas. We chose the industry classification benchmark (ICB) code corresponding to the five industries to screen our sample of unethical companies (ICB, 2012).

The oil/gas industry in our sample is oil/gas producers (ICB code 0530) and oil equipment services and distributors (ICB code 0570). These two sectors include four different sub-sectors: exploration and production (ICB code 0533), Integrated oil and gas (ICB code 0537), oil equipment and services (ICB code 0573) and pipelines (ICB code 0577).

The alcohol industry is divided in into two parts, brewers (ICB code 3533) and distillers/vintners (ICB code 3535). The sub-sector brewers include in its definition manufacturers and shippers of cider or malt products such as beer and ale. Furthermore, distillers and vintners include producers, distillers, vintners, blenders, and shippers of wine and spirits such as whiskey, brandy, rum, gin or

liqueurs.

Gambling (ICB code 5752) contains companies that provide gambling and casino facilities. It includes online casinos, racetracks, and manufacturers of pachinko machines and casino and lottery equipment.

Tobacco (ICB code 3780) Manufacturers and distributors of cigarettes, cigars and other tobacco products, includes tobacco plantations.

Defense (ICB code 2717) Producers of components and equipment for the defense industry, including military aircraft, radar equipment, and weapons.

The portfolio allocation is equal weighted and rebalanced monthly for 16 years. The dynamic variables we choose to include in our screening procedure are the price-to-book ratio, monthly total return, and market capitalization.

The period of our research range from 01/01/2001 to 31/12/2016 with a monthly total return of our equally weighted unethical portfolio. After screening for active trading status, relevant sectors (ICB) and exchanges in the US we end up with 599 unethical-stocks. Furthermore, the unethical portfolio will only include companies with a higher market capitalization than 50 million USD, because when including all companies, the only two companies below 50 million market cap experienced enormous return above 1000% for an individual month. Hence, making them extreme outliers in our sample. After screening for the market capitalization and other data availability criteria in Bloomberg Terminal, the final number in our portfolio 01/01/2001 is 225 unethical-stocks and the end count in the portfolio 31/12/2016 is 187 unethical stocks. The differences in the number of sin stocks in the portfolio are due to monthly rebalances. Furthermore, a few individual unethical stocks monthly returns are missing in our portfolio and are therefore omitted in the calculations.

4.2.2 Kenneth R. French Data Library

The co-founder of the Fama-French three-factor model, Kenneth R. French has a data library for all the factors in the different factor models. Monthly data for the factors; MKT (excess market return), SMB, HML, and MOM was retrieved from US research return data from French's data library. The factors are constructed by using six value-weighted portfolios formed on size and book-to-market. The

SMB-factor (small minus big) is an average return on the three small portfolios minus the three big portfolios which can be shown as:

SMB = $\frac{1}{3}$ (Small Value + Small Neutral + Small Growth) - $\frac{1}{3}$ (Big value + Big Neutral + Big Growth).

The next factor is the HML-factor (high minus low) which displays the average return on the two value portfolios minus the average return of the two growth portfolios. Calculated as follows:

HML = $\frac{1}{2}$ (Small Value + Big Value) - $\frac{1}{2}$ (Small Growth + Big Growth).

MKT is the market's excess return, or value-weight return of all the companies in the US from the center for research in security prices (CRSP) databases and listed on either one of NYSE, AMEX or NASDAQ. They should also have a CRSP share code of 10 or 11, right price and share data for month t, and real return data for month t minus the monthly Treasury bill rate from Ibbotson Associates. The momentum factor is calculated by subtracting the average return of two high prior return with the mean of the two low prior return portfolios:

MOM = $\frac{1}{2}$ (Small High + Big high) - $\frac{1}{2}$ (Small low + Big Low).

It is constructed with six value-weight portfolios formed on size, and prior (2-12) returns are used. The monthly formed portfolios are the intersections of two portfolios formed on market equity with the monthly market equity breakpoint, at the median NYSE market equity, and three portfolios formed on prior (2-12) returns with breakpoints at the 30th and 70th NYSE percentiles.

The portfolios used to construct the momentum factor each month include NYSE, AMEX, and NASDAQ stocks with prior return data. Stocks must have a price for the end of month t-13 and a good return for t-2 to be included in the portfolio for several months t which are formed at the end of the month t-1. Furthermore, each stock must have market equity for t-1.

4.2.3 Comparables

As previously mentioned, we compare our unethical portfolio to both indexes and funds to get a comprehensive picture of the performances. These will be S&P 500 index (S&P 500), S&P 500 equal weighted index (S&P 500 EWI), Vanguard FTSE Social Index Fund US, and Parnassus Core Equity Fund. We chose to compare with two different SRI comparables, where one is a passively managed index fund and the other actively managed fund, to get a more coherent comparison of the SRI strategy.

One of the SRI comparables is Vanguard FTSE Social Index Fund US, which is a market capitalization weighted index. This fund eliminates companies involved in; nuclear power, not diversified workplaces, alcohol, gambling, and pornography. Also, those companies that violate any of the human rights or have an adverse impact on the environment are rejected. Top three holdings in Vanguard FTSE are Microsoft, Apple, and Alphabet and in total the portfolio consists of 405 large-capitalization stocks. The fund charges a management fee of 0.19% per year (Vanguard FTSE Social Index Fund, 2016).

The Parnassus Core Equity Fund tries to build a diversified portfolio by investing in equity securities of mainly large market-cap companies that meets the requirement for the SRI parachute. What they do differently from many other large-blend funds is that they put much effort in research, and hold a very concentrated portfolio of approximately fifty stocks. By doing so, they ensure that all the stocks fulfill all the SRI criteria. The total assets under management are just over 11.2 billion USD (Shareholders report: Parnassus Funds, 2017).

The last comparables are two different types of the S&P 500 index. First is the S&P 500 founded in 1957. It consists of over 500 of the biggest companies that have common stocks listed in the US, on New York Stock Exchange and NASDAQ. The top three biggest holdings are Exxon Mobil, Apple, and Microsoft. The S&P index is the most commonly followed index in the world and with the purpose of being representative of the whole US stock market (S&P Dow Jones Indices, 2017).

The second market index is the S&P 500 equal weighted index (S&P 500 EWI) which is included to ensure that we do not get an overestimated result of our equally weighted unethical portfolio. The allocation to each stock is 0.2 % of the index total (Invesco, 2017).

4.2.4 Equally Weighted Portfolios

An equally weighted portfolio is a portfolio with every stock given the same weight regardless of the company's size. In contrast, a market capitalization weighted portfolio will give companies weight according to their market capitalization contribution to the portfolio. Hence, companies with large market-cap will also have a high weight. The different approaches to portfolio weights will result in various characteristics. Small-cap stocks are usually more volatile than large-cap stocks (Fama & French, 1993). Therefore, an equally weighted portfolio can lead to a higher risk, because of the greater weight towards small-cap stocks than a market-cap weighted portfolio.

The largest companies in our unethical portfolio are dominated by companies in the oil/gas industry because of the high entry barrier and oligarchic nature of the industry. Therefore, despite the higher risk exposure, we chose to construct the unethical portfolio with equal weight to get more diversification in all the unethical industries we are interested in. Even with the adjustment for this diversification problem, a large part of the portfolio consists of oil/gas companies.

To comprehensively make a comparison to the market index, we included both the normal S&P 500 and the newer S&P 500 EWI. However, considering the widely use of the "normal" S&P 500 index in finance, we chose to focus on S&P 500 as the regression benchmark in this research.

Vanguard FTSE Social Index US is also market-cap weighted and have to be considered when analyzing the results. Regarding the comparison between the unethical portfolio and Parnassus, the weights for Parnassus are chosen freely by the fund manager, with no standardized weighting of the stocks. It is not an entirely fair comparison, but rather a testimony to the fund manager's skill compared to our equally weighted unethical portfolio.

4.2.5 Survivorship Bias

A survivorship bias is caused by excluding companies from a backtest because they do not operate anymore today or no longer actively traded on the exchanges (Elton, Gruber, & Blake 1996). Often resulting in an overestimation of past performances of a portfolio, because companies that are not successful enough and manage to survive the whole period are excluded. To mitigate this problem, we rebalanced the unethical portfolio monthly, as mentioned before, to account for new companies entering and exiting the portfolio according to the criteria we set up. The same thing is done with the other comparables, where changes of the membership in the indexes/fund are accounted for on a monthly basis.

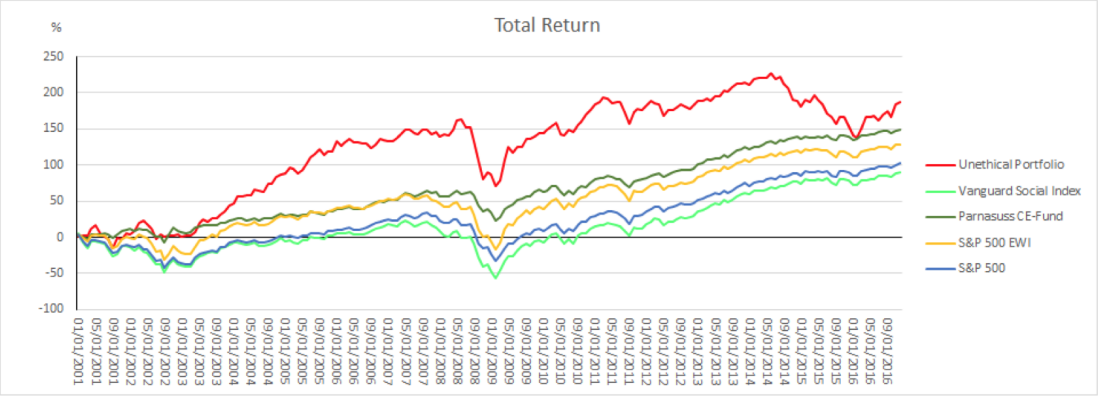
Chapter 5

Empirical Results

In chapter 5 our results from the performance tests of the unethical portfolio and comparables will be divided according to the different hypotheses. In the last section, the results robustness is evaluated and tested. All the alphas are reported, describing the monthly abnormal return for the examined period, which is expressed in percent. Furthermore, summarized statistic tables with Sharpe ratios will be provided.

5.1 Hypothesis I Overall Performance

Figure 5.1. Total Return 2001-2016



5.1.1 Risk

The unethical portfolio outperforms all other comparables regarding total return from 2001-2016 (Figure 5.1), but it comes with a higher exposure to risk, as shown in the summarized statistics (Table 5.2). The unethical portfolio has the highest standard deviation (7,82%) among the comparables, meanwhile, Parnassus Core Equity Fund have the lowest standard deviation (3,64%). Another measurement of risk is the market beta, which measures the systematic risk in comparison to the overall market. As displayed in Table 5.1, the market beta for the unethical portfolio in the four-factor model is 1,058, hence more exposed to systematic risk and more volatile than the broader market. Similarly, Vanguard Social Index US is also more volatile than the broader market with a market beta above 1, but slightly lower than for the unethical portfolio with a value of 1,052. Furthermore, the graph (Figure 5.1) and the high R-squared (0,973) shows that Vanguard Social Index US closely follows the S&P 500 Index, indicating a very similar stock composition between the two indexes. The reason may be that companies included in S&P 500 must be selected by the committee which assesses the company. Therefore, making the S&P 500 index include very few stocks which Vanguard Social Index US considers unethical. The comparable least exposed to systematic risk is Parnassus Core Equity Fund with a market beta of 0,777.

5.1.2 Risk-adjusted Performance

Parnassus Core Equity Fund have the highest Sharpe ratio of all the comparables, which means that the fund generates the most return in excess of the risk-free rate per unit of risk, measured by standard deviation. The equally weighted unethical portfolio and S&P 500 EWI have very similar Sharpe ratio of 0,110 and 0,112 respectively, and are only surpassed by Parnassus Core Equity Fund with Sharpe ratio of 0,182. Hence, putting our unethical portfolio right in the middle among the comparables and Vanguard Social Index US lowest according to their Sharpe Ratio (Table 5.2).

When analyzing the alphas of the factor models in table 5.1, we observe that the unethical portfolio yields an excess return over required rate of return with very large p-values. Thus, we cannot conclude that the alpha estimate is significantly

different from zero, which indicates that the unethical portfolio neither under- or outperform the overall market. The unethical portfolio is exposed to the size factor, SMB, and the value factor, HML, with values of approximately 0,72 and 0,5 irrespective of the factor model, indicating that our unethical portfolio exhibits large exposure to stocks with low market capitalization and value stocks. Moreover, the momentum factor is statistically insignificant.

Vanguard Social Index US has a statistically significant negative alpha at a 10% significance level. The index yields too low return corresponding to the risk it incurs and underperforms the overall market by approximately 0,12% on a monthly basis. Vanguard's size factor, SMB, is negative and statistically significant in the four-factor model, indicating that the index contains predominantly large-cap stocks. Furthermore, the negative momentum factor tells us that the winners of the period (month), on average, is not the winners of the previous period. Comparably, Parnassus Core Equity Fund yields a statistically significant positive alpha at a 1% significance level, which correspondingly means that it yields an abnormal return over the assumed risk and overperforms the overall market monthly by approximately 0,3%. All the other factors in the multifactor models are statistically insignificant.

Table 5.1. OLS-Regression

2001-2016	α	β_{MKT}	β_{SMB}	β_{HML}	β_{mom}	R^2	Obs
Unethical Portfolio							
CAPM	0,272	1,243***				0,485	192
	(0,514)	*(0,000)*					
Fama-French 3 factor	-0,028	1,088***	0,724***	0,497***		0,566	192
	(0,943)	*(0,000)*	*(0,000)*	*(0,009)*			
Carhart 4 factor	-0,010	1,058***	0,723***	0,496***	-0,053	0,567	192
	(0,981)	*(0,000)*	*(0,000)*	*(0,009)*	*(0,646)*		
Vanguard Social Index							
CAPM	-0,161**	1,087***				0,966	192
	(0,015)	*(0,000)*					
Fama-French 3 factor	-0,147**	1,099***	-0,062**	0,010		0,967	192
	(0,030)	*(0,000)*	*(0,025)*	*(0,767)*			
Carhart 4 factor	-0,119*	1,052***	-0,064**	0,008	-0,081***	0,973	192
	(0,062)	*(0,000)*	*(0,011)*	*(0,766)*	*(0,000)*		
Parnassus CE-Fund							
CAPM	0,297***	0,777***				0,873	192
	(0,002)	*(0,000)*					
Fama-French 3 factor	0,302***	0,783***	-0,040	0,022		0,874	192
	(0,002)	*(0,000)*	*(0,404)*	*(0,701)*			
Carhart 4 factor	0,298***	0,790***	-0,040	0,022	0,011	0,874	192
	(0,003)	*(0,000)*	*(0,408)*	*(0,699)*	*(0,709)*		

*The results are calculated using a robust OLS-regression with monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill) as the dependent variable and the factors according to CAPM, Fama-French three-factor model and Carhart four-factor model as the independent variable from 2001 to 2016. The total return includes dividends reinvested. The values in parentheses are the p-value of the coefficients. All coefficients in the regression is rounded to three decimal numbers. *** 1%, ** 5% and * 10% significance.*

Table 5.2. Summary Statistic 2001-2016

	Obs	Mean	Std.dev	Min	Max	Sharpe Ratio
Unethical Portfolio	192	0,972	7,820	-26,791	28,399	0,110
Vanguard Social Index	192	0,465	4,829	-19,290	13,840	0,070
Parnassus CE-Fund	192	0,777	3,635	-15,410	12,240	0,182
S&P 500 EWI	192	0,670	4,953	-21,144	18,565	0,112
S&P 500	192	0,532	4,252	-16,793	10,919	0,098
Mean	192	0,683	5,098	-19,886	16,793	0,115
Median	192	0,670	4,829	-19,290	13,840	0,110

The summarized statistics are calculated from the monthly total return of the different portfolios. The Sharpe ratios are calculated using the monthly total return of the portfolio in excess of the risk-free rate (one-month US Treasury bill). All values are rounded to three decimal numbers.

5.2 Hypothesis II - Prior And Post The Financial Crises

There is a large contrast prior and post the global financial crises. Before the financial crises, the unethical portfolio has the highest Sharpe ratio among the comparables and highest positive alpha (though only significant for the CAPM) and a market beta below 1. After the financial crises, we see an almost complete reversal of the results, with the unethical portfolio having the lowest Sharpe ratio, a negative alpha and an increased systematic risk to a market beta above 1.

As presented in figures 5.2 and 5.3 below, the unethical portfolio generally seems to outperform both market and the two SRI index/fund on a risk-adjusted basis before the global financial crises. After, it underperforms the comparables (the coefficients of the regressions are interpreted as the section above for the whole period). The post-financial crises period is characterized by the unethical portfolios sudden drop in monthly total return, and all other comparables closely following S&P 500.

Figure 5.2. Total Return 2001-2006

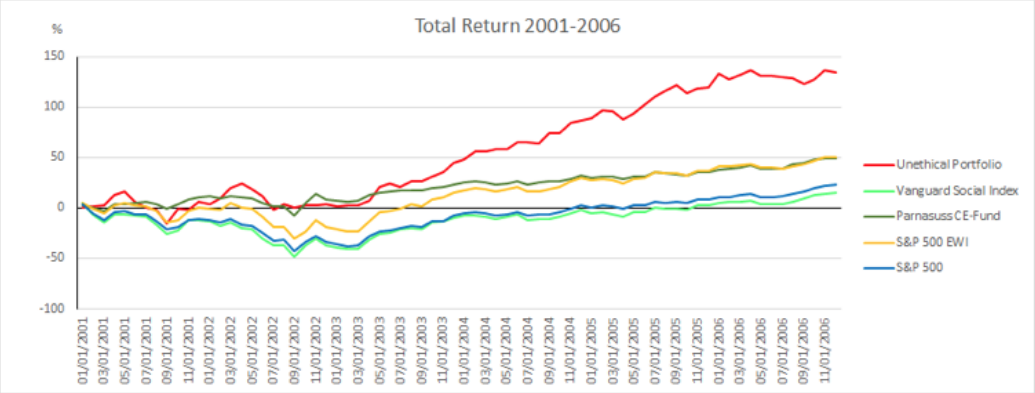


Table 5.3. Summary Statistic 2001-2006

	Obs	Mean	Std.dev	Min	Max	Sharpe Ratio
Unethical Portfolio	72	1,859	5,991	-14,099	14,881	0,274
Vanguard Social Index	72	0,215	4,593	-11,830	11,440	0,001
Parnassus CE-Fund	72	0,682	3,140	-9,160	12,240	0,150
S&P 500 EWI	72	1,335	4,670	-11,584	9,118	0,240
S&P 500	72	0,321	4,002	-10,858	8,793	0,027
Mean	72	0,882	4,479	-11,506	11,294	0,139
Median	72	0,682	4,593	-11,584	11,440	0,150

The summarized statistics are calculated from the monthly total return of the different portfolios. The Sharpe ratios are calculated using the monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill). All values are rounded to three decimal numbers.

Figure 5.3. Total Return 2010-2016

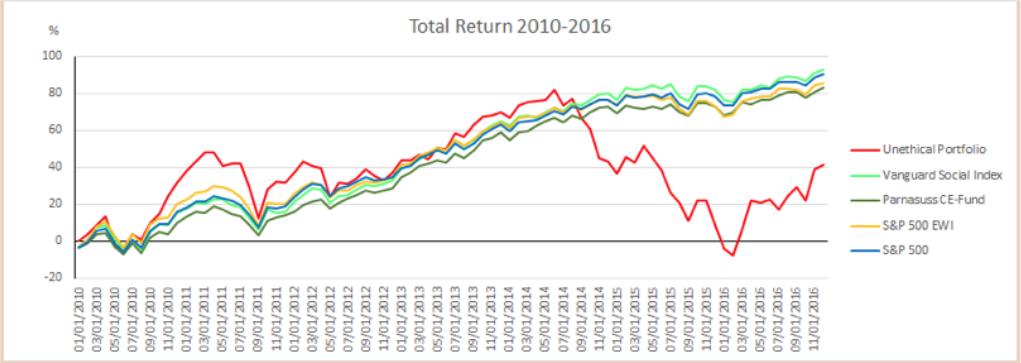


Table 5.4. Summary Statistic 2010-2016

	Obs	Mean	Std.dev	Min	Max	Sharpe Ratio
Unethical Portfolio	84	0,496	7,519	-16,315	16,918	0,065
Vanguard Social Index	84	1,102	3,850	-7,590	10,950	0,285
Parnassus CE-Fund	84	0,988	3,334	-7,660	8,760	0,295
S&P 500 EWI	84	3,563	12,186	-24,310	32,872	0,292
S&P 500	84	1,075	3,655	-7,977	10,919	0,293
Mean	84	1,445	6,109	-12,770	16,084	0,246
Median	84	1,075	3,850	-7,977	10,950	0,292

The summarized statistics are calculated from the monthly total return of the different portfolios. The Sharpe ratios are calculated using the monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill). All values are rounded to three decimal numbers.

Table 5.5. OLS-Regression Before and After the Financial Crisis

2001-2006	α	β_{MKT}	β_{SMB}	β_{HML}	β_{mom}	R^2	Obs
Unethical Portfolio							
CAPM	1,487**	0,812				0,311	72
	(0,014)	*(0,000)*					
Fama-French 3 factor	0,533	0,807***	0,759***	0,549**		0,470	72
	(0,347)	*(0,000)*	*(0,002)*	*(0,032)*			
Carhart 4 factor	0,608	0,975***	0,739***	0,372	0,234**	0,494	72
	(0,282)	*(0,000)*	*(0,003)*	*(0,169)*	*(0,029)*		
Vanguard Social Index							
CAPM	-0,212**	1,095***				0,966	72
	(0,036)	*(0,000)*					
Fama-French 3 factor	-0,016	1,076***	-0,107***	-0,151***		0,976	72
	(0,873)	*(0,000)*	*(0,001)*	*(0,000)*			
Carhart 4 factor	-0,026	1,052***	-0,104***	-0,126***	-0,033	0,977	72
	(0,795)	*(0,000)*	*(0,002)*	*(0,003)*	*(0,122)*		
Parnassus CE-Fund							
CAPM	0,338*	0,672***				0.780	72
	(0,053)	*(0,000)*					
Fama-French 3 factor	0,407*	0,665***	-0,040	-0,052		0.783	72
	(0,077)	*(0,000)*	*(0,637)*	*(0,665)*			
Carhart 4 factor	0,397*	0,643***	-0,037	-0,028	-0,032	0.784	72
	(0,098)	*(0,000)*	*(0,678)*	*(0,845)*	*(0,610)*		
2010-2016							
Unethical Portfolio							
CAPM	-1,078*	1,438***				0,529	84
	(0,071)	*(0,000)*					
Fama-French 3 factor	-0,934*	1,182***	0,676**	0,879***		0,633	84
	(0,091)	*(0,000)*	*(0,017)*	*(0,001)*			
Carhart 4 factor	-0,710	1,130***	0,741***	0,616**	-0,580***	0,683	84
	(0,186)	*(0,000)*	*(0,005)*	*(0,012)*	*(0,002)*		
Vanguard Social Index							
CAPM	0,006	0,999***				0,976	84
	(0,929)	*(0,000)*					
Fama-French 3 factor	-0,005	1,018***	-0,068**	-0,015		0,977	84
	(0.943)	*(0,000)*	*(0,031)*	*(0,575)*			
Carhart 4 factor	0,001	1,017***	-0,066**	-0,022	-0,016	0,978	84
	(0,989)	*(0,000)*	*(0,038)*	*(0,449)*	*(0,515)*		
Parnassus CE-Fund							
CAPM	0,071	0,837***				0,912	84
	(0,530)	*(0,000)*					
Fama-French 3 factor	0,046	0,875***	-0,148**	-0,015		0,920	84
	(0,666)	*(0,000)*	*(0,017)*	*(0,732)*			
Carhart 4 factor	0,023*	0,880***	-0,154	0,012	0,060	0,923	84
	(0,098)	*(0,000)*	*(0,678)*	*(0,845)*	*(0,610)*		

*The results are calculated using a robust OLS-regression with monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill) as the dependent variable and the factors according to CAPM, Fama-French three-factor model and Carhart four-factor model as the independent variable. The total return includes dividends reinvested. The values in parentheses are the p-value of the coefficients. All coefficients in the regression is rounded to three decimal numbers. *** 1%, ** 5% and * 10% significance.*

5.3 Robustness of Results

To determine the accuracy of the regression analysis a couple of diagnostic tests have been used. We started with the Durbin-Watson test, which is widely used in time series data and will generate a number that always lies between 0 and 4. The test indicates if there is any autocorrelation in the residuals. A number close to 2 indicates that there is no autocorrelation in the residuals, while there is positive autocorrelation if the number is closer to 0 and negative autocorrelation if it is closer to 4 (Durbin & Watson, 1951). One thing to keep in mind is that the Durbin-Watson test is biased for models with the autoregressive moving average which leads to an underestimation of the autocorrelation. For an unbiased statistic for large samples, we computed the Durbin h-statistic. By doing a Durbin-Watson test, we find that our data does not contain any autocorrelation. Thus, there is no need to adjust for when doing the regression analysis. We received a test-statistic of 1.977693.

By doing a Breusch-Pagan (BP) test we checked for heteroscedasticity, this is one of the most commonly used tests for checking if the data has a heteroscedastic error term. It works by allowing the heteroscedasticity to be a function of the independent variables and assumes that it is a linear function of those variables (Breusch & Pagan, 1979). By running the Breush-Pagan test in Stata, we received the chi-squared test result with a p-value of 0.0024 and therefor reject the null hypotheses of homoscedasticity, at a 10% & 5% & 1%-level of alpha. Consequently, we use robust in the regressions. Applying these heteroskedasticity-consistent standard errors does not change the main results of the paper. However, a downside of the (BP) test is that it considers the heteroscedasticity to be a linear function of the independent variables. So, if one fail to find clear evidence of heteroscedasticity with the BP test it may not rule out a nonlinear relationship between the independent variables and the variance in the error term.

Finally, we controlled the assumption of normality in the error terms distribution with the Jarque-Bera test. The test did reject the null, meaning that the error term has not a normally distributed error term. Even though this normality of error terms assumption, is an explicit assumption behind a model, it is also typically the least important one (Bera & Jarque, 1981). Therefore, we do not make any alterations to account for it.

Table 5.6. Robustness Check

	Unethical Portfolio		Vanguars Social Index		Parnasuss CE-Fund	
	Rejected	Not Rejected	Rejected	Not Rejected	Rejected	Not Rejected
Jarque-Bera test H0:Normally distributed error term	X		X		X	
Breusch-Pagan/Cook-Weisberg test H0 Homoscedasticity in residuals	X		X		X	
Durbin's alternative test H0 Autocorrelation in residuals	X		X		X	

Chapter 6

Discussion

The results shown in the previous chapter will here be analyzed and the reasons behind discussed. Particular attention will be brought to the definition of unethical stocks and the impact of including the oil/gas industry. Furthermore, a comparison with earlier findings and a discussion around the underlying theories will also be included.

6.1 Hypothesis I - Overall Performance

Through the evaluation process, we have tested the applicability of CAPM, Fama-French, and Carhart's factor models to determine if a selection of unethical stocks outperformed the SRI comparables and the market. By examining all factor models, we can find if the systematic risk and abnormal return in CAPM are attributed to other risk factors.

As expected, the unethical portfolio and S&P 500 EWI experience more volatility than the other comparables due to the equal weight of the stocks, reflecting the higher weight given to small-cap stocks, which generally are riskier than mid-cap or large-cap stocks. The results of the other factors in the regressions show that the unethical portfolio loads positively on the market factor (MKT), size factor (SMB) and value factor (HML) at a statistical significance level of 1%. Indicating that the portfolio is exposed to the risk represented in respective risk-factor. Overall, the unethical portfolio is largely exposed to systematic risk, skewed pronouncedly towards small-cap and value stocks. Consequently, the outperformance of the un-

ethical portfolio shown in the total return graph (Figure 5.1) is attributed to the higher required rate of return of the portfolio.

Meanwhile, Vanguard Social Index US has a similar exposure to systematic risk and loads negatively on the size factor (SMB) and momentum factor (MOM). For the Parnassus Core Equity Fund, the relevant factor model to consider is the CAPM due to the statistical insignificance of the other risk factors. The actively managed SRI fund has the lowest exposure to systematic risk and a positive alpha. In this research, it seems that the fund manager of Parnassus Core Equity Fund overcame the hurdle of statistical significance, thus showing evidence of skill when executing a SRI approach. Another thing to take notice of is the high predictability of the linear factor models for the return streams of Parnassus Core Equity Fund and Vanguard Social Index US, which means that almost all of the returns can be explained by the variables.

As previously mentioned, there should be no opportunity to obtain an abnormal return in a fully efficient market. Consequently, the alpha in every performance test should be indistinguishable from zero. The assumption of an efficient market holds true for the unethical stocks during the entire examined period with an insignificant alpha for all factor models, thus indistinguishable from zero. The same cannot be said about the other comparables in the regressions. Vanguard Social Index US experienced a negative monthly alpha of -0,119% with a p-value of 6,2%, thus underperforms the regression-based market benchmark according to the four-factor model. Comparably, Parnassus Core Equity Fund experienced a positive monthly alpha of 0,298% with a p-value of 0,3%. These findings suggest that the stock market for SRI is not entirely efficient and that it is possible to earn an abnormal return. The results of the OLS-regressions correspond with the Sharpe ratio results. The unethical portfolio has almost the same Sharpe ratio as the market while Vanguard Social Index US has a lower and Parnassus Core Equity Fund higher.

According to Kim and Venkatachalam (2011), the investors chose to neglect unethical stocks, despite them having both higher financial reporting quality and superior risk-adjusted returns, to match the norms of the society. Contrary to their assertion, our results show that Parnassus Core Equity Fund managed to outperform the market benchmark by 0,298% during the past 16 years, whereas

the unethical portfolio did not. Thus, suggesting that investors, could neglect unethical stocks in their portfolios and still not miss out on any abnormal return.

Moreover, Salaber (2009, p.12) showed that unethical stocks tend to outperform the market during a recession. The intuition behind this is that, even in economic pain, people still buy unethical company's products and services, due to their addictive properties. For example, tobacco, alcohol, gambling companies still have a group of core consumers. Thus, performing better during recessionary periods. Contrary to Salaber (2009, p.12), our results suggest otherwise. The high market beta of the unethical portfolio indicates a high market sensitivity and the total return falls with approximately 93.7% from the beginning of the crisis in April 2008 until it bottomed out in February 2009. Meanwhile, the S&P EWI, S&P 500, Parnassus Core Equity Fund and Vanguard Social Index US falls with 56%, 50%, 35,8% and 55,3% respectively.

6.2 Hypothesis II - Before and After the Financial Crises

As discussed previously, Hong and Kacperczyk (2009) presented evidence that potentially shunning US unethical stocks would lead to a noticeable effect on the expected return. Thus, more SRI will result in even higher abnormal returns than before. However, Angel and Rivoli (1997) argue that for Hong's and Kacperczyk's (2009) theory of neglection to be viable, the neglection has to be substantial and that there was more explanatory variables affecting the abnormal return. It was then supported by Salaber's (2009) research in the European market with religion, taxation and litigation risk affecting the abnormal return in addition to the neglection effect.

In our study, we look at this phenomena by examining the different time periods prior and post the global financial crisis. If we dig deeper into the different periods (2001-2006 and 2010-2016), we experienced mixed results. The results presented in this study suggests that the unethical portfolio outperforms the market and SRI-comparables during the six years before the global crisis, both when it comes to Sharpe ratio and alpha in the CAPM. However, when observing the multifactor

models, the Alpha is still positive, but becomes insignificant and attributed to other risk factors. For the post-financial crisis period, the abnormal return is negative and statistically significant for the CAPM and three-factor model, making it worst among the comparables. By looking at the graphs and regression tables corresponding to each period (Figure 5.2 & 5.3), the expected abnormal return decreased in the second period while SRI increased (Figure 1.1). Indicating the opposite of the evidence Hong and Kacperczyk (2009) presented and more in line with those of Angel and Rivoli (1997), and Salaber (2009). One reason for this is that our approach includes the oil/gas and defense industry, making the return more sensitive to political policy changes and the economic cycles. It cannot be ignored, that the US changed governing political party from republican to democrat between the two time-periods, while SRI gained in popularity (Whitehouse, 2017). Making political policies like taxation, litigation risk in addition to oil-related factors the main suspects to the cause of decreasing alpha in the unethical portfolio for the post-crisis period.

6.3 General Discussion

Comparing our results with Salaber (2009), Hong and Kacperczyk (2009), and other previous studies, we find the results from our sample to be substantially different from what has been concluded by them. The contradictory results are probably due to the differences in definitions of unethical industries, period, portfolio constructions and approach. To make our research more comprehensive, we also conducted a regression with S&P 500 EWI as the benchmark index, as stated before (Appendix A, tables A.1 A.2). The regression shows very similar results as the one conducted with the market-cap weighted benchmark, but with lower statistical significance.

In this study, we the included oil/gas industry which also is the main difference between our study and the already existing literature on the performance of unethical stocks in the US. The inclusion of oil/gas companies, which are very sensitive to the economic cycle of the overall market, tend to impact the performance of the unethical portfolio substantially, making it more volatile over time. Hence, the poorly performance during the latest recession.

The numerous oil/gas companies included makes the performance of the unethical portfolio strongly affected by oil prices. The correlation between the portfolio and the price of crude oil is 0.58 (Appendix, figure B.2). None of the other comparables are nearly as correlated to the crude oil price. It explains the sudden decline in returns, during the post-crisis period, for the unethical portfolio which happened simultaneously as the drop in oil prices 2014 (The Economist, 2014). Like other commodities, the oil price is partly determined by supply, demand and market sentiment. The energy demand is strongly affected by economic activity and the supply by actions of major producers and geopolitical risk. There were many factors that caused the drop in oil prices in 2014 (The Economist, 2014). The economic activity was low and technological advances made some demand shift to alternative energy sources. Additionally, through technological advances companies discovered new, more efficient ways to produce, for example, fracking, which then made the US the largest oil producer in the world (Zimpleman, 2015). Though they are not exporting, their imports have decreased substantially, creating a vacuum in the demand and an oversupply. Furthermore, the Organization of Petroleum Exporting Countries (OPEC) with Saudi Arabia in focus, did not want to lose market share to restore the price. Thereby OPEC failed to agree on withholding some of the supply and instead continued with their usual quantity of production (The Economist, 2014). These factors, in combination with a strong dollar, was the cause of the drop in prices in 2014, hence, also, the unethical portfolio.

To test the unethical portfolio's sensitivity to oil/gas, we recreated the results of the unethical portfolio in the absence of those companies which are presented in the appendix (Table B.2). When doing so, the results are in line with those of previous studies, with the unethical portfolio clearly outperforming the market and the comparables throughout all periods. Specifically, with an alpha of 0.492%** for the entire period, 0,757%* for 2001-2006, and 1,485%*** for 2010-2016. The contradictory results prove the fact that the under-performance of the unethical portfolio after the financial crisis is solely due to the oil/gas industry. The post-crisis period could be influenced by a potential "catching up" effect, which in that case is more prevalent for all indexes than the unethical portfolio according to the graph (Appendix B, Figure B.3). Despite that, the unethical portfolio, with

oil/gas excluded, still performed better than the comparables between 2010-2016. It supports the view of advocates for unethical investments, that alcohol, tobacco, gambling, and defense industries are profitable for investors. The rationale is that these unethical industries have high entry barriers, many large multinational companies, and a steady demand of their high-margin products/services regardless of economic conditions (Dimson, Marsh, Staunton, Holland, Matthews, & Rath, 2015). Furthermore, the results confirm that the findings of Salaber (2009, p.12) hold true even in the US market.

Additionally, Hong and Kacperczyk (2009) used Fama's and French's (1997) own industry classification of stocks based on their SIC codes. Meanwhile, we used the ICB classification system which can make a difference when screening. Furthermore, the regressions they conducted of their unethical portfolio return was in excess of a comparable portfolio's return as the independent variable. The comparable portfolio consisted of stocks that belonged to Fama-French (1997) industry groups 2(food), 3(soda), 7(fun) and 43(meals and hotel), which was the comparables to the unethical industries alcohol, tobacco and gambling. Instead of pairing the unethical industries with comparable sectors, we chose to compare our unethical portfolio returns separately against one SRI fund and index. Therefore, the approach we conducted is to research the effectiveness of a passively managed SRI screening (Vanguard Social Index) and actively managed SRI screening (Parnassus Core Equity Fund) compared to our unethical portfolio, rather than the neglection effects on unethical stocks as Hong and Kacperczyk (2009) did. Thus it incorporates the far-reaching effects of SRI.

Through the prior conclusion that the market is not fully efficient due to the existence of abnormal returns, the attention is directed towards the semi-strong market efficiency. Here abnormal returns are only possible by the use of insider information. Yet, we obtained abnormal returns solely through the screening process conducted with public information (Appendix B, Table B.2). Hence, supported by previous literature and our results, we can draw the conclusion that the abnormal returns must be generated by something else and the market is not semi-strong efficient. Consequently, if we do not have a strong or semi-strong efficiency market, we must be in the spectrum for a weak efficient market.

In this paper, we examine historical data for different time periods. However,

the truth of the matter is that past performances do not predict future performances. Even if we found statistically significant alpha, it may not persist over time. In an ever changing economic environment, it is challenging to anticipate the future even with an abundance of historical data.

There is an argument to be made that hypothesis II needs more historical data to prove the performance of our comparables. The nature of statistics makes it hard to obtain any significance if there are not a plethora of data. However, since the global financial crises happened fairly recently, there are a limited number of observations for the post-crises period. Furthermore, SRI funds and indexes had not made a breakthrough until the 21st-century making the data availability limited for the prior-crises period in Bloomberg Terminal. The problem is evident when looking at the alpha of the regressions for hypothesis II (Table 5.5). Even though some estimates may not be statistically significant, it can give some indication of the skewness of the estimates.

Chapter 7

Conclusion

In this last chapter, we will conclude if unethical investment strategy is a superior strategy and answer our research questions by summarizing the results. Following is our thoughts on how to further examine the performance of unethical stock.

Previous academic literature shows that unethical stocks are recession-resistant, profitable business fields, and cash-flow stable. Furthermore, due to societal norms, public investors, as mutual funds, pension funds, and other institutions chose to neglect these unethical companies at an excessive rate. In this thesis, we set out to investigate if an unethical investment strategy in the US is a superior strategy in the 21st-century and consequently if there is an disadvantage for SRI to neglect unethical stocks. Furthermore, if the increased SRI has impacted the unethical stock performance.

What separates our study from previous work is that we included a different, broader, definition of unethical industries. Therefore, presenting a different combination of unethical stocks that before have not been of main interest. By also including the periods beyond those of previous studies, we provide updated empirical evidence of unethical stock performance in the US.

Though it had seemed like a financial mistake to neglect unethical stocks in previous years, our study presents evidence that suggests it to be a close call between the unethical portfolio, the market, and other SRI comparables. The mixed results, with Vanguard Social Index US having the lowest risk-adjusted return and Parnassus Core Equity Fund having the highest throughout the period,

suggest that it is possible to earn both a positive and negative abnormal return when pursuing an SRI strategy, which is not a conclusive result.

On a risk-adjusted basis, and with the original constraints of the unethical portfolio, we are not able to find evidence of an abnormal return with statistical significance from 2001-2016. Likewise, the Sharpe ratio showed the same results. Hence, we cannot reject the null hypothesis (H0,a)– that the unethical portfolio does not outperform the market index, Vanguard Social Index US and Parnassus Core Equity Fund regarding return and risk. Meaning that the unethical portfolio did not yield any return over the required rate of return at a statistically significant level during the past 16 years. Hence, the conclusion that our unethical investment strategy had not been the superior strategy so far in the 21st-century and that a rational investor should be indifferent between investing in our unethical portfolio and a market index. Thus, there is no loss in neglecting the unethical stocks, and the increasing SRI seems to be driven by, not only personal values, but by the added social welfare to all stakeholders in addition to financial gains.

For Hypothesis II, we reject the null hypothesis that the unethical portfolio yields the same abnormal return post-crisis as prior. The results suggest that our unethical investment strategy outperforms the other comparables before the global financial crisis, and underperforms after. The trend of SRI is positive and closely following the market, while the trend for our unethical portfolio is the reversed for the post-crisis period. Though it may not have overcome the hurdle of statistical significance in the four-factor model, the aggregated results from 2010-2016 indicate a downward trend for unethical stocks in this particular unethical stock combination. Suggesting that the influx of SRI in recent years (Figure 1.1) is financially motivated.

Contrary to our conclusion, previous literature has shown the superiority of unethical stocks in the US. However, when changing the unethical definition and excluding the oil/gas industry from the unethical portfolio, it outperforms all comparables by a substantial margin (Table B.2). Hence, the conclusion that the bad performance of the unethical portfolio is solely due to the oil/gas industry. It also shows that the market is not entirely efficient and that Fama's Efficient Market Hypothesis does not hold for the two strongest forms of efficiency.

7.1 Further Research

As mentioned before, the definition of an unethical business is in a constant state of fluctuation. What we consider unethical is very different, depending on location, religion, period, etc. The next generations to come might not perceive the same industries as unethical. Hence, the continuous changes in the definition, we find it essential to keep updating this field of subject through time. Findings in this study contradict the earlier study of Salaber (2007) in the European market showing that an unethical portfolio performs better than comparable indexes during a recession. Therefore, a thorough investigation on the behavior of unethical stocks including oil/gas during recessions in the European market would be interesting to study.

Furthermore, an extended version of this research can be conducted in the future beyond our time period and compared against more SRI indexes/Funds to comprehensively research effectiveness of SRI. It would also be interesting to include an existing unethical fund, for example, Vice Fund, to compare with an actively managed unethical investment strategy.

Appendix A

A.1 Regression Against S&P 500 EWI

Table A.1. Regression Against S&P 500 EWI Entire Period

2001-2016	α	β_{MKT}	β_{SMB}	β_{HML}	β_{mom}	R^2	Obs
Unethical Portfolio							
CAPM	0,218	1,52***				0,535	192
	(0,581)	*(0,000)*					
Fama-French 3 factor	0,014	1,001***	0,580***	0,333*		0,577	192
	(0,970)	*(0,000)*	*(0,002)*	*(0,053)*			
Carhart 4 factor	0,002	1,031***	0,576***	0,329*	0,036	0,577	192
	(0,996)	*(0,000)*	*(0,003)*	*(0,058)*	*(0,735)*		
Vanguard Social Index							
CAPM	-0,170*	0,939***				0,927	192
	(0,081)	*(0,000)*					
Fama-French 3 factor	-0,097	0,988***	-0,185***	-1,148**		0,941	192
	(0,269)	*(0,000)*	*(0,000)*	*(0,023)*			
Carhart 4 factor	-0,092	0,979***	-0,183***	-0,147**	-0,014	0,941	192
	(0,303)	*(0,000)*	*(0,000)*	*(0,021)*	*(0,652)*		
Parnassus CE-Fund							
CAPM	0,287***	0,677***				0,873	192
	(0,005)	*(0,000)*					
Fama-French 3 factor	0,336***	0,710***	-0,131***	-0,092*		0,864	192
	(0,001)	*(0,000)*	*(0,010)*	*(0,060)*			
Carhart 4 factor	0,313***	0,752***	-0,139***	-0,098**	0,069***	0,871	192
	(0,002)	*(0,000)*	*(0,007)*	*(0,042)*	*(0,002)*		

*The results are calculated using a robust OLS-regression with monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill) as the dependent variable and the factors according to CAPM, Fama-French three-factor model and Carhart four-factor model as the independent variable from 2001 to 2016. The total return includes dividends reinvested. The values in parentheses are the p-value of the coefficients. All coefficients in the regression is rounded to three decimal numbers. *** 1%, ** 5% and * 10% significance.*

Table A.2. Regression against S&P 500 EWI Before and After the Financial Crisis

2001-2006	α	β_{MKT}	β_{SMB}	β_{HML}	β_{mom}	R^2	Obs
Unethical Portfolio							
CAPM	0,612	0,922***				0,535	72
	(0,220)	*(0,000)*					
Fama-French 3 factor	0,333	0,808***	0,456*	0,116		0,554	72
	(0,529)	*(0,000)*	*(0,068)*	*(0,568)*			
Carhart 4 factor	0,371	0,857***	0,438*	-0,014	0,113	0,561	72
	(0,487)	*(0,000)*	*(0,079)*	*(0,955)*	*(0,229)*		
Vanguard Social Index							
CAPM	-0,884**	0,789***				0,645	72
	(0,012)	*(0,000)*					
Fama-French 3 factor	-0,122	0,839***	-0,352***	-0,730**		0,840	72
	(0,636)	*(0,000)*	*(0,000)*	*(0,000)*			
Carhart 4 factor	-0,198	0,742***	-0,315***	-0,472**	-0,226	0,887	72
	(0,407)	*(0,000)*	*(0,001)*	*(0,000)*	*(0,00)*		
Parnassus CE-Fund							
CAPM	-0,090	0,498***				0,552	72
	(0,722)	*(0,000)*					
Fama-French 3 factor	0,337	0,526***	-0,196*	-0,410***		0,684	72
	(0,254)	*(0,000)*	*(0,076)*	*(0,005)*			
Carhart 4 factor	0,288	0,463***	-0,172	-0,243	-0,146**	0,726	72
	(0,338)	*(0,000)*	*(0,145)*	*(0,147)*	*(0,022)*		
2010-2016							
Unethical Portfolio							
CAPM	-1,096*	0,446***				0,522	84
	(0,062)	*(0,000)*					
Fama-French 3 factor	-0,947*	0,366***	0,654**	0,894***		0,626	84
	(0,077)	*(0,000)*	*(0,021)*	*(0,001)*			
Carhart 4 factor	-0,733	0,340***	0,735***	0,701***	-0,430**	0,653	84
	(0,181)	*(0,000)*	*(0,008)*	*(0,007)*	*(0,024)*		
Vanguard Social Index							
CAPM	0,0414	0,297***				0,882	84
	(0,773)	*(0,000)*					
Fama-French 3 factor	0,032	0,301***	-0,053	0,008		0,883	84
	(0,822)	*(0,000)*	*(0,479)*	*(0,934)*			
Carhart 4 factor	-0,028	0,308***	-0,076	0,060	0,121**	0,891	84
	(0,849)	*(0,000)*	*(0,300)*	*(0,529)*	*(0,028)*		
Parnassus CE-Fund							
CAPM	0,099	0,249***				0,826	84
	(0,530)	*(0,000)*					
Fama-French 3 factor	0,075	0,259***	-0,137*	0,003		0,833	84
	(0,631)	*(0,000)*	*(0,078)*	*(0,968)*			
Carhart 4 factor	-0,016	0,270***	-0,172**	0,081	0,181***	0,857	84
	(0,920)	*(0,000)*	*(0,030)*	*(0,330)*	*(0,000)*		

*The results are calculated using a robust OLS-regression with monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill) as the dependent variable and the factors according to CAPM, Fama-French three-factor model and Carhart four-factor model as the independent variable. The total return includes dividends reinvested. The values in parentheses are the p-value of the coefficients. All coefficients in the regression is rounded to three decimal numbers. *** 1%, ** 5% and * 10% significance.*

Appendix B

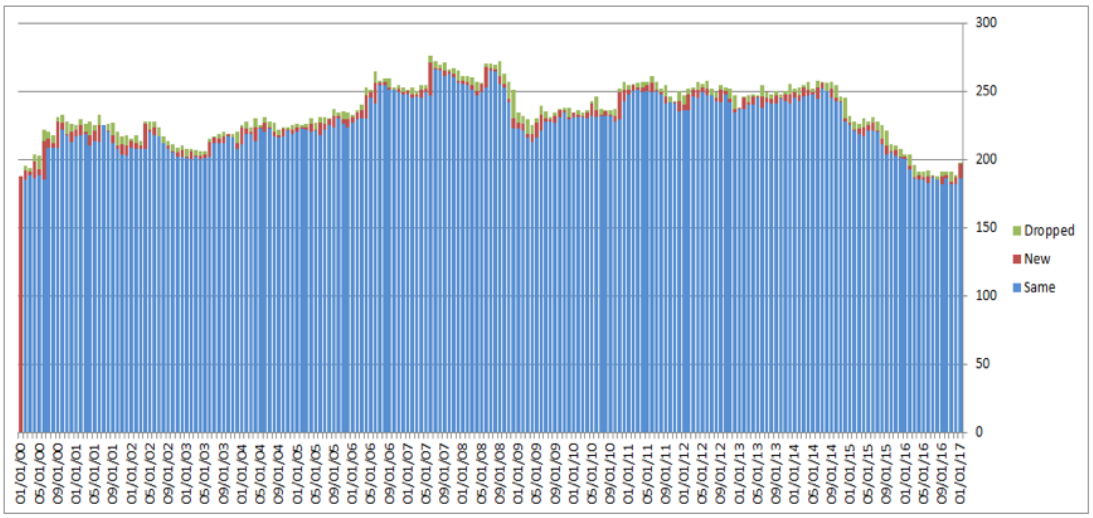
B.1 Companies in Portfolio 2016

Table B.1. Top 10 Market Cap in the Portfolio 2016

Company	Market Cap ($)
EXXON MOBIL CORP	361 757 540 352
CHEVRON CORP	213 865 381 888
ALTRIA GROUP INC	122 652 524 544
SCHLUMBERGER LTD	117 718 605 824
LOCKHEED MARTIN	78 049 165 312
REYNOLDS AMERICA	76 935 536 640
EOG RESOURCES	60 383 944 704
CONOCOPHILLIPS	59 745 902 592
OCCIDENTAL PETE	54 463 713 280
GENERAL DYNAMICS	53 717 250 048
LAS VEGAS SANDS	49 420 288 000

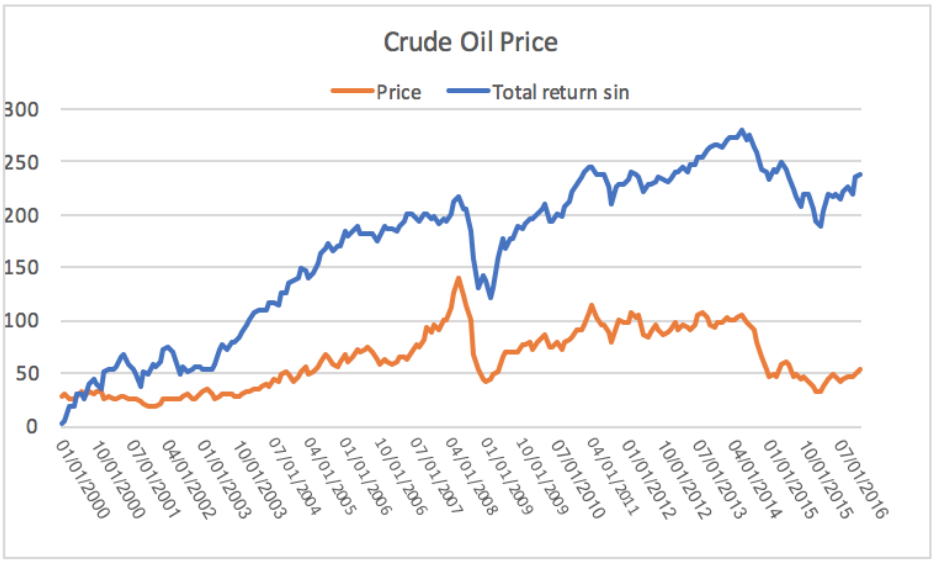
B.2 Monthly Stock Amount In Portfolio

Figure B.1. Monthly Rebalances Of The Unethical Portfolio



B.3 Oil Correlation

Figure B.2. Oilprice vs Unethical Portfolio



B.4 Excluding Oil/Gas

Table B.2. Unethical Portfolio Excluded Oil/Gas Industry

2001-2016	α	β_{MKT}	β_{SMB}	β_{HML}	β_{mom}	R^2	Obs
Unethical Portfolio							
CAPM	0,714***	1,042***				0,586	192
	(0,010)	*(0,000)*					
Fama-French 3 factor	0,454**	0,897***	0,700***	0,354***		0,694	192
	(0,047)	*(0,000)*	*(0,000)*	*(0,000)*			
Carhart 4 factor	0,492**	0,834***	0,698***	0,352***	-0,111	0,702	192
	(0,033)	*(0,000)*	*(0,000)*	*(0,000)*	*(0,217)*		
2001-2006							
CAPM	1,546***	0,814***				0,454	72
	(0,001)	*(0,000)*					
Fama-French 3 factor	0,729*	0,767***	0,752***	0,391***		0,651	72
	(0,078)	*(0,000)*	*(0,000)*	*(0,004)*			
Carhart 4 factor	0,757*	0,828***	0,744***	0,326**	0,086	0,656	72
	(0,069)	*(0,000)*	*(0,000)*	*(0,040)*	*(0,471)*		
2010-2016							
CAPM	1,483***	-0,091				0,005	84
	(0,009)	*(0,499)*					
Fama-French 3 factor	1,539***	-0,173	0,370	-0,090		0,0,030	84
	(0,007)	*(0,257)*	*(0,194)*	*(0,744)*			
Carhart 4 factor	1,485***	-0,161	0,355	-0,027	0,139	0,037	84
	(0,009)	*(0,307)*	*(0,217)*	*(0,924)*	*(0,461)*		

*The results are calculated using a robust OLS-regression with monthly total return of the portfolio in excess of the risk-free rate (one month US Treasury bill) as the dependent variable and the factors according to CAPM, Fama-French three-factor model and Carhart four-factor model as the independent variable. The total return includes dividends reinvested. The values in parentheses are the p-value of the coefficients. All coefficients in the regression is rounded to three decimal numbers. *** 1%, ** 5% and * 10% significance.*

Figure B.3. Exclusion of oil/gas 2001-2016

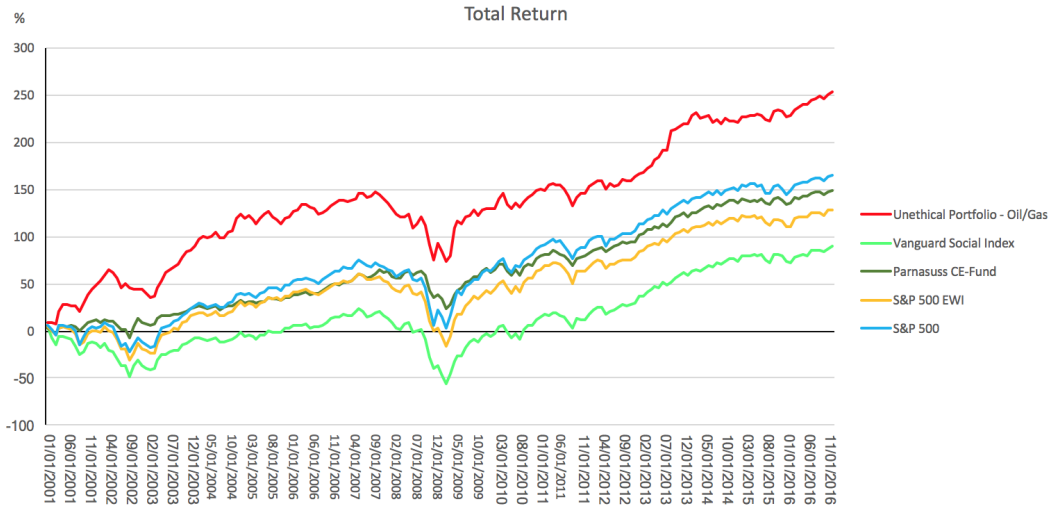


Figure B.4. Exclusion of oil/gas 2001-2006

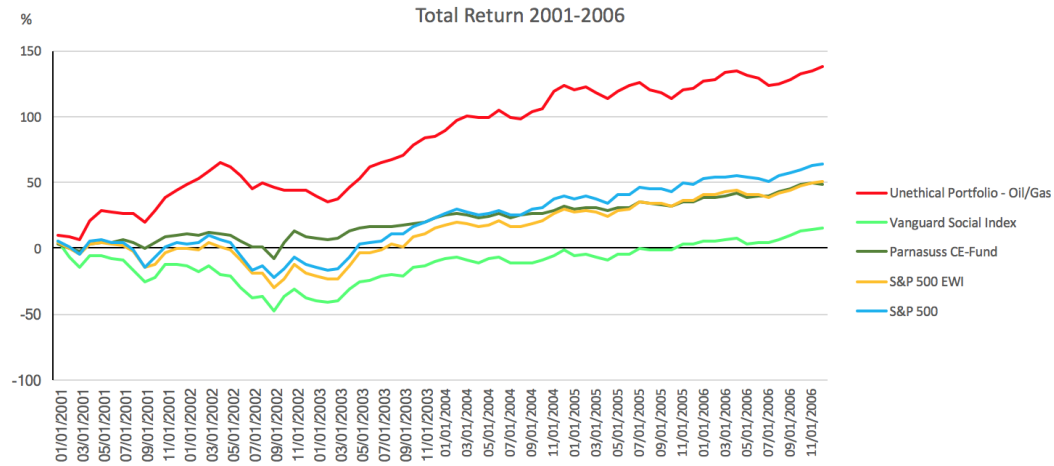
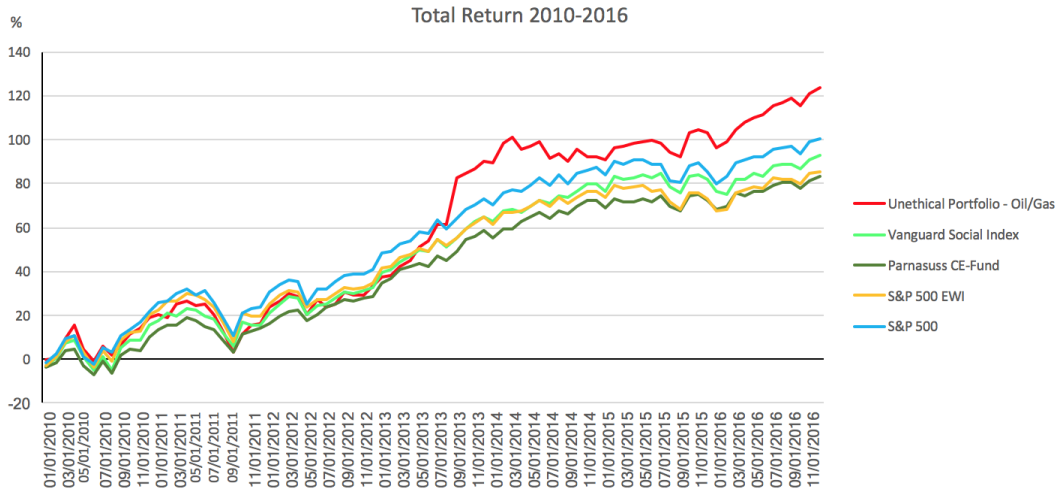


Figure B.5. Exclusion of oil/gas 2010-2016



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