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THE EFFECTS OF SOCIAL SCREENING ON PORTFOLIO PERFORMANCE

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ABSTRACT

Socially responsible investing (SRI) is the fastest growing investment trend in the world and it has been extensively studied in the past decades. Most scholars have studied the phenomenon in the context of the modern portfolio theory, some have sought different approaches. However a vast majority of the studies have concentrated on professionally managed funds and indices. For this study the socially responsible portfolios are created on purely ethical grounds by disregarding all financial indicators. The practice of social screening is also inspected thoroughly in order to find out at which point the screening stringency starts to limit the performance of the investment.

The effect of social screening is studied though a set of socially responsible portfolios. The portfolios are based on a company specific ethical score which is provided by Covalence, an independent Swiss research company. The portfolios are constructed so that they reflect different levels of screening stringency. The portfolios are then subjected to performance analysis, more specifically risk and return indicators, regression analysis and risk-adjusted performance metrics. The effect of industries is also investigated. The observation period is divided into distinctive periods in terms of market cycles in order to find out whether the results differ in bull and bear markets.

The results are very much consistent with previous studies in the bull market. Although some SRI portfolios performed better than the market based on risk-adjusted metrics, none of the results were significant. However the unethical companies were able to beat the market with significance. Overall the results from period 1 support prior evidence. However there are some anomalies which occur in the midst of the financial crisis in period 2. All portfolios seem to behave differently in terms of SMB and HML –factors of the Fama-French model. None of the regression coefficient proved significant but the worst performers of period 1 seemed to be the best in period 2. The industries do not seem to have important effect, though the ones which have low ethical scores have also the lowest correlation with SRI portfolios. The results also conclusively indicate that after a certain point the level of risk rises at an accelerating rate when more screening is imposed. Nonetheless the empirical evidence indicates that SRI should not lead to a direct performance penalty, and should therefore be regarded as a viable option for any investor.

KEYWORDS: Socially Responsible investing, Social Screening, Portfolio Performance, Economic Cycles.

1. INTRODUCTION

For the past decades the world has undergone remarkable developments in technology, distribution of information and globalization, just to mention a few. This has consequently led to a growing social awareness for people, which in turn has affected all aspects of the modern society. Even the quintessential purpose of a company is questioned. Investors in growing numbers have started taking social responsibility into account when making investment decisions, although, from a theoretical perspective, this is considered irrational behavior. Today socially responsible investing (SRI) is the fastest growing investment trend in the world. The Social Investment Forum (2010) estimates that in the United States roughly 12.2 percent of assets under professional management, are now involved in SRI. In other words, nearly one out of every eight dollars is invested in a socially responsible manner. Although there is no single minded determination of what is considered socially responsible investing, it can roughly be defined as an investment process that integrates personal values and societal concerns into decision-making.

Socially responsible investing, however, is not a form of philanthropy. The most common form of socially responsible investing is social screening in which possible investment opportunities are valued according to their positive and negative effects in respect to social responsibility. The premise of SRI is that investors do no longer need to separate good fortune from good will. However, the problem often associated with SRI is that in theory it should be financially disadvantageous for investors. The reason for this lies in the restricted universe of investment opportunities. According to the modern portfolio theory, any limitation in absolute diversification leads to a suboptimal portfolio. Therefore the best possible risk-return relationship can never be achieved. (Markowitz 1952.) Other theories imply that social responsibility can give a company competitive advantage, which would evidently have a positive effect on stock performance (Wagner, Schaltegger & Wehrmeyer 2001). Arbitrage pricing theorists suggest that the suboptimal portfolio can be corrected if the factor sensitivities are adjusted to correspond to those of the benchmark. In other words modern quantitative tools allow investors to change the composition of nearly any investment portfolio so that its movements mimic a selected benchmark. (Roll & Ross 1980; Kurtz 2005.) One other concern regarding socially responsible investing is towards the screening process itself. The use of exclusionary screens is questioned because many of the excluded companies and industries have special characteristics that may have an

appreciating effect on stock returns. Due to their unethical reputation they also tend to suffer from neglect by several marker participants, which may cause them to be undervalued. (Merton 1987; Hong & Kacperczyk 2009.) Due to a somewhat interdisciplinary nature of the social screening process, it has also provoked conceptual and methodological scrutiny by scholars and investment professionals.

Nevertheless, the phenomenon has been widely investigated since the early 90's from several different perspectives. Although there has been dispersion in the findings, the most common outcome suggests that socially responsible investing should not lead to performance penalty, nor should it produce higher than average returns (e.g. Hamilton, Jo & Statman 1993; Sauer 1997; Lobe, Rothmeier & Walkshäusl 2009). This conflict between theory and practice has intrigued scholars and many have attempted to find out why it is so. Several studies reveal that SRI portfolios are tilted towards growth stocks and empirical evidence suggest that value stock tend to outperform growth stocks in the long run. Abramson & Chung (2000) were able to demonstrate that a value subset of socially responsible stocks was able to outperform the market. Also the selected approach on social screening seems to have an effect. Screening out unethical or "sin" stocks tends to have a depreciating effect on the portfolio (Hong & Kacperczyk 2009; Kim & Venkatachalam 2006), while picking out strong ethical performers seems to boost the portfolio performance (Barnett & Salomon 2006; Statman & Glushkov 2009). The overview of these studies along with other related literature is presented in Chapter 4. Altogether, socially responsible investing is a multi-dimensional phenomenon and this study attempts to approach it from a new and fresh perspective.

1.1 Motivation

Socially responsible investing has become the fastest growing trend in investing, especially in the US, and the phenomenon has been extensively studied during the last two decades. Most of the studies have examined the performance of professionally managed funds and indices. However professionally managed funds always take financial aspects into consideration. Many indices, then again, select companies using "best in class" ratings, which means that for instance tobacco and alcohol companies may be accepted in the index if they have reputable CSR-standards. Therefore neither of them show the performance of companies selected on purely ethical grounds.

The premise for this study is the article *Answers to Four Questions* (2005) by Lloyd Kurtz, where he discusses different issues regarding socially responsible investing. Among other things Kurtz hypothesizes in his article that the more stringent the social screens are, the greater the tracking error will become. The expected relationship between screening stringency and tracking error is visualized in figure 1 For investors it would be important to find out at which point the degree of tracking error per unit of social stringency begins to accelerate (Point A). Kurtz also notes that such a study has not yet been conducted.

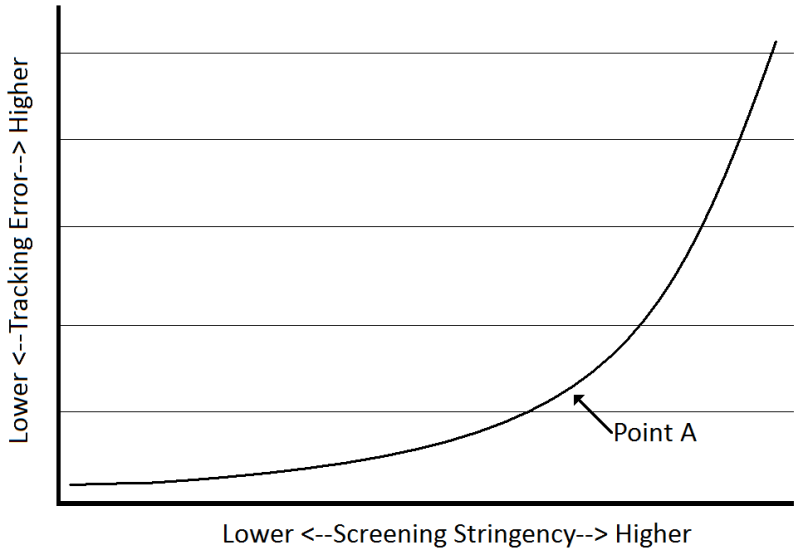

Figure 1. Notional Impact of Stringency on Tracking Error. (Kurtz 2005)

Studying the effects of screening stringency is evidently the primary basis for the study, but there are also other issues that have been partly neglected in the field of socially responsible investing. Copp, Kremmer and Roca (2010) find that SRI-indices outperformed their benchmarks in a downturn although they became riskier. Interestingly enough Hong & Kacperczyk (2009) find that also unethical investments perform exceptionally well in downturns, but other than these finding, there is little empirical evidence on the matter. Therefore the relationship between market cycles and SRI is another point of interest in the study. Equally the effect of industries on SRI has been disregarded in prior literature. It would be interesting to find out how sensitive SRI portfolios are with respect to different industries and how ethical these

industries are. Combining these elements we may find new and relevant information regarding the field of socially responsible investing.

1.2 The purpose of the study and research hypotheses

The fundamental purpose of the study is to investigate the performance of portfolios selected on purely ethical grounds by disregarding all financial indicators. The performance of the portfolios is measured with different indicators starting from the underlying elements of risk and return. Screening plays also an important role in the study, therefore several socially responsible portfolios are constructed to reflect different levels of screening stringency. The objective for this approach is the attempt to find out how much screening effects the risk and return of a portfolio and at which point the lack of diversification becomes unbearable for an investor. Also an unethical portfolio is constructed to monitor the possible effects of negative screening and the performance of an opposing investment strategy. In order to further extend the study, socially responsible standings of different industries and the possible industry-related sensitivities of the portfolios are also investigated.

The study is limited to cover the US stock market for a period of 9 years. The ethical scores, which are the basis for the portfolios, are provided by Covalence, an independent Swiss research company. The data directly imposes some restrictions on the study. The ethical reputation score is available from 2002 onwards, therefore the time period for the study extends from 2002 to 2010. The period is then divided into two sub-periods to characterize different market cycles. The total sample provided by Covalence consists of nearly 600 multinational companies from all over the world. However, only the 240 companies based in the United States are selected from the sample. The stock market data for the selected companies does not fully correspond to the data provided by Covalence, therefore the final sample consists of 236 US companies. The applied research methods have been selected due to their popularity and functionality in similar studies. It was also decided to limit the study only to the stock market performance and not to include performance figures from the balance sheet and income statement.

The hypotheses are formulated from financial theory and previous empirical findings regarding socially responsible investing. The first research hypothesis regarding SRI performance has two dimensions, theoretical and empirical. From a theoretical

perspective social screening limits the universe of possible investments and it therefore should have a depreciating effect on the portfolio performance. Hence, based on the modern portfolio theory the first hypothesis is as follows:

> $H1_A$: Socially responsible investments underperform in comparison to the market and other well diversified portfolios.

However a vast majority of studies that have studied SRI suggest that such underperformance does not occur. Therefore based on the empirical evidence the alternative hypothesis is as follows:

> $H1_B$: The performance of socially responsible investments does not differ from the performance of conventional investments.

The second hypothesis is derived from Kurtz's (2005) reflections on the notional impact of screening stringency on tracking error. However, there are several ways to indicate the riskiness of a portfolio. From the perspective of the modern portfolio theory, the volatility of a portfolio is important risk factor. Inadequate diversification should particularly impact the riskiness of a portfolio, hence, the second hypothesis is as follows:

> $H2$: An intensifying screening stringency leads to a greater level of portfolio risk

The third hypothesis is linked to the undesirable implications of exclusionary screening. Kim and Venkatachalam (2006) and Hong and Kacperczyk (2009) discovered that a portfolio consisting of "sin" stocks outperforms the market. Although the approach in constructing the unethical portfolio differs from previous studies, we may assume that portfolio companies suffer from the same market neglect, which is supposedly the attribute for excess returns.

> $H3$: The unethical portfolio outperforms the market.

The fourth hypothesis is related to the relationship between SRI portfolios and industries. This connection has not been studied before, therefore the hypothesis cannot be directly derived from empirical evidence. Certainly there will be differences in how well different industries perform on ethical grounds. Specific industries such as tobacco, alcohol and weapons industries will undoubtedly be subjected to negative media exposure, which evidently effects their ethical reputation. However when it comes to broader industry specifications, it will be interesting to find which ones stand

out for better and for worse and how they correlate with SRI portfolios. From this stand point we can draw the last hypothesis:

> $H4$: Industries with poor ethical scores have a lower correlation with SRI portfolios

1.3 The structure of the thesis

The thesis is comprised of two major parts including a theoretical and an empirical. The first Chapter presents a brief description of the topic and lays out the research problem. In Chapter 2, the phenomenon of socially responsible investing is introduced. The concept of screening is more thoroughly presented due to its importance regarding the study. Chapter 3 provides an insight to the theoretical background concerning socially responsible investing. In order to cover the background for the research, important studies that have been previously conducted on this field of studies are presented in Chapter 4. The empirical part of the study starts in Chapter 5 with a description of the data and how it has been utilized. Chapter 6 describes the selected empirical methods with detail. In chapter 7, findings of the thesis are discussed with rigor and the hypotheses are either rejected or accepted. Finally Chapter 8 summarizes the findings and concludes with suggestions for further research.

2. SOCIALLY RESPONSIBLE INVESTING

Social investment forum (2005), the most prominent nonprofit membership association dedicated to advancing the practice and growth of socially responsible investing describes socially responsible investing as “an investment process that considers the social and environmental consequences of investments, both positive and negative, within the context of rigorous financial analysis.” Steve Schueth (2003) defines SRI as “the process of integrating personal values and societal concerns into investment decision-making”. (Social Investment Forum 2005; Schueth 2003; Kurtz 2005.)

Although many critics of SRI believe it to be a passing fad, it has not faded during the latest recession. The fact is that it gained popularity with both institutional and individual investors. In part, this may be due to the outperformance of professionally managed SRI investments compared to conventional ones. During 2008 – 2009 S&P companies had a fairly flat growth while SRI assets grew by 13%. Not only did their performance remain steady, the asset size also grew and more money managers started adopting SRI approaches. Social investment forum (SIF) indicates that the value of assets under management directed to SRI grew from 2,7 trillion in 2006 to 3,1 trillion by then end of 2009. Although SRI has traditionally had a strong involvement in Public Pension Funds and Mutual Funds, also Exchange Traded Funds (ETF), which are currently the fastest growing area of all investment vehicles, have started adopting SRI standards. (Boerner 2011.)

In this Chapter we will take a closer look at socially responsible investing. First the origins of the phenomenon are investigated from the first known socially responsible investments until the immense growth of the last decades. The different strategies regarding SRI are presented next, but the focus is on one particular strategy. The practice of screening is not only the most common SRI strategy, but also directly linked to the empirical part of the study. The screens are divided into negative (or exclusionary) screens and positive (or qualitative) screens, but also future screens are discussed. Evidently socially responsible investing has not only received praise due to its somewhat indistinct concept. For this reason it is also important to present the conceptual and methodological criticism it has faced from scholars and professionals.

2.1 Origins of Socially Responsible Investing

In order to fully understand the current state of socially responsible investing, one must look into the origins of the phenomenon. The first appearance of socially responsible investing dates back to early biblical times and was strongly linked to religious traditions, morals and ethics. Religious investors from Jewish, Christian, and Islamic faiths and many indigenous cultures, whose traditions embrace peace and nonviolence, have avoided investing in enterprises that profit from products designed to kill or enslave other human beings. Jewish law even laid down directives on ethical investing. The Methodist and Quaker immigrants in the US started to manage money using what are now referred to as social screens. The religious origins of SRI can still be seen in the widespread avoidance of "sin stocks", which among others include companies in the alcohol, tobacco and gaming industries. Pioneer Fund is believed to be the first investment to use negative screens in the United States, it was established in 1928. (Social Investment Forum 2005; Schueth 2003; Schwartz 2003.)

The modern roots of SRI are closely linked to major changes in society in the last third of the century and follow the growth of key social movements for the environment, human rights and animal rights. The political climate in the late 60's was in turmoil and many societal concerns were raised up in the process, among these were the anti-Vietnam war movement, civil rights movement, concerns about the cold war, equality for women, management and labor issues and anti-nuclear sentiment. As social responsibility became an issue, in 1969 the Council on Economic Priorities (CEP) began rating companies on their social and environmental performance. In 1971 the first SRI fund, the Pax World Fund, was set up in response to the demand for investments which did not benefit from the Vietnam War. Responding to an increasing concern about environmental issues after the catastrophes of Chernobyl, Bhopal and Exxon Valdez, a new breed of "green" SRI's started to emerge. Meanwhile other forms for socially responsible investment were created. Shareholder advocates turned to proxy-resolution process to bring up issues at company meetings and Mercury Provident was set up as the first bank designated to lend to projects with a social benefit. Lately the anti-apartheid movement, school killings, human rights and healthy working conditions in globalizing industries and the growing concern about climate change have all raised interest towards socially responsible investing. (Social Investment Forum 2005; Shepherd 2000; Schueth 2003.)

Although SRI has been slowly raising its head during the last five decades the most important change from margin to mainstream happened by the passing of the new millennia. Several elements have been presented as key factors to the robust growth of SRI (Sparkes & Cowton 2004). The possibilities for socially responsible investing have grown with the coming of new products and fund styles. Money managers have increasingly started to incorporate social and environmental factors into their investing practices. This may be due to the fact that investors are better educated and informed today than at any other time before. The better-informed investors are, the more responsible their actions tend to be. The latest economic trends have brought women to manage investment decisions and the social investment industry calculates that roughly 60 percent of socially conscious investors are women. Also unit trusts, pension funds and insurance companies who tend to invest in a socially responsible manner have significantly increased their share ownership. Importantly a growing number of evidence supports the notion that investors no longer need to separate good fortune from good will. (Shepherd 2000; Social Investment Forum 2007; Schueth 2003.)

Due to the sudden growth of SRI, institutional investors find themselves in a position leading to a new form of SRI shareholder pressure. Investing in corporations that comply with specific ethical standards gives incentive for other companies to review their policies. The current trend has an ongoing disciplinary effect on companies due to the fact that if they do not take social responsibility issues into consideration, they make themselves less attractive to a growing number of investors. This observation has made investors thinking what possible implications negative screening may have on the portfolio performance. (Crane & Matten 2007: p 253.)

The inception of Vice Fund in 2002 started the emergence of unethical investing. Unethical investing can broadly be defined as the inverted use of negative screens, which would be excluded in SRI. As its counterpart, the standard for what constitutes vice changes over time and among societies and cultures. The definition of what constitutes a controversial industry is itself controversial. However the most acknowledged base of unethical industries today is the so called “Triumvirate of Sin”, it includes alcohol, tobacco and gaming industries. Social responsible investors choose to invest in ways that support and encourage improvements in quality of life while pursuing financial goals. Unethical investing on the other hand is restricted to a unique subset of investors who are willing to bear a social cost. (Visaltanatchoti, Zou & Zheng 2009; Schueth 2003.)

2.2 SRI Strategies

There are three universally acknowledged strategies for socially responsible investing. The most common is social screening which will be more thoroughly addressed below. Another commonly used strategy is shareholder advocacy. One potential lever for socially aware investors with which to make corporations accountable is to buy shares of that company with a main objective to make positive use of the rights of shareholder democracy. Shareholder advocacy involves actions many social investors take in their role as owners of companies. These actions include engaging in dialogue with companies on issues of concern as well as submitting and voting proxy resolutions. Proxy resolutions generally aim to improve corporate behavior and enhance the well being of all the company's stakeholders all while promoting long-term shareholder value and financial performance. (Crane & Matten 2007: 247; Social Investment Forum 2005; Schueth 2003.)

There are three basic types of shareholder resolutions. Social responsibility resolutions address issues concerning company policies, practices and actions when it comes to questions on e.g. environment, health and safety, equal employment opportunity, labor standards, military and defense contracting, corporate political contributions, sustainability, tobacco, and animal welfare. Corporate governance resolutions focus on how the company is governed when it comes to questions on calls for majority elections of the board, proxy voting policies, independent board chairs, separation of the CEO and chair, limitations on consulting by auditors, expensing stock options and awarding performance-based options, restricting executive compensation, and repealing classified boards and takeover provisions. Crossover proposals include resolutions overlapping the two, they address issues such as board diversity and executive pay tied to social benchmarks. (Social Investment Forum 2005.)

The third strategy is community investing. Social investing can be roughly divided into two main sub-classes, the first being socially responsible investing (SRI) and the other socially directed investing, which occurs when investors voluntarily accept lower returns for community development or other purposes. Community investing provides capital to low-income communities that are underserved by conventional financial services. Social investors tend to earmark a percentage of their investments to community investment institutions with missions focused on providing financial services to disadvantaged communities and to supply capital for small businesses and

important community services, such as affordable housing, child care and healthcare. (Social Investment Forum 2005; Schueth 2003; Sparkes 2001.)

There is a wide range of different institutions and initiatives focused on community development, but they can be divided into four primary types. Community development banks focus their lending on rebuilding disadvantaged communities, but also offer conventional bank services. Community development credit unions are membership owned and nonprofit institutions that offer financial services to people and communities that have limited access to conventional credit unions. Community development loan funds pool investments and loans provided by individuals and institutions to make or guarantee loans to small businesses, affordable housing developments, and community service organizations in specific geographic areas. Community development venture capital funds focus investing in highly competitive small businesses that have the potential for rapid growth in certain geographic areas, while creating jobs, entrepreneurial capacity, and wealth. (Social Investment Forum 2005.)

2.3 Screening

Screening or social screening is basically the practice of evaluating investments on corporate governance, social, ethical, environmental and other criteria. Investors choose to include or exclude companies from their portfolios based on a specific set of standards. Usually investors seek to own companies that not only make a positive contribution, but also perform well. Screens can also be used as filters to identify managerial competence and superior corporate governance. The practice of screening is often divided into two types of screens, exclusionary or negative screens and qualitative or positive screens. (Schueth 2003; Schwartz 2003.)

Investors using negative screening avoid investing in companies whose products and business practices are harmful. Conversely, investors using positive screens seek out companies with outstanding corporate social responsibility. The evolution of screening practices over time closely reflects the change in social investors as well. The major change has been the idea of moving from avoidance to the promotion of corporate social responsibility and stronger corporate citizenship while also creating wealth for companies, shareholders and communities. Negative screens, due to their historical

background are often referred to as the first generation of SRI screens, positive screens are naturally the second generation of screens. Modern screening tends to take into account economic, environmental and social criteria comprised by both negative and positive screens. This kind of integrated approach is also known as the third generation of screening. The fourth generation combines prior screening practices with shareholder activism. (Social Investment Forum 2005; Renneboog et al. 2008.)

2.3.1 Negative screening

The practice of negative screening is the oldest and most basic strategy of SRI. The practice of negative screening usually means that specific stocks or industries are excluded from the portfolio based on selected criteria. Traditionally socially conscious investors have screened out companies involved in alcohol and gambling, the so-called sin stocks, most investor label also tobacco as a sin stock. Social Investment Forum (2005) reports that still more than half of all screened funds screen out these stocks. Other commonly used negative screens include defense and weapons industry, environmental issues, poor labor relations, poor consumer-product safety, unequal employment opportunities, animal rights violations and pornography. (Social Investment Forum 2005; Crane & Matten 2007: 251; Renneboog et al. 2008.)

Due to globalization SRI investors have been forced to look beyond the domestic corporate social responsibility. New times have created new kinds of negative screens which include negative community impact, child labor, companies producing or trading with oppressive regimes, environmentally hazardous products or processes and human rights violations (Crane & Matten 2007, p 251). Not only do the companies have to keep track of their own actions, they also need to stipulate them from their partners and subcontractors. Some investors choose to exclude companies that are directly involved in unethical sectors or they screen them out if their revenues from unethical activities exceed a predetermined threshold. However, there are also investors who apply negative screens to the branches and suppliers of the underlying companies. For instance some SRI investors have screened out companies doing business in countries with poor labor standards and human rights or where conflict, civil strife, terrorism, or pandemic diseases are daily realities of the business climate. (Social Investment Forum 2005; Renneboog et al. 2008.)

The evolution of negative screening has been very dynamic. Investors have elaborated a new generation of screens to address changes in society, and more exclusionary screens will evolve together with the society. In part due to this, some negative screening criteria do not share a coherent alignment. Genetic engineering, biotechnology and nuclear power might have had a negative reputation due to historical safety concerns, but are not necessarily viewed by all as negative screens today. Also political views and social awareness are increasingly taken into account in screening. For instance investors might be concerned about the unequal distribution of wealth, and therefore screen out companies with excessive executive compensation. (Crane & Matten 2007: 251; Kinder and Domini, 1997.) Some investments are directed to investors with strong ideological or religious convictions. These investors may choose to screen out e.g. companies affiliated with abortion, youth concerns or anti-family entertainment and lifestyle. Islamic investments tend to exclude firms producing pork products and some Christian investors avoid investing in insurance companies insuring non-married people. These kinds of screens can be found for nearly any religion or sect, including Lutheran, Christian Scientist, Catholic, Islamic, Mennonite, Judeo-Christian, fundamentalist Christian, and Mormon. (Social Investment Forum 2005; Renneboog et al. 2008; Schwartz 2003.)

Table 1. Typical positive and negative screens and their application by known SRI funds and indices. (USSIF 2011.)

	Domini social Index	**Calvert Social Index**	**Parnassus Fund**	**Ariel Fund**
Environment				
Climate and Clean Technologies	P	P	P	-
Pollution and Toxics	P	P	P	-
Environment and Other	P	P	P	P
Social				
Community Development	P	P	P	P
Divesity & Equal Employment Opportunity	P	P	P	P
Human Rights	P	R	P	-
Labor Relations	P	P	P	-
Governance				
Board Issues	P	P	P	P
Executive Pay	-	P	P	-
Products				
Alcohol	X	R	R	-
Animal Testing	R	R	R	-
Defense/Weapons	X	R	R	X
Gambling	X	R	R	-
Tobacco	X	R	R	X
P : Positive Investment, seeks investments with positive impact in this area		**R : Restricted Investment, seeks to avoid poorer performers in this area**		
X : No Investment, excludes investments engaged in this activity		**- : No Screens, does not screen investments in this area**		

2.3.2 Positive screening

Evaluating the ethical performance of companies is very different from simple exclusionary screening. The qualitative evaluation of a company's performance poses a much more difficult challenge and requires extensive resources. Positive screening is directly linked with corporate social responsibility (CSR) and focuses in finding companies that actively engage in creating a positive impact. When selecting companies through qualitative screening, usually the emphasis is on selecting companies with strong CSR standards. The most common positive screens focus on corporate governance, good employer-employee and labor relations, strong environmental practices, sustainability of investments and product quality and safety issues. Positive screens are also frequently used to select companies with a good record concerning equal opportunities and ethical employment practices, public transport, inner city renovation and community development programs and green

technologies, such as renewable energy usage. In a globalizing business environment qualitative screening criteria may also include the impact of offshore operations, the respect for human rights around the world and the stimulation of cultural diversity. (Social Investment Forum 2005; Renneboog et al. 2008; Kinder & Domini 1997.)

Qualitative screens usually rely on different indicators from which broad conclusions about a company may be drawn. These indicators should measure all aspects of corporate performance that should concern the investor and point out areas of strength. Alternatively the same indicators can be used to identify poor performers. The problem incidental to the use of these kinds of indicators is that someone must evaluate the company's record and make judgment on it. They lack the virtue of simple exclusionary screens. This aspect of positive screening is, among others, scrutinized in the next sub-chapter. The use of qualitative screens is sometimes combined with a "best in class" approach in which companies are ranked within their specific industry or market sector based on CSR criteria. To some extent this might be in contrast with exclusionary screening if they are not applied together. Nevertheless qualitative screening has become an essential part of SRI investment practices. (Kinder & Domini 1997; Renneboog et al. 2008.)

Social investors are well aware that there are no perfect companies, consequently the qualitative screening process generally seeks only to identify better-managed companies. The attained results steer towards a portfolio that meets a certain social criteria, but it always comes up to the personal choices of the investors, therefore screening decisions are never black and white. Positive screening, however, requires an enormous amount of qualitative analysis of corporate policies, practices, attitudes and impact on top of the traditional quantitative determination of profit potential. Due to this many social investors have turned to organizations providing independent research on the environmental, social, governance (ESG) and ethical performance of companies. (Schueth 2003; EIRIS 2009.)

2.3.3 Future screens

Most of the screens applied today attempt to capture a more nuanced sentiment of corporate performance and therefore both positive and negative screens are applied. So far the changes in society, overall awareness and prevalent values have dictated the evolution of social screening. It is, nonetheless, safe to say that the range of the current qualitative screens will expand. The emerging qualitative will focus primarily on offshore corporate activity, screens regarding global issues will most likely increase due to the globalization of business and the increasing popularity of mutual funds with global exposure. Also the number of different environmental screens will rise as investors become distressed by global warming and local concerns. Land use issues may also be an important screening area in the future, given the ever rising population in some urban and urbanizing areas. (Kinder & Domini 1997.)

Diversity issues will gradually emerge as the demographics of the American workplace is transforming both in terms of ethnicity and age. Workplace justice will therefore surely be one of the future social screens. Company policies will also determine future screens. Investors will pay more to employee relations attention, already excesses executive compensation, outsourcing or job exporting are a point of concern. The organized labor's increasing interest in social investing by will most likely accelerate this trend. Needless to say that unpredictable events will determine the future of social screening but it is also safe to expect that conventional securities analysis will take into account more social screens in the future. (Kinder & Domini 1997.)

2.4 SRI criticism

Expectedly socially responsible investing has also faced criticism from scholars and investment professionals alike. The theoretical concerns will be addressed Chapter 3, but there are also other issues regarding socially responsible investing that face opposition. Some concepts of SRI are believed to be too obscure of confusing and the absence of the very definition of SRI criticized. The methodology behind SRI is another point of concern. Opponents of SRI believe that addressing social issues together with financial issues is problematic and inevitably leads to biased and questionable research and decision-making methods.

2.4.1 Conceptual Issues

The very definition of socially responsible investing has been subjected to a lot of controversy and scrutiny. Socially responsible investment and ethical investment are generally thought to be equivalent terms, but one might argue whether this should be the case. Lately the term “ethical investment” has increasingly been replaced by that of “socially responsible investment”. This may in parts be due to the fact that people might feel uncomfortable using the word “ethical” in terms of investment matters. (Sparkes & Cowton 2004.) Although Socially Responsible Investing or its abbreviation SRI is the most common term, intriguingly scholars use a variance of other semantic definitions. These definitions include mission-based investing, mission-related investing, social investing, socially aware investing, socially conscious investing, green investing and values-based investing. These terms are often used interchangeably and all refer to an investing approach that integrates social and environmental concerns into investment decisions. However many disagree with these terms. SRI seems to be the preferred term in the United States, but Europeans tend to use the terms sustainable investing and green investing. The term socially responsible investing can also give the impression that unscreened portfolios are irresponsible, therefore other alternatives include terms such as guideline investing, screened investing and natural investing. (Social Investment Forum 2005; Schueth 2003; Kurtz 2005.)

The views of social responsibility and ethics differ between culture differences and even on a personal level which poses a problem on screened investment products such as portfolios, funds and indices. Defining an ethical fund may be impossible due to the fact that there is no single accepted body of ethics and the difficulty of fitting a personal ethical spectrum to discrete portfolio choices results to a widely diverse composition of ethical investment products. The problem becomes clear when legislation is involved, for instance all UK private sector pension funds have been legally obliged to consider socially responsible investments as part of their overall investment policy. However the government regulations make no attempt to define what the required social, environmental or ethical considerations might be. Even the ethical fund sector cannot provide a comprehensive definition of what an ethical business is. Hogget & Nahan (2002) argue that the lack of a shared definition of SRI makes it possible to address nearly any investment product as ethical, sustainable or responsible. The absence of an agreed definition of SRI is the most controversial issue regarding this area of studies. (Sparkes 2001; Hoggett & Nahan 2002.)

Schwartz, in his article *The "Ethics" of Ethical Investing* (2003), contemplates whether ethical screens can even be ethically justified. Ethical or social screening usually holds both positive and negative screens, but Schwartz limits his analysis to negative screening. He argues that alcohol and tobacco should be excluded based on nearly any moral code due to their addictive and destructive features. Other negative screens, according to Schwartz, are more problematic. Gambling, which is one of the most common negative screens, is often a government sponsored activity e.g. governments around the world operate a lottery. According to American Gaming Association more than three quarters of US adults approve casino entertainment. And where is the ethical margin between gambling and investing? One could argue that investing in ethical funds is an act of gambling. Military and weapons industry is another controversial industry. Undeniably weapons are the reason for a lot of suffering and destruction, but could the use of aggressive force be also necessary to stop a greater evil. The obvious example is the disarmament of the Nazi regime, but lately weapons were also necessary in overthrowing such violent dictators as Saddam Hussein, Slobodan Milosevic and Muammar Gaddafi. Maybe weapons can be used in activities that might be considered morally appropriate or even desirable. For instance the US military has been known to provide assistance during natural disasters. (Schwartz 2003.)

Other negative screens also divide opinions. Nuclear power is often considered an unethical choice due to the incidents in Chernobyl, the 3 Mile Island and recently Fukushima. However the most likely alternatives for nuclear power are fossil fuels which aggravate global warming. Also animal testing is considered unethical, but some animal tests are used in order to produce life-saving drugs. And what about the use of child labor for a multinational company? One might argue that children would be forced to work anyway, but in this case the company would ensure safe working conditions and provide education and health services. Unethical indeed, but maybe it is the lesser of two evils. According to Schwartz (2003) labeling screens as ethical is misleading or even deceptive if they do not contain any ethical justification. He suggests that the word "ethical" should be completely discarded. Screens are designed to reflect investor's social, religious, or political attitudes and therefore they should be given a clear justification. (Schwartz 2003; Entine 2003.)

2.4.2 Methodological Issues

The methodological concerns are primarily based on the assumption that SRI research data suffers from a lack of reliability and credibility. Entine, in his article *The Myth of Social Investing: A Critique of its Practice and Consequences for Corporate Social Performance Research* (2003), claims that the research is generated with insufficient resources and its subjectivity can be questioned. Another issue of concern is the standards used in collecting data. The standards are, according to Entine, seemingly straight-forwards and often subjective and arbitrary. Different fund managers or researchers apply different screening practices without proper justification. Some may choose to screen-out companies that derive 50% or more of revenue from tobacco or alcohol, others choose 20% as the equivalent screen. No exhaustive explanation is given for these arbitrary percentages. Also Schwartz (2003) ponders the correct application of screens. He states that from an ethical perspective, an ambiguous use of screening percentages is problematic. Schwartz believes that firms should be morally evaluated based on the totality of their practices and that screens should be applied accordingly. (Entine 2003; Schwartz 2003.)

According to Entine (2003) researchers also choose to ignore aspects of corporate activity that are hard to measure and are therefore biased against industries that are more transparent. For instance banks do not necessarily state the composition of their investments, this means that they may have high stakes in controversial industries, but if the banks façade is clean, they can be accepted as ethical. Schwartz (2003) believes that these screen infringements are not calculated, but nevertheless they do occur indirectly. For instance a paper company may supply cigarette paper to a tobacco company or an aluminum manufacturer may sell cans to a brewery. Simplistic screens often miss layered business models such as franchising and complex business structures typical for multinational and multi-industrial companies. Indirect contribution should, however, be incorporated in the screening process in order to retain ethical consistency. In reality a thorough screening process faces many practical difficulties. Researchers have admitted they often do not have the resources or the sophistication to go beyond a superficial analysis. (Entine 2003; Schwartz 2003.)

In order to find an answer to SRI credibility issues Kempf and Osthoff (2008) conducted a study in which they investigated whether SRI funds truly do invest according to social and environmental standards. They matched the compositions of ethically identified mutual funds with ethical ratings provided by Kinder, Lyndenberg & Domini (KLD).

They also examined the possibility of ethical window dressing i.e., fund managers would change the composition of the fund just before the end of the fiscal year in order to improve their ethical rating. The sample consists of US equity funds which are analyzed from 1991 to 2004. Kempf and Osthoff found that SRI funds have a significantly higher ethical ranking than conventional funds with respect to every criterion the ranking is based on. Their findings also revealed that the higher ethical ranking of SRI funds was not obtained by window dressing strategies. (Kempf & Osthoff 2008.)

However the fiercest criticism by Entine (2003) is towards KLD ratings. His allegations are based on several monitored issues. For instance the unscrupulous green-washing by Odawalla and The Body Shop raises questions. It has been alleged that there were personal relations between ethical raters and company executives. The other option is that the raters were simply too gullible to take their word, in any case, both options cast a shadow on the credibility of the raters. Entine also asserts that the numerical ratings used by researchers create an illusion of objectivity. The scores are based on an arbitrary system which has no scientific justification. A good rating was e.g. given for a company that introduced more that 10% of women in the board of members, but the quality or contributions of these board members were not examined. In another example points were given for innovative hiring programs, but the word “innovative” was not defined. Another issue arises when the qualitative factors need to be transformed into quantitative scores or ratings. These kinds of practices are completely subjective to the personal biases of the rater and according to Entine, these biases do exist. (Entine 2003.)

Schwartz (2003) raises yet another point of concern: Which comes first, the financial performance or the ethical performance? In an example a Canadian Ethical fund persistently held on to shares of a chemical company after an environmental spill. Due to the incident the company stock was no longer eligible according to the funds environmental screen, but the stock price had also dropped significantly. Selling the stock would have been the correct action ethically, but it would have affected the fund performance radically. Schwartz argues that at minimum, ethical funds must clearly state whether financial returns or the ethical screens take priority in decision-making and explicitly disclose their approach to screen infringements. Schwartz also proposes that ethical funds should periodically conduct an ethical audit of their own activities in order to maintain full transparency and accountability. (Schwartz 2003.)

3. THEORETICAL BACKGROUND

All financial theories make generalizations that often exclude the possibility of irrational behavior. Incorporating ethical preferences into investment decision making is one example of this kind of investor irrationality. For this reason there are a number of different theories that are said to explain socially responsible investing. The theoretical framework concerning socially responsible investing is dominated by two somewhat opposing theories: the Modern Portfolio Theory and the Arbitrage Pricing Theory. Recently there have also been concerns that stem from the growing interest in negative social screening. Another issue regarding this field of studies is whether addressing social issues is something companies should do to begin with or might there be a possibility for competitive advantage through corporate social responsibility.

Adam Smith was one of the first to make the link between social responsibility and business. Smith's Wealth of Nations (1776) was the cornerstone of the neoclassical theory, the basis of all financial theories. One of its statements was that any external social cost would lead to decreased value. Others recognized that social responsibility was not just a cost, but that the achieved gains of socially responsible actions would be modest compared to the complex costs of producing them. In fact classical economics and social welfare theorems did not see a conflict between maximizing shareholder value and social value. According to these theories social welfare is maximized when firms maximize their profits in a competitive and complete market. Although it was obvious that in practice it was not so, for many years to come there was a consensus that this was the absolute truth. (Renneboog et al. 2008; Wagner 2001.)

3.1 Shareholder and Stakeholder Theories

In the 20th century the societal changes gave companies incentive to review the impact they have on the surrounding world and soon people started talking about corporate social responsibility (CSR). Milton Friedman (1970) released an article where he expressed his concern regarding the growing interest on adopting CSR standards into business. Friedman stated that there is a fundamental discrepancy between CSR and the rational goal of wealth maximization of the shareholders. He argued that the principals of CSR would have long been incorporated into business if they would

improve profitability and that rationally operating companies should not take into account voluntary ethical measures. The assumption that CSR is only an external cost leads to the conclusion that taking CSR measures companies act against the interest of their shareholders. Friedman's ideas have later been referred to as "the shareholder theory" which makes the fundamental argument that the only social responsibility of a company is to increase its profits as long as it stays within the rules of the game. Now, one might argue that the rules of the game have changed. Freeman (1984) questioned the shareholder theory and introduced the stakeholder theory, which redefined the purpose of a company. Freeman argued that a corporation not only bears responsibility to its shareholders, but to all the groups that are vital to the survival and success of the corporation. These other groups, that have a stake in the company, include consumers, employees and the community at large. Although the two theories disagree on the responsibilities of a company, they both still view corporate social responsibility merely as an extra cost for the company.

However a new take on Freeman's Stakeholder theory has emerged in the last decades. Corporate social responsibility (CSR) may be used as a tool in gaining competitive advantage. Nowadays it is a generally accepted fact that companies cannot confide on the assumption that the industry structure will secure high returns. Competitive advantage gives companies a possibility to position themselves within their specific industry so that they can obtain economic rent. In other words they can gain profits that are higher than the cost of their capital. (Brealey, Myers, Allen 2006: 281.) Traditionally there have been two schools of thought regarding CSR and economic performance, their relationship is either reviewed as strictly negative or positive. Wagner, Schaltegger & Wehrmeyer (2001) however suggest that the relationship between corporate social responsibility and competitive advantage can be either positive or negative depending on their interdependence and integration. They also suggest that a growing level of corporate social responsibility benefits the economic performance of a company to a certain optimal point after which CSR improvements can only increase costs and reduce profits. (Wagner et al. 2001.)

Porter & van der Linde (1995) advocate that social responsibility can be a key element in improving the financial performance a company. Forcing companies to follow the trends of sustainable development is also important for the economy, because it would drive innovations and hence, improve the predominant technology. In return, this would enhance the profitability of the companies and would give them a competitive edge. Wagner (2005) was able to demonstrate that positive

environmental impact is a potential source for competitive advantage. To a certain point CSR-based competitive advantage allows companies to improve productivity, lower expenses and reach new markets.

Due to the ever growing social awareness, companies have been obliged to integrate CSR into their practice. However only a few have had a consistent plan for CSR, let alone integrated it into strategy. Traditionally there have been four main reasons for the introduction of CSR standards: Moral obligation, sustainability, license to operate and reputation. Each of them aims to alleviate the tension between business and society when the focus, in fact, should be on their interdependence. If companies choose to take on CSR measures aligned with their strategy they can create shared value. Companies should therefore discard their views of CSR as a defensive tool and put more emphasis on creating a social impact. Companies should therefore start thinking in terms of "Corporate Social Integration" instead of "Corporate Social Responsibility". (Porter & Kramer 2006.)

3.2 The Modern Portfolio Theory

In 1952 Markowitz released a paper titled "Portfolio Selection", with the purpose of analyzing the relationship of risk and return when it comes to portfolio selection. The paper gave birth to what is now known as the Modern Portfolio Theory, which would eventually be refined as the Capital Asset Pricing Model by Treynor, Sharpe, Lintner and Mossin. The modern portfolio theory is the dominant theory regarding the expected underperformance of socially responsible investing. (Markowitz 1952.)

The modern portfolio theory makes the assumption that investors should take into account that an optimal portfolio has the best possible risk-return relationship, investors should thus place their funds into securities that provide high returns with low variance. The modern portfolio theory also assumes that investors behave rationally; therefore if an investor has a choice between two securities with similar expected returns but different risk, the investor should select the one with lower risk. According to Markowitz, portfolio selection is divided into two separate stages. In the first stage investors make assumptions on the future performance of available securities based on observation and experiences. In the second stage investors acquire

all necessary information regarding the future performances, which is then utilized in creating an optimal portfolio. (Markowitz 1952: 77 – 79.)

The portfolio theory concentrates on the effect of diversification on risk-return relationship of the portfolio. Investors may limit the risk exposure of a particular security by means of diversification of assets. By placing assets in a variety of different securities from different sectors of the economy, the overall risk of the portfolio can be less than that of any individual security within the portfolio. The more securities investors incorporate in their portfolios, the lower the variance. Markowitz however notes that variance can never completely disappear. (Bodie, Kane & Marcus 2009: 174 – 176; Markowitz 1952.)

The correlation between securities is the key in reducing risk. The correlation coefficient of two securities can vary from -1, being perfectly negatively correlated to +1, being perfectly positively correlated. Portfolio risk can be reduced by incorporating securities that have low or negative correlation, such as securities from different sectors of the economy. Investing in companies across sectors is more profitable since different sectors have different economic characteristics and have therefore lower covariance than companies within the sector. The correlation coefficient can be calculated by dividing their covariance by the product of the standard deviation. A positive covariance increases the risk of the portfolio and accordingly a negative covariance reduces risk. (Bodie et al. 2009: 177 – 178; Markowitz 1952.)

Portfolio risk cannot be completely eliminated by adding an infinity of securities into the portfolio. The total risk can be divided into market risk or systematic risk and unique risk or unsystematic risk. The systematic risk proceeds from macroeconomic factors that affect all securities and the unsystematic risk is formed by all risk factors that affect an individual company or sector. By means of diversification the unsystematic risk can be reduced to a minimum, but the market risk still remains. (Nikkinen, Rothovius & Sahlström 2002: 30 – 31; Markowitz 1952: 79.)

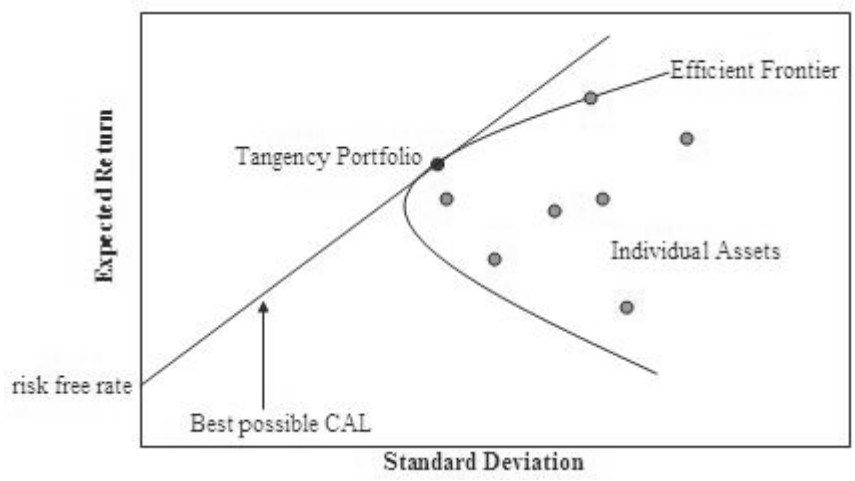

Figure 2. The efficient frontier and the optimal risky portfolio. (Edinformatics 2010.)

In order to achieve an appropriate complete portfolio one must first single out all risk-return combinations available from risky assets. When calculating the lowest possible variances for any given portfolio one can create a minimum-variance frontier. On the frontier lies also the global minimum-variance portfolio and the part of the frontier that lies above it can be defined as the Efficient Frontier. After this one has to calculate the optimal risky portfolio by selecting the optimal proportion of assets in the portfolio in order to achieve the highest possible risk-return relationship for the capital allocation line (CAL). The point where the capital allocation line is supported by the tangency portfolio located on the efficient frontier, is the point where we find the optimal risky portfolio or the tangency portfolio (Figure 2). Finally one can determine the risk-free rate for the investments, incorporate it with the risky assets and obtain an appropriate complete portfolio. (Bodie et al. 2009: 240 – 241; Copeland & Weston 1988: 178 – 179.)

There are several reasons why investors who believe in the modern portfolio theory should expect underperformance from socially responsible investing. First of all, the very nature of socially responsible investing differs from traditional investing. The Modern portfolio theory expects that investors base their decisions on risk and return expectations, which are usually derived from a multitude of fundamental factors. If investors, however, would let their decision be affected by non-fundamental factors, such as social responsibility, they would be less inclined to alter them in case of a downturn. This would eventually lead to underperformance. Then again some are

willing to accept it as a contribution to the underlying cause. (Hickman, Teets & Kohls 1999; Bodie et al. 2009: 246.)

Socially responsible investing, in its most common form, is based on screening. For socially responsible investors this means that their universe of investment opportunities becomes smaller. By assuming that all modern portfolio theory assumptions hold, then screening securities will lead to a position where absolute diversification is no longer possible. Restricting this universe will shift the efficient frontier down and results in a suboptimal portfolio. In other words there is a cost for socially responsible investing in form of a lower risk return relationship. (Kurtz 2005; Bodie et al 2009: 246.) The risk proceeding from restrained diversification is valid especially for investors whose choices are limited to begin with, may this be due to other convictions or simply lack of professionalism. Moreover, for skilled investors the narrowed universe of investment opportunities leads to a reduced amount of upside outliers they can capture. (Kurtz 2005; Geczy, Stambaugh & Levin 2005.)

Moskowitz was the first one to challenge the assumptions of the modern portfolio theory in respect with socially responsible investing. In 1972 Moskowitz released an article called “Choosing responsible stocks”, where he presented fourteen socially aware companies for investors. He had noticed that socially responsible investing could, in fact, be profitable for investors and suggested a new perspective on the efficient frontier. He argued that socially responsible companies could bear a special sensitivity, which gives them an edge for surpassing competition. In other words the strictest reading of the modern portfolio theory would not apply, when it comes to socially responsible investing. Soon after, other financial theories would corroborate his views. (Moskowitz 1972; Kurtz 2005.)

3.3 The Arbitrage Pricing Theory

In introduced the Arbitrage Pricing Theory (APT) which presented a different approach for stock pricing. When the modern portfolio theory focuses on the construction of an efficient portfolio, the arbitrage pricing theory assumes that any investor is willing to increase the return of the portfolio if it can be done without increasing the risk. The way to do this, is by means of arbitrage. The model assumes that stock returns depend partly on the influence of different “factors” and partly on “noise”. The factors stem

from different macroeconomic influences and the noise arises from unique company specific events. (Brealey et al. 2006: 199.)

The arbitrage pricing model consists from a variety of different factors that affect the stock return. The theory does not state what the factors are, simply that the factors and their sensitivity vary between companies. For example an airline is by nature more sensitive to changes in crude oil price, than a textile manufacturer. The return is therefore assumed to pursue the following pattern (Brealey et al. 2006: 199.):

$$\text{Return} = a + b_1(r_{factor\,1}) + b_2(r_{factor\,2}) + b_3(r_{factor\,3}) + \cdots + e \quad (1)$$

Where a is the expected return, $b_1, b_2, etc.$ represent the sensitivity for each factor and e is the noise coefficient.

The factors can be anything from changes in GDP or discount rates to weather conditions and social responsibility. Similarly to the modern portfolio theory the arbitrage pricing theory assumes there are two sources of risk. Since the unique risk (noise) can be eliminated by diversifying assets, the expected risk premium should then depend on the factors and the stock's sensitivity to them. Thus the formula is (Brealey et al. 2006: 199):

$$\mathrm{r} - \mathrm{r_f} = b_1(r_{factor\,1} - \mathrm{r_f}) + b_2(r_{factor\,2} - \mathrm{r_f}) + b_3(r_{factor\,3} - \mathrm{r_f}) \ldots \quad (2)$$

Where $\mathrm{r_f}$ is the risk free rate and $\mathrm{r} - \mathrm{r_f}$ is the expected risk premium.

The arbitrage pricing theory is based on the assumptions that the market is perfectly competitive and frictionless, investors are risk-avoiding rational beings and the number of available securities is higher than the number of factors. In these conditions two well diversified portfolios should behave similarly if their factor bets are the same. In other words the arbitrage pricing theory assumes that both portfolios should produce the same return and arbitrage would not exist. (Roll & Ross 1980: 1076; Nikkinen et al. 2002: 76 – 79.)

In terms of socially responsible investing, the arbitrage pricing theory offers a more positive view on its expected performance. As the modern portfolio theory expects that social screening would lead to underperformance due to lack of diversification, the arbitrage pricing theory makes no such a statement. Engaging in social investing would not lead to a performance penalty if the factor bets are adjusted to resemble those of the benchmark and the effect of "noise" is reduced to a similar level. Indeed a certain amount of diversification is necessary in order to reduce the effect of the unique risk, the stringency of screens cannot therefore be too restrictive. To sum up, investors who choose to invest in a social manner are able eliminate the expected theoretical underperformance of their portfolio if they are willing to optimize it to the benchmark. (Kurtz 2005.)

3.4 Value Investing Theory

The generally acknowledged disadvantage of the arbitrage pricing theory is that it does not state what are the factors that influence stock returns. There have been many attempts to testify a general set of factors that would apply to all companies. In 1992 Fama and French studied the affect of company size and book-to-market (B/M) ratio to US stock returns over the period of 1962–1989. They found out that stocks of small companies and stocks with a high book-to-market ratio had outperformed the market. Evidence showed that these factors were closely related to company profitability. The findings led to the inception of the "Fama-French three-factor model", a more specific take on the arbitrage pricing model (Fama & French 1992; Brealey et al. 2006: 203.):

(3) $$\mathrm{r} - \mathrm{r_f} = \\ = b_{market}\left(r_{market\ factor}\right) + b_{size}\left(r_{size\ factor}\right) + b_{B/M}\left(r_{B/M\ factor}\right)$$

Where: $r_{market\ factor}$ is the return on market index *minus* risk-free interest rate
$r_{size\ factor}$ is the return on small firms *minus* return on large firms
$r_{B/M\ factor}$ is the return on high B/M firms *minus* return on low B/M firms

The findings of Fama and French (1992) regarding the B/M ratio have resulted in the widely accepted assumption that “value” stocks perform better than “growth” stocks. However there are a number of other measures that indicate whether a company is value or growth oriented. Any stock that has a low market price in comparison to earnings, dividends or historical prices can be considered a value stock. Nevertheless all evidence seems to point out that value stocks perform better in the long run. (Fama & French 1992; Blake 2000: 545.)

A quick cross-section of socially responsible portfolios reveals that most of them have a growth bias. The finding is not very surprising, since it is clear that for instance resource-extractive industries, that are not attractive from SRI stand point, fall into the value stock category. Moreover the beta of socially responsible portfolios tends to be above 1, which implies outperformance in a bull market, but then again underperformance in a bear market. In other words value investing theory implies that growth oriented socially responsible investing cannot outperform the market in the long run. (Abramson & Chung 2000; Kurtz 2005.)

Value investing notions per se do not contradict with those of socially responsible investing, but they do contradict with the way most socially responsible portfolios are managed. Since evidence shows that current SRI portfolios tend to be growth oriented, believers in value investing would be likely to discard social responsibility as a viable criteria. In 2000 Abramson and Chung were, however, able to demonstrate that value oriented socially responsible investing did not lead to performance penalty. Evidently SRI benchmarks still seem to be less biased on growth, but again modern quantitative tools enable investors to adjust the factor bets of their portfolio according to their individual preferences. (Kurtz 2005; Abramson & Chung 2000.)

4.5 The Neglected Company Effect

The growing interest in socially responsible investing has also created an opposing investment strategy. As many social investors share common exclusion criteria in selecting stocks, some have raised up the question whether this could influence their performance. The stock selection of unethical investing is based on a reversed negative screening process, so to that extent unethical portfolios are subject to same arguments as socially responsible portfolios. In other words MPT and APT assumptions hold also

for unethical investing based on screening practices. Then again evidence shows that unethical portfolios tend to be value biased, which would imply better long-term performance in comparison to growth biased SRI portfolios. However there are additional theories that might explain the abnormal performance of sin stocks. Due to their dubious nature, they do not share a widespread interest among institutional investors, moreover sin stocks often possess special characteristics that may have positive and negative effects on stock performance.

The neglected company effect is the most common argument for the possible outperformance of sin stocks. The modern portfolio theory and the arbitrage pricing theory both rely on market efficiency, that is to say they both assume that all publicly available information diffuses instantaneously to stock prices. Conversely the neglected company effect is based on the assumption that the market, in reality, is inefficient. The information which affects the stock price comes not only from the company itself, but from a variety of different sources. Although information may be available, investors and analysts tend to treat different pieces of information differently and therefore the pace of the diffusion of information to prices differs respectively. Asset price behavior depends basically on the nature of the information and the time it takes to analyze its content. For instance profit warnings usually take no time at all while even years after a release of a study, the academic community still argues on its validity. Another form of market inefficiency, when it comes to the diffusion of information, arises when investors do not share the same amount of attention to each stock. If a stock is not followed on a regular basis by professional analysts or is left out by institutional investors, it is referred to as a" neglected stock". (Merton 1987.)

Most individual investors keep a majority of direct investments, but some of the assets are invested through ownership of mutual funds, pensions and trusts. Institutional investors, such as pension funds, universities, religious organizations, banks and insurance companies are often exposed to public scrutiny. Therefore many have implemented social standards that limit their possibilities to invest in ethically questionable securities. Moreover a number of institutional investors have a restriction of exceeding a predetermined percentage of the total portfolio when purchasing securities, therefore they cannot react on all information. (Merton 1987; Hong & Kacperczyk 2009.)

Even though the number of indirect investments is only a fraction of direct investments, individual investors follow the lead of professional portfolio managers. Therefore individual investors tend to neglect the same stocks they do and are usually aware of only a small number of available securities in the market. This leads a smaller investor base for these neglected stocks. Merton's study reveals that neglected stocks which had a small investor base had relatively larger expected returns than those that had a large investor base and "complete information" on which to act. According to Bodie et. al (2009) the higher equilibrium return for these stocks can be interpreted as a compensation for the risk associated with the lack of information. For this reason it is not necessarily a case of market inefficiency, but an additional risk premium for the companies in question. Merton concludes that the excess return of neglected stocks would disappear if professional money managers could identify them and start following them more closely. However this does not apply in the case of sin stocks because they have been neglected deliberately. (Merton 1987; Bodie et al. 2009: 391.)

4.6 Other Implications of Negative Screening

When it comes to social screening the group of neglected stocks is very specific and the underlying companies tend to have similar characteristics when it comes to the risks they carry and the very nature of their business. The general disapproval of their business, places sin companies in a position where they face higher regulatory scrutiny than conventional companies. On the other hand, strong regulation creates an environment where only the strong survive, which gives a competitive edge to companies that manage to outlive competitors. Regulatory risk comes in many forms. Sin companies, for instance, are subject to higher litigation exposure than other companies. Companies are unable to operate without significant legal assistance, which is a major cost factor. Evidently alcohol and tobacco industries have to bear the cost of unhealthy consumption, but to some extent the same applies for gambling and other sin industries. The risk of legal costs requires special attention and may therefore have a depressing effect on stock prices. Consequently sin companies tend to have low P/E and P/B ratios, which would put them in the value-stock category. High litigation risk may result in damaged company reputation and consumer confidence, therefore investors are expected to require an increased risk premium for the stock. (Salaber 2009; Hong & Kacperczyk 2009.)

Another cost related risk for sin companies is the risk of increasing excise taxation. All selective taxes, related levies and charges of a specific product or service constitute excise taxation. It is by nature selective and discriminating, therefore the charges it places vary according to necessity. The purpose of excise taxation is to increase income that alleviates the external costs the product or service creates, but also to discourage consumption. From an economic point of view the high taxation of addictive products, such as tobacco, alcohol and gambling, is justifiable. These kinds of products lack of natural substitutes, which implies inelasticity in demand. In addition the consumption of detrimental products creates external costs in form of physical, financial and psychological costs that users and producers of these products inflict on others. The revenues generated by excise taxation can alleviate the external costs when properly allocated. Excise taxation has also a motive which is not related to the creation of revenues, this motive is to discourage consumption. High level of taxation and pricing seems to be the preferred way in reducing the overall negative impact of detrimental products. Increasing excise taxation is a risk factor for investors who choose to invest in sin stocks, therefore it should also reflect on the pricing of the stocks. (Salaber 2009.)

The public opinion is often persuaded by the media, for this reason the headline risk is something that has to be taken into account. Headline risk refers to the depreciating effect a piece of news has on the stock value. Controversial industries are constantly being valued from the social perspective and their every action is monitored and questioned. It is therefore not surprising that any piece of news is often interpreted as negative and negative news always obtain more coverage. Companies considered to neglect the social impact they create, are perceived by the market to sustain a permanent headline risk. (Fabozzi et al. 2008.)

What sin industries also have in common is that due to their nature, they all have significant barriers to entry. All of the aforementioned risk factors in part make sin industries less interesting for new entrepreneurs. This gives the existing companies competitive advantage in form of oligopolistic and even monopolistic power. The mere existence of sin industries is controlled by a wide set of rules and restrictions, not to mention legislative regulations. In order to operate gambling or gaming business companies have to undergo a long and tedious process in order to get all necessary permits and licenses. In many countries governments hold total control over tobacco and alcohol industries, if they have been liberated from government monopole, they are subdued to a strict set of regulations. Pharmaceutical and weapons industries, on

the other hand, are very capital intensive. Research and development in these industries has a high cost, hence it creates a natural economic barrier to entry. Moreover they are very vulnerable to shifts in political climate, which can make or destroy a company. All things considered, any company operating in sin industries that has managed to overcome all obstacles has earned its particular position in the market and should therefore be compensated with higher returns. (Fabozzi et al. 2008.)

All risk factors associated with sin companies, litigation risk, excise taxation risk and headline risk, have two distinct effects on the stocks. First they lead to a permanent discount in valuation, second they place a higher premium of expected return on the stock. All risk factors considered sin stocks are, hence, expected to underperform. However the extremely challenging field, in which sin companies operate, decimates competition giving the remaining companies higher pricing power. This might result in high returns and therefore better stock performance. (Fabozzi et al. 2008.)

4. PREVIOUS STUDIES

There is no question that the performance of SRI has been most analyzed in the modern portfolio theory framework. The research has concentrated on analyzing the performance of different socially selected indices or funds by a variety of different measures, however some researchers have also constructed their own portfolios. Some studies have been conducted from the perspective arbitrage pricing theory by using factor models. Some of these studies attempt to show how the expected performance can be manipulated by adjusting the sensitivity to factors, whilst others use factor-models in order to eliminate distortion in results. The effects of negative screening have also been studied, mainly from the perspective of unethical investing, but also vis-a-vis the effects of positive screening. The studies in this chapter are presented in a chronological order and have all brought a new or improved approach in the study of SRI performance. A summary of the studies is presented in table 2 at the end of the chapter.

The first notable study on the performance of socially responsible investing was conducted by Hamilton, Jo and Statman (1993). They analyze the performance of 32 socially responsible mutual funds from January 1981 to December 1990. As a measure of excess return they use Jensen's Alpha. Their findings show that socially responsible mutual funds do not produce statistically significant excess returns, but also that their performance does not differ from the performance of conventional mutual funds. From the perspective of the modern portfolio theory this was not to be expected.

Diltz (1995) studies the impact of social ethical screens on portfolio performance. In order to analyze the effect of screening, Diltz uses a corporate social responsibility rating provided by the Council on Economic Priorities. Based on the ratings he creates 14 portfolio pairs from a universe of 159 companies. One of the portfolios of each pair consists of companies which received the highest rating for a given ethical screen, and the other portfolio consists of companies which received the lowest rating. The examined time period is from January 1, 1990 to December 31, 1991. By using the measures of Jensen's Alpha and the cumulative average abnormal returns (CAARs) Diltz finds that ethical screening does not seem to have neither negative nor positive impact on portfolio performance. He also notes that ethical screening does not seem constrain the portfolio return for a given systematic risk.

Sauer (1997) studies the effect of social screening on portfolio performance. Sauer aims to eliminate the possible effect of transaction costs, management fees, and differences in investment policy that are associated in actively managed mutual funds. He uses the Domini 400 Social Index (DSI 400) as a proxy for socially responsible investing and the S&P 500 as well as the Chicago Center for Research in Security Prices -indices as unrestricted and well diversified benchmarks. The performance of the portfolios is followed between 1986 and 1994 on measures of monthly raw returns and variability, Jensen's alpha, and the Sharpe ratio. Consistent with previous studies, Sauer finds that social screening does not have a significant effect on the portfolio performance. He concludes that for a socially responsible investor the total risk would be a more appropriate measure of risk exposure than the market risk.

DiBartolomeo and Kurtz (1999) take the approach of arbitrage pricing theory by trying to show that social responsibility is not a discounting factor. They follow the performance of the Domini 400 Social Index (DSI 400) and S&P 500 index from May of 1990 through January 1999. They apply an APT-model which uses seven macroeconomic variables as its factors in order to discover the sensitivity to each factor. They then reweight the DSI 400 portfolio so that the factor loadings would match those of S&P 500 index. They find that the unoptimized DSI 400 portfolio outperformed S&P 500 index and the performance of the optimized DSI 400 portfolio did not significantly differ from that of S&P 500. DiBatolomeo and Kurtz also presume that the outperformance of the unoptimized DSI 400 is related to its growth orientation on a bullish market and that social screening itself is not the factor, but rather the cause for the growth bias.

Hickman, Teets and Kohls (1999) examine what effect incorporating social funds has on the risk/return relationship of a portfolio. Six socially responsible funds were examined over the period of 1991 through 1995. Hickman et al. created portfolios by implementing different proportions of the funds into the S&P 500 index. By examining the efficient frontier of the portfolios they discovered that S&P 500 index is not an optimal risky portfolio, but a better risk/return relationship can be achieved by incorporating an appropriate mix of social funds. However none of the funds were able to outperform the S&P 500 index over the time period. The results of the study seem to indicate that social funds have a low correlation with the market, so they can be used as means of diversification.

The first important study on socially responsible investing as part of value investing was conducted by Abramson and Chung (2000). They differentiate value stocks from Domini 400 Social Index (DSI 400) by measures of relative dividend yield and relative market capitalization-to-revenues. The created value subset of the DSI 400 is then compared to other value indices from the year 1990 to 2000. The performance is measured based on quarterly rebalance strategy and buy-and-hold strategy. Abramson and Chung find that both strategies produced higher returns than the average of the benchmarks. They conclude that based on their findings socially responsible investing seems to be style-neutral.

Statman (2000) revises his original study with Hamilton and Jo (1993) by including both mutual funds and stock indices in his study. He uses the S&P 500 index and the Domini 400 Social Index (DSI 400) as benchmarks for 31 socially responsible funds and conventional funds. The period of the study extends from 1990 to 1998. The performance is measured by Jensen's Alpha and excess standard-deviation-adjusted return, a modified version of the Sharpe ratio. Statman finds that the DSI 400 performed equally with the S&P 500 Index. Socially responsible mutual funds performed worse than the indices, but no worse than conventional mutual funds.

Blank, and Carty (2002) study whether environmentally conscious companies can deliver superior returns, the so called "eco-efficiency anomaly". They use Innovest ethical ratings when selecting companies in the S&P 500 index form 1997 to 2000. They apply the arbitrage pricing model in order to create an environmentally responsible version of the index with similar factor bets. Blank and Carty identified 20 systematic sensitivities which they used as factors in the APT model. The findings show that the environmentally responsible portfolio clearly outperformed the S&P 500. The top rated companies' also outperformed bottom rated companies in the most environmentally sensitive industries. Blank and Carty conclude that according to their study the eco-efficiency anomaly seems to exist, although the phenomenon should be investigated on a longer time period.

Also Derwall, Günster, Bauer and Koedijk (2005) study the concept of eco-efficiency. They selected a longer period (1995 – 2003) in order to find out whether environmentally responsible companies delivered a long-run premium or penalty. They constructed two mutually exclusive stock portfolios and ranked them based on Innovest rating. They find that the high-ranked portfolio provided significantly higher average returns compared to the low-ranked portfolio. Derwall et al. apply a wide

range of performance attribution techniques which also show that the performance differential cannot be explained by differences in market sensitivity, investment style, or industry-specific components.

Shank, Manullang and Hill (2005) take the approach of including individual stocks in the research. They compare the performance of three socially responsible mutual funds, the NYSE Composite Index, and 11 firms most valued by socially responsible mutual fund managers. Their performance is followed on 3 and 5 year investing periods from 1998 to 2003. Measured by Jensen's Alpha Shank et al. find that the performance of socially responsible investing varies in the short run, but statistically significant positive returns were discovered in the longer time-horizon.

Kim and Venkatachalam (2006) study whether the neglect of sin stocks is caused by the information risk arising from poor financial reporting quality. They observe US publicly-traded stocks in the gaming, tobacco, and alcohol industries from 1988 to 2003. The sample comprises of 111 unique firms and the control sample of 2,441 unique firms. Kim and Venkatachalam find that sin stocks outperformed the control sample. Moreover they find that sin firms have superior financial reporting quality. They conclude that despite the superior returns, investors seem to include non financial factors into the investment selection criteria.

Also Barnett and Salomon (2006) attempt to measure the link between financial and social performance of socially responsible investment funds, but their study focuses on the intensity of screening. The sample consists of 61 SRI funds from 1972 to 2000. The financial performance is measured on a monthly basis and the social performance on the number of applied screens. Barnett and Salomon find a curvilinear relation between screening intensity and performance. In other words as the number of screens increases, performance first decreases and then increases. The researchers explain this phenomenon with two factors. First the funds which apply only a few screens do not significantly differ from conventional funds and therefore it does not affect the performance. Second the funds which apply a large number of screens tend to select the companies with the highest standards and this, according to the stakeholder theory, should result in superior performance. The problem is with funds that are found in the middle. These funds suffer from the lack of diversification, but their screens are not stringent enough to only hold companies with outstanding social responsibility.

Hong and Kacperczyk (2009) have the most prominent study concerning the field of unethical investing. The early version of the study was first released as a working paper in 2005, so it can be defined as the pioneering study concerning this field. Hong and Kacperczyk study the performance of 184 US sin stocks in the gaming, tobacco, and alcohol industries over the period 1926 – 2006. They find that over the observation period their behavior is similar to those of value stocks. Furthermore, they observe that the excess returns are attributed by the neglect by institutional market participants and the fact that they receive less coverage from analysts. The neglected stock effect as well as the increased litigation risk of sin stocks heightens the expected returns of sin stocks, this consequently reflects directly to the cost of capital for these companies. They conclude that the existence of limits to arbitrage on sin stocks is a clear sign of market inefficiency.

Lobe, Roithmeier and Walkshäusl (2009) take the approach of directly comparing, both socially responsible investing and unethical investing styles from July 1995 to July 2007. They create a sin-index consisting of a total number of 755 stocks across 51 countries from adult entertainment, alcohol, gambling, nuclear power, tobacco, and weapons industries. They compare the performance of their index with a set of 32 internationally acknowledged SRI indices and employ the MSCI World Index as a benchmark for conventional investing. The performance is measured by CAPM and multifactor models. Lobe et al. first report that unexpectedly they find no statistically significant difference in risk-adjusted returns between the sin-index and conventional benchmarks. Moreover they find no significant difference between the two investment styles performance wise. They also note that the performance of sin indices is value-oriented, when the performance of SRI indices is growth-oriented. Lobe et al. conclude that ethics based individual preferences can be incorporated in investment decision making, since they do not seem to have any significant effect on the performance.

Statman and Glushkov (2009) investigate the effect of different screens on SRI performance. The sample is constructed from the KLD dataset, which was implemented in 1991 to follow the socially responsible performance of DS 400 and S&P 500 companies. KLD data later on has expanded its coverage to include all companies in the Russell 3000 Index and the number of observed companies has grown from approximately 650 to 2,955 by the year 2006. The observation period is between 1991 and 2006. The performance of each screen is measured on the market model, the Fama-French 3-factor model and the Carhart's 4-factor model. The results indicate that positive and negative screening may impact portfolio performance in

different ways. Statman and Glushkov find a positive relation between positive screening and portfolio performance but a negative relation between negative screening and portfolio performance. They suggest that the advantages generated from the tilt toward companies with high social responsibility scores might be nullified by the negative effects from excluding sin stocks. According to the researchers this is possibly the reason why prior studies have not been able to find any significant difference between SRI and conventional investing. Statman and Glushkov suggest that portfolio managers should adopt the best-in-class method when constructing their portfolios in order to avoid this effect.

Also Lee, Humphrey, Benson and Ahn (2010) study the effects of screening intensity. They attempt to find evidence of a linear or curvilinear relation between the number of employed screens and portfolio performance. The portfolio performance is divided into risk and return and they relations to screening intensity is studied separately. The sample consist of 61 US equity funds reported by the Social Investment Forum which are examined from 1989 to 2006. Lee et al. find that screening does not affect the unadjusted return of the portfolio, however they do find, that when applying the Carhart's model, the return declines by 70 basis points per additional screen. In terms of risk, they find no significant relation between unsystematic risk and screening intensity. Conversely, they find a curvilinear relation between screening intensity and systematic risk. They argue that the results indicate that fund managers attempt to favor stocks with lower beta, but the universe of acceptable low beta stocks diminishes as more screens are imposed. However, it seems that if the systematic risk is disregarded, adequate diversification can be obtained even in portfolios with very intense screening.

Copp, Kremmer and Roca (2010) examine the similarities of risk-adjusted returns between socially responsible investments and conventional investments during the latest economic downturns in Australia and worldwide. The sample consists of four indices from which the Dow Jones Total Stock Market Index-World (DJTM World) and the Dow Jones Total Stock Market Index-Australia (DJTM Australia) represent conventional investments and the Dow Jones Sustainability Index-World (DJSI World) and the Dow Jones Sustainability Index-Australia (DJSI Australia) represent SRI. The weekly price indices are gathered from the June 1994 to May 2009 providing a total 804 observations. The researchers apply the market model and GARCH model in order to estimate betas over the time period for both SRI funds and conventional investment funds. The state of the market in different economic cycles is categorized into

"normal" economic conditions and downturns with the application of dummy variables. They find that conventional equity investment returns decline during an economic downturn. Also SRI returns decline, but not as much as conventional investments. They also find that in an economic downturn socially responsible investments become riskier than conventional investments, especially worldwide.

Humphrey and Lee (2011) revisit their previous study (Lee et al. 2010) on the effects of screening intensity by investigating the performance and risk of SRI equity funds in the Australian market and worldwide. The sample comprises 27 SRI funds and 514 conventional funds as the benchmark. The observation period extends from January 1996 to December 2008. The performance of SRI is measured on the market model and the Carhart's four factor model. The screening intensity is studied by regressing the performance of each individual SRI fund against the number of positive and negative screens. Humphrey and Lee do not find any significant differences in the returns between SRI and conventional funds and little evidence to suggest that positive or negative screening impacts fund performance. However they do find indications that highly screened portfolios offer higher risk-adjusted returns and that an increase in the number of screens significantly decreases market risk. When it comes to screening intensity, it would appear that increasing the number of positive screens significantly reduces total and diversifiable risk, but SRI funds which impose a large number of negative screens may suffer from a lack of diversification. They also find a curvilinear relation between the number of screens and idiosyncratic risk (similar to Lee et al. 2010), and a negative relation between the number of screens and systematic risk.

Study	Year	Data	Observed	Approach	Main findings
Hamilton et al.	1993	32 US SRI funds	1981–1990	MPT	SRI fund performance does not differ from conventional funds
Diltz	1995	14 portfolio pairs	1990-1991	MPT	Screening has no effect on performance
Sauer	1997	DSI 400	1986-1994	MPT	No effect on performance. For SRIs, the total risk is a more appropriate measure than the market risk.
DiBartolomeo et al.	1999	DSI 400	1990-1999	APT	By adjusting the factor bets of the SRI portfolio, the differences in performance can eliminated. SRIs seem to have a growth bias.
Hickman et al.	1999	6 SRI funds	1991-1995	MPT	SRI funds have a low correlation with the market, so they can be used as means of diversification.
Abramson & Chung	2000	Value stocks from DSI 400	1990-2000	VIT	Value subset of DSI outperformed the market. SRI seems to be style-neutral.
Statman	2000	31 Us SRI funds & DSI 400	1990–1998	MPT	DSI performance was equal to market. SRI funds underperformed, but equally to conventional funds.
Blank & Carty	2002	Eco-subset of S&P 500 index	1997-2000	APT	Eco-subset outperformed the S&P 500 index. Top rated companies outperformed bottom rated companies.
Derwall et al.	2005	Portfolio on Innovest ratings	1995-2003	APT	High ranked portfolio outperformed the low ranked portfolio.
Shank et al.	2005	3 SRI funds & 11 SRI firms	1998-2003	MPT	Performance varies in the short run, but positive returns can be found in the long-run
Kim & Venkatachalam	2006	111 sin stocks	1988-2003	NCE	Sin stocks outperformed the control sample. The neglect seems to be based on non financial factors.
Barnett & Salomon	2006	61 SRI funds	1972-2000	MPT/SHT	There is a curvilinear relation between screening intensity and performance.
Hong & Kacperczyk	2009	184 US sin stocks	1926-2006	NCE	Sin stocks outperformed the market and behave similarly as value stocks.
Lobe et al.	2009	755 sin stocks & 32 SRI indices	1995-2007	MPT & APT	No difference in performance between SRI and sin stocks, but sin stocks are value-oriented and SRI indices growth-oriented.
Statman & Glushkov	2009	KLD data	1991-2006	MPT & APT	Exclusionary (Qualitative) screening has a negative (positive) relation with portfolio performance.
Lee et al.	2010	61 US equity funds	1989-2006	MPT & APT	There is a curvilinear relation between screening intensity and systematic risk, but no relation with unsystematic risk
Copp et al.	2010	DJTM & DJSI indices	1994-2009	MPT	In a downturn DJSI became riskier, but outperformed DJTM
Humphrey & Lee	2011	27 SRI funds	1996-2008	MPT& APT	Intensifying positive screening reduces diversifiable risk, but intensifying negative screening may result in lack of diversification

MPT = Modern Portfolio Theory, **APT** = Arbitrage Pricing Theory, **SHT** = Stakeholder Theory, **NCE** = Neglected company effect, **VIT** = Value Investing Theory

Table 2. Chronological summary of previous studies.

5. DATA

This chapter opens the empirical part of the study. The starting point of the study is to create an effective way to rank companies based on their social responsibility. This is done by applying The Ethical Quote data, which was provided by a third party. The description of this data is presented first, naturally the data also needed to be modified for research purposes. In this case the ethical data is patched together with stock data in order to create portfolios with different attributes. The portfolio construction is presented in detail and all necessary data modification and eliminations are explained. The final sample is then evaluated and discussed with the intention of discovering possible defects and partialities.

5.1 Ethical Quote data

As abovementioned, the basis of the study was to find a reliable scoring system in order to rank companies based on their social responsibility. There are several providers for such a data from which the most prominent is Covalence, an independent company based in Geneva, Switzerland. The company gathers and maintains Ethical Quote which is an ethical reputation scoring system that tracks the world's largest companies. Covalence also offers reputation research and ESG ratings. The company reports that its mission is to increase the density of information on business ethics and to offer this information for finance professionals. Information provided by Covalence has also been acknowledged in scientific papers (e.g. Erwin 2010; Maon, Lindgreen & Swaen 2010). Currently, Covalence Ethical Quote Ranking covers a universe of 581 companies within 18 sectors following the Dow Jones Sector Titans.

Ethical Quote score is based on publicly available online information gathered from search engines, individual websites and correspondents. The primary objective is to gather the largest quantity of relevant information with scientific rigor. For Covalence neutrality is the most important value, therefore all sources are considered equally and as reliable as the other.

News items are classified according to 45 criteria, which are classified into the following 4 groups:

- I. Working Conditions (e.g. standards, wages, diversity and social benefits)
- II. Impact of Production (e.g. job creation, fiscal contributions and environmental impact of production)
- III. Impact of Product (e.g. product social utility and product environmental risk.
- IV. Institutional Impact (e.g. human rights policy, United Nations Policy and anti-corruption policy)

Covalence criteria are designed to cover any multinational company and to allow cross-sector comparisons. The criteria are based on the contribution to human development according to an international legal framework. The specifics of each criterion are derived from:

- Universal Declaration of Human Rights (1948)
- OECD Guidelines for Multinational Enterprises (1976)
- ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (1977)
- Rio Declaration on Environment and Development (1992)
- Copenhagen Agreements on Social Development (1995)
- United Nations Global Compact (2000)
- United Nations Millennium Declaration & Millennium Goals (2000)

(Covalence criteria of business contribution to human development are more thoroughly addressed in appendix 1)

Each news item is given a score of 1 or 2 points depending on how detailed the information is. The points get a positive or a negative sign according to the orientation of the information. The Ethical Quote score of each company is calculated from the points given on different pieces of news concerning the company in question. The absolute score is then adjusted for media exposure and size biases. For the research, all US companies from the Ethical Quote data were selected, starting from the inception of the tracking system in 2002. The number of US companies tracked by Covalence has gradually grown from 75 to 240 by the end of 2010. A dynamic ranking based on the Ethical Quote score of each individual company was then created from the data. (Covalence 2011.)

5.2 Portfolio construction

In order to investigate the hypotheses from different angles, a total of seven portfolios were created. The compositions of each portfolio in this study are based on the Ethical Quote scores. First of all the stringency of social screening is investigated through five portfolios with different threshold-levels. These portfolios represent the companies with the top 25%, 20%, 15%, 10% and 5% of Ethical Quote scores, and are referred to as "stringency portfolios". Evidently the screening stringency also leads to a diminishing universe of applicable stocks. In addition the number of companies monitored by Covalence in the beginning of the period was very low, therefore a portfolio containing less than 5% of ethical quote stocks would most likely deliver biased and scientifically insignificant results. Figure 3 shows how the number of observed companies has grown over time in each portfolio.

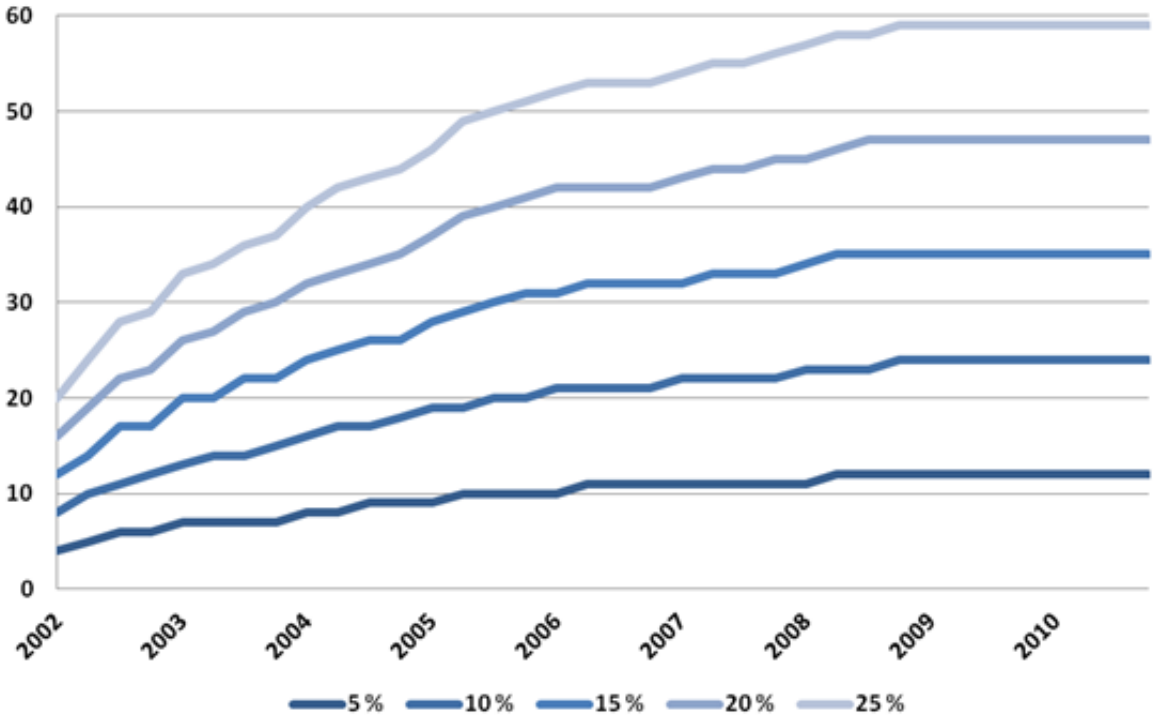

Figure 3. The number of observed companies in the portfolios.

In addition to the stringency portfolios, which represent the top ethical scorers, a portfolio was created to measure the performance of companies which may not have the highest total score, but which have significantly improved their ethically sound operations. The "Best Improvement Portfolio" represents the companies which have improved their score the most in respect to previous year's score (for the first year the

score was reflected back to the first quarterly score). When examining the results, it appeared that no more than 10% of the companies had significantly improved their score, therefore it was decided that the portfolio would include the top 10% of improvers. Many previous studies suggest that unethical companies tend to outperform the market and for this reason a portfolio was also constructed to measure the performance of the bottom 10% SRI performers. Unlike in prior studies, The "Unethical Portfolio" does not have similar limitations as negative screening usually has, it is purely based on the Ethical Quote scores.

In order to calculate the portfolio returns the daily stock quotes for all companies represented in the Ethical Quote database were derived from Thomson One Banker Analytics Database provided by the University Of Vaasa. The daily company returns were then calculated from the stock quotes using the arithmetic return method:

$$(4) \qquad R_{i,t} = \left(\frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}}\right)$$

where $R_{i,t}$ is the company i stock return, $P_{i,t}$ is the closing price of the stock i in day t and $P_{i,t-1}$ is the previous trading day's closing price.

The daily portfolio returns were then calculated from the daily returns of individual stocks. Based on common practice it was decided that the portfolios would be quarterly adjusted. That is to say, the composition of each portfolio is amended according to the most recent Ethical Quote scores. For the sake of simplicity, it was assumed that there are no transaction costs. Within the quarter, each portfolio stock is held with a buy-and-hold approach, but as the composition of the portfolio changes also the weights of the stocks are rebalanced at the beginning of each quarter. Market capitalizations of the companies, however, do not have a weighting effect for the portfolios.

A total of 4 companies were eliminated due to insufficient stock data. Several companies continued to be monitored by Covalence after their stock exchange had ended due to a merger, delisting or chapter-11 protection. From these companies only Sun Microsystems and General Motors would have affected the portfolios with a significant presence. Covalence also monitored Philip Morris International Incorporated from the beginning of 2002 although its stock was an Altria spin off only

from March 24, 2008. These ambiguities were taken into account in the composition of the portfolios. The Final sample consists of 236 companies of which 146 made a presence in at least one of the seven portfolios during the observation period. For the full list of US companies monitored by Covalence, please see appendix 2.

Covalence Ethical Quote monitors the world's biggest companies but this study limits the observations to the US stock markets. All of the companies are listed either in NYSE or NASDAQ and evidently represent the largest companies in the US. For this reason the value-weighted return on the whole US market (NYSE, AMEX, and NASDAQ) does not represent the sample in terms of composition and company size. Therefore it was decided that the S&P 500 index is used as the benchmark for the portfolios, as its composition is very much similar to the sample. Similarly to Fama-French studies, the risk free rate used in this study is the one-month Treasury bill rate. The benchmark and T-bill returns were also derived from Thomson One Banker Analytics Database provided by the University Of Vaasa.

Finally the sample is divided into two distinctive periods in terms of market cycles. Period 1 extends from the 2nd quarter of 2002 until the end of the 3rd quarter of 2007. In the beginning of period 1, the US market is still in a downturn resulting from the terrorist attacks of 9/11, but the markets take a turn in the last quarter of 2002 and continue to boom until the end of the period. Period 2 starts where period 1 left off, at the 4th quarter of 2007 and extends until the end of 2010. The second period is first marked by a descent due to the financial market disturbances which, in the last quarter of 2009, lead to a drastic stock market dive. In the end of the first quarter of 2009 the market, however, takes a turn and first picks up rather quickly, but the pace slows down towards the end of the period. Each portfolio consists of 1398 observed daily returns in period 1 and 833 observed daily returns in period 2.

5.3 Portfolio and data characteristics

In regard to previous studies there are some oddities, concerning the sample, that do occur due to the selected approach. As the portfolios are constructed strictly based on Ethical Quote score, no additional screening practices are used. In result there are 19 companies that visit both the top ethical performers' portfolio and the unethical portfolio. Three of these companies would be screened out by most SRI funds and

indices and several others would not pass their qualitative screens. Another issue which separates these portfolios from SRI funds and indices is the lack of active portfolio management. Financial expectations do not play a part in the portfolio management, only past ethical performance does. Consequently, it can be expected that the portfolios follow the benchmark more closely and it would not come as a surprise if the results on the performance of the portfolios differ from previous studies on social screening. In fact this approach is closer to the best in class approach than traditional social screening, although they both tend to have active portfolio management on their side.

Table 3. Descriptive statistics on the portfolios and S&P 500 Index

Period 1

	S&P	P25	P20	P15	P10	P5	PBI	PUE
Observations	1398	1398	1398	1398	1398	1398	1398	1398
Mean	0,025 %	0,025 %	0,020 %	0,024 %	0,023 %	0,030 %	0,017 %	0,047 %
Median	0,059 %	0,039 %	0,036 %	0,029 %	0,030 %	0,045 %	0,038 %	0,075 %
Standard Deviation	0,996 %	1,137 %	1,106 %	1,107 %	1,170 %	1,178 %	1,149 %	1,021 %
Kurtosis	3,403	4,054	3,775	3,825	4,455	4,940	4,033	3,445
Skewness	0,254	0,418	0,340	0,353	0,441	0,304	0,406	0,169
Shapiro-Wilk	0,955***	0,940***	0,948***	0,948***	0,943***	0,950***	0,945***	0,961***
Minimum	-4,154 %	-4,467 %	-4,547 %	-4,572 %	-5,441 %	-6,938 %	-4,493 %	-4,537 %
Maximum	5,733 %	6,690 %	6,195 %	6,509 %	7,215 %	7,865 %	6,508 %	6,325 %

Period 2

	S&P	P25	P20	P15	P10	P5	PBI	PUE
Observations	833	833	833	833	833	833	833	833
Mean	-0,006 %	0,003 %	0,005 %	0,002 %	0,002 %	-0,004 %	0,011 %	0,007 %
Median	0,074 %	0,043 %	0,068 %	0,044 %	0,058 %	0,053 %	0,079 %	0,035 %
Standard Deviation	1,851 %	1,801 %	1,863 %	1,916 %	1,930 %	1,998 %	1,794 %	2,094 %
Kurtosis	6,268	4,679	4,588	4,438	4,101	4,067	4,769	4,964
Skewness	0,057	0,124	0,114	0,151	0,121	0,176	0,305	-0,063
Shapiro-Wilk	0,911***	0,931***	0,931***	0,932***	0,938***	0,940***	0,938***	0,933***
Minimum	-9,035 %	-8,090 %	-8,671 %	-8,418 %	-8,080 %	-8,550 %	-7,701 %	-10,148 %
Maximum	11,580 %	10,659 %	10,759 %	10,961 %	11,013 %	11,484 %	11,097 %	12,964 %

Now let us take a closer look at the sample and the descriptive statistics of each portfolio. In periods 1 and 2, each portfolio consists of 1398 and 833 observed daily returns respectively. All descriptive statistics presented for the portfolios in table 3 are

also computed from daily returns. The arithmetic mean is the sum of the daily returns divided by the number of observations. The arithmetic mean is a simple estimate of the average daily portfolio returns. Median is the numerical value separating the higher half of the daily returns from the lower half. A positive median implies that most daily returns have a positive value as it is the case for all portfolios in both periods. The standard deviation measures how widely the values of the sample disperse from the mean. Basically the standard deviation is a measure of portfolio risk and is more often presented in an annualized form, in table 3 the standard deviation is presented for daily returns. Kurtosis and skewness are measures that describe the distribution of the sample. Kurtosis portrays the relative peakedness or flatness of the sample distribution compared to normal distribution. When kurtosis delivers a value of zero, the sample peak is leveled with symmetric standard deviation. Negative kurtosis would imply flatness, but table 3 shows that all portfolios deliver positive values in both periods. This means that the distribution of returns has a relatively higher peak and a thinner deviation compared to normal distribution.

The symmetry of the sample deviation is characterized by skewness. A perfectly symmetric deviation has skewness zero, a negative value of skewness is tilted on the left side in comparison to normal distribution. All portfolios, however deliver positive values which indicates a distribution with an asymmetric tail extending toward more positive values. The normality of the distribution is also measured with the Shapiro-Wilk test, which compares the sample values against the normal distribution. The test implies that none of the portfolio samples are normally distributed (*** = alpha level of 0,01). The minimum and maximum are the extreme values of each data set. (Heikkilä 2004: 82 – 89.)

Figure 4 presents a graphic illustration of the sample. It shows the histogram on the dispersion of daily returns for each portfolio as well as the S&P 500 index. The figure also shows the normal distribution curve computed from the whole sample. Both periods seem to have some skewness and kurtosis, although considerably more in period 2. We can also note that the scale of the returns is significantly larger in period 2.

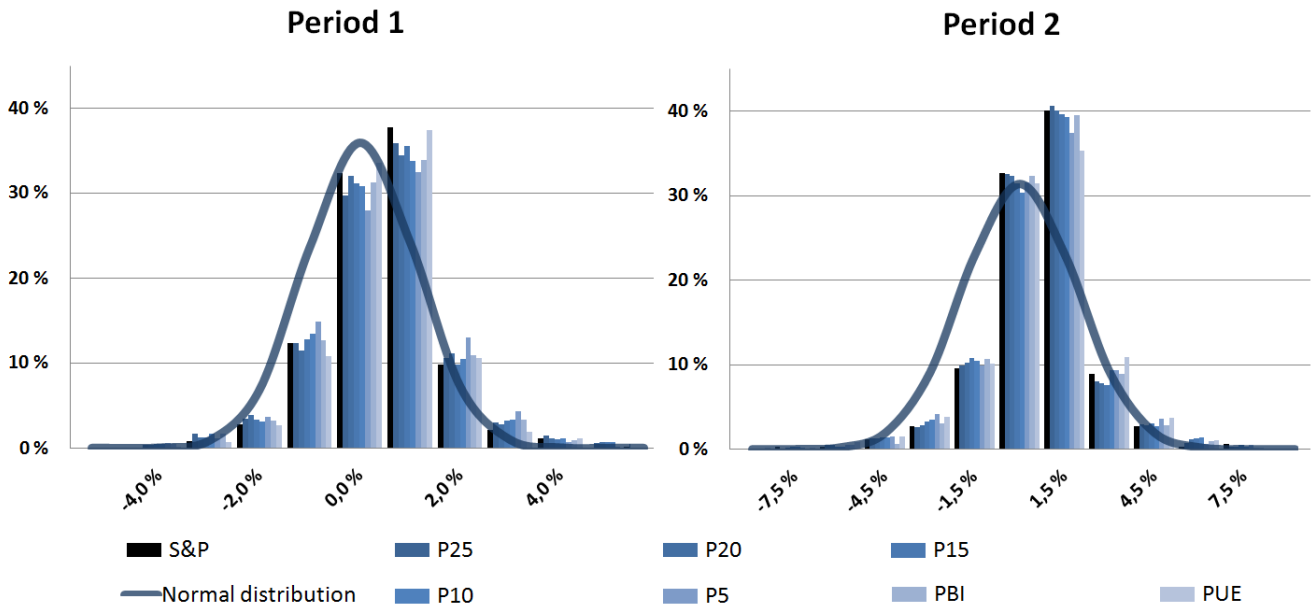

Figure 4. Distribution of the daily returns for the portfolios and S&P 500 Index.

6. METHODOLOGY

Risk and return are the two critical components underlying all investment decisions. One of the most important contributions of academic finance theory is that risk and return are essentially the same element viewed from different sides. The phenomenon is known as the "Risk-Return Tradeoff", which in generalized terms means that potential returns rise with an increase in risk. The balance between risk and return is what makes all the difference, highly risky investments may produce high returns only if the risk does not materialize. For this reason the risk and return of the portfolios are first analyzed individually from an ex-post perspective. Next the portfolios are subjected to a regression analysis in order to find out the Beta and Alpha coefficients and sensitivities to different factors. After this, the risk and return components are combined and the performance of the portfolios is calculated for five risk-adjusted performance metrics. Finally the possible effects of industries are investigated.

6.1 Portfolio risk and return

The daily returns of the portfolios serve as a basis for all calculations. However the daily returns were not directly applicable for every calculation and therefore they were extended to monthly and yearly returns by cumulating the daily returns. Also in order to have a graphic illustration, the cumulative returns were also calculated for holding periods 1 and 2. The formula for cumulative returns is as follows:

$$(5) \qquad Cumulative\ return = \left[\prod_{i=1}^{n}\left(1+\frac{R_i}{100}\right)-1\right]*100$$

Where n is the number of observation and R_i is the i-th return

Although the portfolio returns indicate how much profit was on offer, it is also important to know how much risk they carry. Volatility is a measure of risk closely related to the capital asset pricing model. It indicates the dispersion of returns for a given portfolio or security. In common terms, the higher the volatility, the riskier the portfolio. In this study the volatility has been calculated from the daily returns and is then annualized. The annualized volatility is calculated for each month separately and

for both observation periods overall. The formula for portfolio volatility is as follows (Nikkinen et al. 2002: 211.):

$$(6) \qquad Portfolio\ Volatility = \sigma_p = \sqrt{\frac{1}{n-1}\sum_{i=n}^{n}(R_i - \bar{R})^2}$$

Where R_i is the return of a given portfolio on day, n is the number of observations and $\bar{R}$ is the mean return.

Another gauge of risk is the tracking error. It measures how loosely the portfolio return follows the benchmark index return. Tracking error is defined as the time-series standard deviation of the difference between a fund return and its benchmark. High tracking error indicates that the portfolio returns have deviated a lot from the returns of the benchmark index. Tracking error increases when the portfolio holdings start to differ from the benchmark holdings. A tracking error of 5% means that the returns deviate 5% from the benchmark returns. If a portfolio contains exactly the same securities as the benchmark, then the tracking error for is 0%. The tracking error in this study has been calculated from monthly returns, its formula is as follows (Bodie et al. 2009, 929 – 930.):

$$(7) \qquad Tracking\ Error = \sqrt{\frac{1}{n-1}\sum_{i=n}^{n}(ER_i - \bar{R})^2}$$

Where ER_i is the return for a given portfolio on month i in excess of the return of the benchmark index in month i, $\bar{R}$ is the mean of ER_i in the observation period and n is the number of observations.

The two most common reasons for tracking error are the attempt to outperform the benchmark by active portfolio management and the passive replication of the benchmark. In this study the portfolios are not actively managed, but rather socially responsible sub-portfolios of the benchmark and for this reason they should mimic it. However passive portfolio management per se usually refers to automated transaction systems, so to that extent passive management does not correspond to the portfolios examined in this study either. Nonetheless, a high tracking error indicates that the

portfolio return has varied extensively in relation to the benchmark return. Correspondingly, a low tracking error indicates that the portfolio and benchmark returns are very much similar. The magnitude of tracking error should be directly related to the extent of volatility of the stocks comprising the index. (Ammann & Tobler, 2000.)

Transaction costs, portfolio cash flows and the application of dividends are factors often related to the appearance of tracking error, however these factors are excluded from the study. Another possible reason is in the different composition between the portfolios and the benchmark. S&P P500 Index is market capitalization weighted, which means that the amount of each stock held in the index fluctuates depending on the proportion of the market capitalization of the stock relative to total market capitalization of the index. Conversely, the stocks in the portfolios are equally weighted and quarterly balanced according to the latest Ethical Quote score. Yet, the most likely reason for the possible appearance of tracking error in this study is the lack of diversification in the portfolios. In accordance with assumptions of the modern portfolio theory the stringency of screening limits the universe of available investment opportunities and therefore affects the riskiness of the portfolio. (Frino & Gallagher, 2001.)

6.2 Regression analysis

The regression analysis is a statistical method with a fundamental purpose of analyzing the relationship and dependence between specified variables. The analysis is used to determine the variability of a dependent variable (y) through its sensitivity to one or more independent variables. A simple regression model contains only one independent variable (x), when a multiple regression contains more than one independent variable. The analysis is carried out through the estimation of a relationship of the variables. Formula 8 presents a common multiple regression model with n independent variables (Wooldridge 2009: 71 – 75, 89.):

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_n x_n + \varepsilon_t \quad (8)$$

Where y is a dependent variable, β_0 is a constant term, $\beta_1 \dots \beta_n$ are coefficients, $x_1 \dots x_n$ are independent variables, and ε_t is an error term.

The results of a regression analysis serve two purposes, they show how much the dependent variable (y) changes in respect to the independent variables ($x_1 \dots x_n$) and they allow to make prediction and forecasts of y based on $x_1 \dots x_n$. However the results regarding the regression variables have no use if the model is flawed, therefore the results also indicate whether the selected model is applicable to begin with.

The beta coefficients ($\beta_1 \dots \beta_n$) are used to describe the relation between the movements of the dependent variable and the independent variables in the model. In this study the dependent variables are the SRI portfolios and the Unethical portfolio whereas the independent variables are the S&P index (as a proxy for the market) and SMB & HML –factors (from the 3-factor model). A positive beta coefficient indicates that the portfolio and the independent variables generally move to the same direction and a negative beta indicates an inverse relation. A beta coefficient of 1.0 indicates that the portfolio has the same risk profile as the factor in question. The main advantage of the beta coefficient is that it is easy to interpret. If the beta is higher than 1.0 the portfolio is riskier than the benchmark and vice-versa. However as the beta is calculated from ex post data, the disadvantage is that it tells very little about the attractiveness or the value of the portfolio in the future. (Wooldridge 2009, 187 – 188.) The precision of the estimates can be measured with standard error (ε_t). The error term provides a general indication of the likely accuracy of the regression parameters. It is basically the measure of the degree of uncertainty in the estimated values for the coefficients. Therefore a small standard error indicates that the coefficients are likely to be precise on average, but not how precise they are. (Brooks 2008, 46 – 47.)

The estimation results of a linear regression model also produce measures which help in defining the models utility. R-square (R^2), also known as the coefficient of determination, is used to evaluate a model's explanatory power or goodness-of-fit. It is basically the correlation between the dependent variable (portfolio) and the independent variables (market, SMB & HML –factors). Every model is able to explain a certain amount of the total variability of the dependent variable, R-square expresses this amount in percentage. The closer R-square gets to 1 (or 100%), the better the explanatory power of the model. Correspondingly, a low R-square states that very few of the portfolio's movements are explained by the factors. Adjusted R-square takes into consideration the number of independent variables and is therefore a better measure for multifactor models if added variables are able to increase the goodness-of-fit. (Brooks 2008, 106 – 111; Wooldridge 2009, 199 – 201.) It is also necessary to determine whether the coefficient values are significant enough to have explanatory

value. The t-ratio is a common significance test, basically it is the calculated ratio of the coefficient to its standard error. In order to make judgment on significance, the ratio has to be compared with appropriate critical values from a t-distribution. The critical values, or significance levels, for a two-sided test are commonly 10%, 5% and 1%. (Brooks 2008, 65 – 66.) The basic assumption of the OLS regression is that the errors do not correlate with one another. If they do, the model may be biased by autocorrelation. The Durbin-Watson test measures the first order autocorrelation. It provides a value between 0 and 4, if it the value is close to 2, there is very little autocorrelations in residuals, however a considerable deviation from 2 indicates its presence. (Brooks 2008, 144 – 147.)

The Ordinary Least Square (OLS) regression driven Capital Asset Pricing Model (CAPM) is the most common regression model used in stock market analysis. The beta coefficient delivered by the CAPM model implies the sensitivity of the studied portfolio to the market portfolio. If the portfolio is able to create abnormal excess return, the equation gets an additional intercept term called the Jensen's alpha. (Jensen, 1968.) The alpha coefficient (α_0) as such is the constant term in a market model regression. In finance it is determined as the intercept of the security market line (see chapter 3.2). The following CAPM equation is used for regression analysis in this study:

$$R_{pt} - R_{ft} = \alpha_0 + \beta_1\left[R_{mt} - R_{ft}\right] + \varepsilon_t \quad (9)$$

where, R_{pt} is the portfolio return in trading day t, R_{mt} is the market portfolio (S&P500) return for day t, R_{ft} is the 1 month Treasury bill return for day t and acts as a proxy for the risk free rate.

However the CAPM is a simple regression model with only the risk-adjusted market return as the independent variable. CAPM is derived from the implications of the modern portfolio theory (see chapter 3.2) and it has been criticized due to its assumption on systematic risk. It has later been proven that the efficient market conditions do not usually apply. Therefore CAPM results may be biased. (Bodie et al. 2009, 297.)

Many SRI studies which utilize time-series regression have chosen multifactor models instead. Multifactor models increase the explanatory power of the regression model because they assume that several factors affect the returns. One of these models is the Fama-French three factor model which was created in 1992 as a result of the

research paper “The Cross-Section of Expected Stock Returns” by Fama and French. Similarly to CAPM the Fama-French model also includes the market return premium, but also two other factors based on well known market anomalies, these factors are the small size premium (SMB) and the high book-to-market premium(HML). Empirical evidence indicate that historical-average returns of small firms and firms with high Book-to-market ratios are higher than predicted by the security market line of CAPM. In other words the evidence suggests that CAPM does not take into account all sources of systematic risk, which in this case are size and book-to-market –factors. In this study the Fama-French 3-factor model is utilized to test stock market efficiency and to ensure that possible abnormal returns are not caused by risk factors. Each factor acts as a proxy for systematic risk, and therefore the alpha should be reduced in comparison to CAPM if SMB and HML -factors have explanatory power in the model. (Bodie et al. 2009, 423 – 424; Lakonishok et al. 1994.)

The applied Fama-French model used in this study is presented as follows:

$$R_{pt} - R_{ft} = \alpha_0 + \beta_1\left[R_{mt} - R_{ft}\right] + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_t \quad (10)$$

where, R_{pt} is the portfolio return in trading day t, R_{mt} is the market portfolio (S&P500) return for day t, R_{ft} is the 1 month Treasury bill return for day t and acts as a proxy for the risk free rate, SMB_t is the return on small firms minus the return on big firms in day t, HML_t is the return on high book-to-market firms minus the low book-to-market firms in day t.

The SMB and HML -factors have been derived from Kenneth French’s data library (2012) and they are constructed using 6 value-weight portfolios formed on size and book-to-market. The SMB -factor is the return of small company portfolios minus the return of big company portfolios. Small companies are the ones that are under the median in market value and big companies the ones that are above the median. The HML -factor is the return of high book-to-market portfolios (representing value stocks) minus the return of low book-to-market portfolios (representing growth stocks). High book-to-market companies are the ones that have the top 1/3 book-to-market ratios of the portfolio, conversely the low ratio group is the one with 1/3 lowest value. (Bodie et al. 2009, 424.)

6.3 Risk-adjusted performance metrics

Although simple return metrics provide information on how well an investment does on a specified period, it is not a very useful measure of performance. Risk-adjusted performance metrics take into account the risk that was taken in order to achieve these returns, therefore they allow a more meaningful comparison between portfolios. The most common measures of risk-adjusted performance are Jensen's Alpha, Sharpe ratio, Treynor ratio and Information ratio. However, it must be noted that the measures have encountered resistance due to some of their inherent problems. The rankings provided by these measures may be misleading if the portfolio characteristics are not comparable. The metrics are based on ex-post data so before they can be used for ex-ante decision making, they require a certain amount of data and time. The risk-adjusted performance metrics are useful measures, but each of them should be assessed according to the underlying circumstances. Investors should also be wary of investments, which are promoted by a single performance metric. (Bodie et al. 2009, 825 – 826; Friend & Blume 1970.)

6.3.1 Jensen's Alpha

Jensen's Alpha is a common CAPM-based performance metric. It depicts the risk-adjusted performance of a portfolio, in other words it is the return in excess of the compensation for the risk. The null hypothesis of the CAPM is that the constant term, or Jensen's alpha, is zero. However in reality this is hardly ever the case. An Alpha which differs from zero implies either a problem in the market valuation or a problem in the model. Usually the model fails to take into account all measurable risk factors. In finance Alpha may also indicate outperformance or underperformance in respect to the market risk. A positive Alpha implies that the investment has performed better than could have been expected based on the Beta of the investment. (Vaihekoski 2004, 207.)

Originally Jensen's Alpha was developed to evaluate the skill of active fund managers in stock picking. Successful active management and financial engineering may improve the Alpha of a portfolio without adversely affecting the Beta. In accordance to the CAPM, Jensen's Alpha is defined by the following equation:

$$(11) \qquad Jensen's\ Alpha = R_p - R_{rf} - \beta(R_b - R_{rf})$$

where R_p is the expected portfolio return, R_{rf} is the risk-free rate, β is the portfolio Beta, and R_b is the market return.

According to Jensen (1968) his model should imply how well the portfolio manager can predict future security prices. He also notes that the concept of portfolio performance has two distinct dimensions: The ability to successfully predict future security prices and the ability to minimize risk through efficient diversification. The model, however, does not take efficient diversification into account because the risk premium is based on systematic risk. Jensen's Alpha has also received other criticism. If the capital asset pricing model is not the correct equilibrium model, Jensen's model delivers flawed indicators. In addition the model does not help to recognize the relation between the performance and the information which drives it. Many studies also reveal that Jensen's Alpha often delivers a high variation in standard error and it seems that statistical tests struggle to affirm its significance. (Jensen 1968; Sauer 1997.)

6.3.2 Sharpe ratio

Sharpe ratio, also known as the reward-to-variability ratio, is probably the most common risk-adjusted performance metric because the ratio is very simple and easy to compute. Sharpe ratio also measures the risk-adjusted performance of a portfolio, but it is measured by volatility. Volatility, or standard deviation, is a measure of the total risk of the portfolio, in other words it takes into account both the systematic (market) and non-systematic (firm-specific) risks. According to Sauer (1997) Sharpe ratio is a more appropriate measure of risk exposure when it comes to socially responsible investing, because it calculates the total risk instead of the market risk. Since screening may restrict the investment universe, SRI portfolios may unintentionally subject themselves to otherwise diversifiable risk. (Sharpe 1966; Sauer 1997.)

Sharpe ratio can be calculated by dividing the average risk-adjusted returns with the standard deviation of the returns. A higher Sharpe ratio indicates a better performance on a risk-adjusted basis, however similarly to other risk-adjusted metrics the ratio should be compared to benchmark. The equation for Sharpe ratio is as follows:

$$(12) \qquad Sharpe\ ratio = \frac{R_p - R_{rf}}{\sigma}$$

Where R_p is the return of the portfolio, R_{rf} is the risk-free return and σ is the standard deviation of the portfolio return over risk-free return.

Because the risk premium is described by the volatility of the portfolio, Sharpe ratio does not share the weaknesses related to the capital asset pricing model. However, also Sharpe ratio has been criticized. The volatility is a somewhat problematic risk measure, because it may deliver severely biased results if the returns are not normally distributed. The standard deviation also fails to observe whether the returns vary bellow or above average returns, hence it inherently discriminates returns which are above average. Sharpe ratio may also deliver biased results if the investment strategy changes during the observation period. For instance the ratio may be the same for two consecutive years if they are calculated separately, but significantly different if the observation period is extended to cover both years. When it comes to professionally managed portfolios this problem often arises when economic cycles shift. (Bodie et al. 2009: 735 – 737.)

6.3.3 Modified Shape ratio

The standard Sharpe ratio is an appropriate measure only if the returns are normally-distributed. In normally distributed samples the entire distribution can be well summarized through the mean and the variance. However many modern investment vehicles, such as hedge funds and bonds, display fat-tailed returns, in which there is the potential for extreme losses. In these situations, the standard Sharpe ratio underestimates risk and should not be used. Favre and Galeano (2002) have modified Sharpe's original measure by eliminating the limitations regarding the shape of the sample distribution. The potential for extreme losses can be quantified through the modified Value at Risk, which takes into account the skewness and kurtosis of the returns distribution. Favre & Galeano were able to demonstrate that volatility can be used as a risk premium even when the sample is not normally distributed. The standard Sharpe ratio is the risk-adjusted return divided by the standard deviation. However, the modified Sharpe ratio is the risk-adjusted return divided by the modified Value at Risk, and is defined by the following equations (Favre & Galeano 2002.):

$$(13) \qquad Modified\ Sharpe\ Ratio = \frac{R_p - R_{rf}}{\mu - Z\sigma}$$

Where R_p is the return of the portfolio, R_{rf} is the risk-free return, μ is the mean return and $Z\sigma$ is the standard deviation of Z

$$(14) \qquad Z = (z_c + \frac{1}{6}(z_c^2 - 1)S + \frac{1}{24}(z_c^3 - 3z_c)K - \frac{1}{36}(2z_c^3 - 5z_c)S^2)$$

Where S is the skewness, K is the kurtosis, z_c is the quantile of the distribution and Z is the Cornish-Fisher asymptotic expansion for the quantile of a non-gaussian distribution. For a detailed derivation of the Cornish-Fisher expansion formula, please see Cornish & Fisher (1937).

6.3.4 Treynor ratio

Treynor ratio, also known as reward-to-volatility ratio, was the first risk-adjusted performance metric and it was introduced in 1965. Treynor ratio is very much similar to Shape ratio, they both divide the effective return by the risk. However they differ on the risk factor. Whereas Sharpe ratio uses the total risk, Treynor ratio is based on the CAPM applying the beta coefficient which measures only the systematic risk of the portfolio. Treynor ratio is also used to characterize how well the portfolio's riskiness is compensated by the return, hence, it indicates the performance on a risk-adjusted basis. The equation for Treynor ratio is as follows (Treynor 1965.):

$$(15) \qquad Treynor\ Ratio = \frac{R_p - R_{rf}}{\beta}$$

Where R_p is the return of the portfolio, R_{rf} is the risk-free return and β is the sensitivity to the benchmark, or the beta coefficient.

The main advantage of Treynor ratio is that it indicates the volatility a stock brings to an entire portfolio. If the portfolio is well diversified Sharpe and Treynor ratios should produce similar results, however if a portfolio lacks efficient diversification it may produce biased results. The reason for this lies in the CAPM derived risk component,

which fails to track all necessary information. Another problem associated with Treynor ratio is its relation to the selected benchmark. Since the beta coefficient represents the sensitivity to a benchmark, different benchmarks naturally generate different beta coefficients. In general, Treynor ratio should only be used as a ranking mechanism for similar investments. (Friend & Blume 1970; Modigliani & Modigliani 1997.)

6.3.5 Information ratio

The Information ratio, also known as the Appraisal ratio, is a risk-reward benchmark that is used to quantify the performance of an investment. Information ratio is often used to represent how efficiently the portfolio generates active returns relative to the amount of risk taken. It also measures the portfolio manager's ability to generate excess returns relative to the benchmark. Information ratio utilizes the tracking error as the risk component. It is equal to the average excess returns divided by the standard deviation of the excess returns. The equation for the Information ratio is as follows (Goodwin 1998.):

$$Information\ Ratio = \frac{E[R_p - R_b]}{\sqrt{var[R_p - R_b]}} \tag{16}$$

where R_p is the return for the portfolio, R_b is the benchmark index return and $\sqrt{var[R_p - R_b]}$ is the tracking error between the fund and the benchmark index

Similarly to other performance metrics, the Information ratio can be used to rank similar investments, however negative Information ratios can be misleading and should not be used. For portfolios which produce similar values for Jensen's Alpha and Treynor ratio, a higher Information Ratio indicates a better managed portfolio with superior stock picking. However, this is only valid if the portfolio and the selected benchmark have a strong correlation. A high Information ratio also indicates that the portfolio manager can achieve higher returns more efficiently than a manager with lower Information ratio by taking additional risk. It is also often used to monitor the consistency of the portfolio performance. (Goodwin 1998.)

6.4 The effect of industries

The effect of industries on socially responsible investing has been much disregarded in previous studies. However company stocks are often valued in respect to their peers and naturally companies positioned in the same industry tend to behave similarly. In order to investigate what kind of sensitivities SRI portfolios have towards industries it is first essential to define a set of industry specifications. Covalence uses a division into 18 sectors following the Dow Jones Sector Titans classification. However for the purpose of analyzing the industry-specific sensitivity of a portfolio, this classification is not entirely appropriate. The classification into 18 sectors is too broad considering the number of observations. Therefore such a division would most certainly lead to biased and insignificant results. Additionally there is no return data available for these sector portfolios, hence, the division was reorganized following one of Kenneth French's classification. Considering the economic conditions during the observation period, it was held important to include the financial sector as one specific industry. The division includes 11 specified sectors and one additional "sector" which covers all companies that do not fit in any of the specified ones. The industry of each company was then determined according to its primary SIC-code as filed with the United States Securities and Exchange Commission. All information regarding the industry portfolios are obtained from the Kenneth French's Data Library (2012).

The next step was to calculate the ethical score for each industry. The Ethical Quote score provided by Covalence represents the cumulative score for each company in question. Calculating averages from the cumulative score would have distorted the outcome, for previous ethical performance play a crucial part in later scores. Therefore calculating the quarterly score for each company gives a more precise result. The quarterly score for a company is calculated from the cumulative score using the following pattern:

$$QCS_{qt} = CCS_{qt} - CCS_{qt-1} \tag{17}$$

Where QCS_{qt} is the quarterly company score for a given quarter, CCS_{qt} is the cumulative company score for the quarter and CCS_{qt-1} is the cumulative company score for the previous quarter.

The quarterly score for a given industry is then calculated as the arithmetic mean of all observed companies in that specific sector.

$$(18) \qquad QIS = \frac{1}{n}\sum_{i=1}^{n} QCS_i$$

Where QIS is the quarterly industry score, n is the number of observed companies in each quarter and QCS is the quarterly company score.

A problem regarding the industry score for the whole observation period arises from the fact that the number of observations has accrued over time. For this reason it might be important to add a weighing factor when calculating the average. However after careful consideration it became clear that people making decision based on the score were to rely on the information that was available for them at the time and hence, had no knowledge to what extent Covalence would grow their universe of observed companies in the future. For this reason the score for each quarter is valued equally and the number of observations is disregarded. Hence, the score for observation periods 1 & 2 were calculated using a simple arithmetic mean of the quarterly industry scores.

$$(19) \qquad ISP = \frac{1}{n}\sum_{i=1}^{n} QIS_i$$

Where ISP is the industry score for the period, n is the number of quarters in the period and QIS is the quarterly industry score.

The next step was to create a correlation matrix between the SRI portfolios and the industry portfolios. The correlation measures the degree of linear association between two variables. In other words it depicts how related the movements of the two variables are on average. It is not as an effective tool as linear regression, but provides indicative information on the dependence between portfolios. Pearson's correlation coefficient is probably the most common measure of correlation. It is calculated with the following formula:

$$(20) \qquad Pearson's\ correlation = \left[\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})\right] / (n-1)\sigma_x\sigma_y$$

Where $\bar{x}$ and $\bar{y}$ are the sample means, σ_x and σ_y are the sample standard deviations

The value of the correlation coefficient varies between -1 and +1. If the coefficient is 0, there is no linear dependence between variables. Values -1 and +1 indicate perfect negative and positive dependence respectively. The significance of the correlation coefficient can also be tested the same way as for regression coefficients. Therefore the t-ratio is used also for Pearson's correlation. (Brooks 2008, 28.)

7. EMPIRICAL RESULTS

In this chapter the empirical results are presented and discussed. The results are presented in a similar order as the methodologies, starting from simple return and risk and moving on to regression analysis, performance metrics and industry effects. The results are presented in tables and figures, which are divided into the two distinctive periods examined in this study. In some cases the stringency portfolios are presented together and the Best Improvement and Unethical –portfolios are presented separately for comparison purposes. The results are also discussed in writing and according to the findings the hypotheses (presented in chapter 1.2) are either accepted or rejected.

7.1 Cumulative returns

The cumulative returns of the portfolios have been calculated for both periods and are presented in figures 5 and 6. Figure 5 shows the cumulative return curves of portfolios P25, P20, P15, P10 and P5 with respect to the benchmark. In period 1 we can first note that all portfolios performed as well or even better than S&P 500 index until the end of 2003. It seems that socially responsible companies picked up quickly after the drop they suffered due to 9/11, but after 2003 their stock growth slowed down. By the end of the period only portfolio P5, which produced a 37,27% return, outperformed the S&P 500 index, which reached a 33,06% return. The lowest return was denoted for portfolio P20 with only 22,18% for the period. In period 2, however, the results are quite opposite. Nearly all portfolios reached higher returns than S&P 500 index, only portfolio P5 suffered a last-minute drop which placed it under the benchmark. However all portfolios had negative cumulative returns by the end of the period. The figure also shows that the stock market crash hit the SRI portfolios harder than the benchmark, but that their recovery was faster. In the second period the highest cumulative return was measured for portfolio P20 with a return of -9,62%. S&P 500 index produced a return of -17,36% and P5 obtained the lowest return of the period, -18,15%.

Figure 6. shows the cumulative return curves for the Best Improvement portfolio, the Unethical portfolio, the 1-month T-bill and the S&P500 index. At first we can observe that in period 1 the Unethical portfolio produced very high returns, with 78,63% by the end of the period.

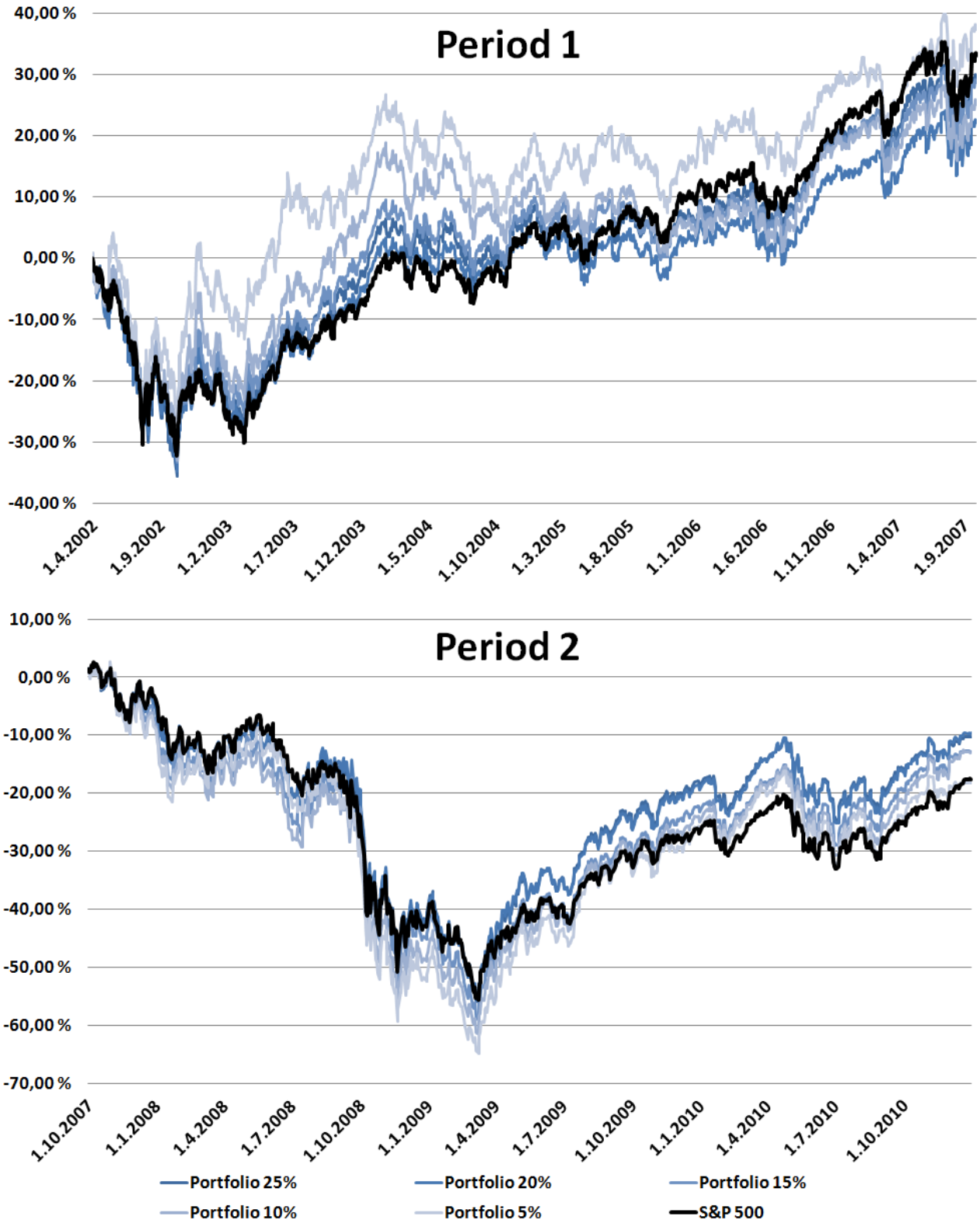

Figure 5. The cumulative daily returns of the stringency portfolios in respect to the benchmark.

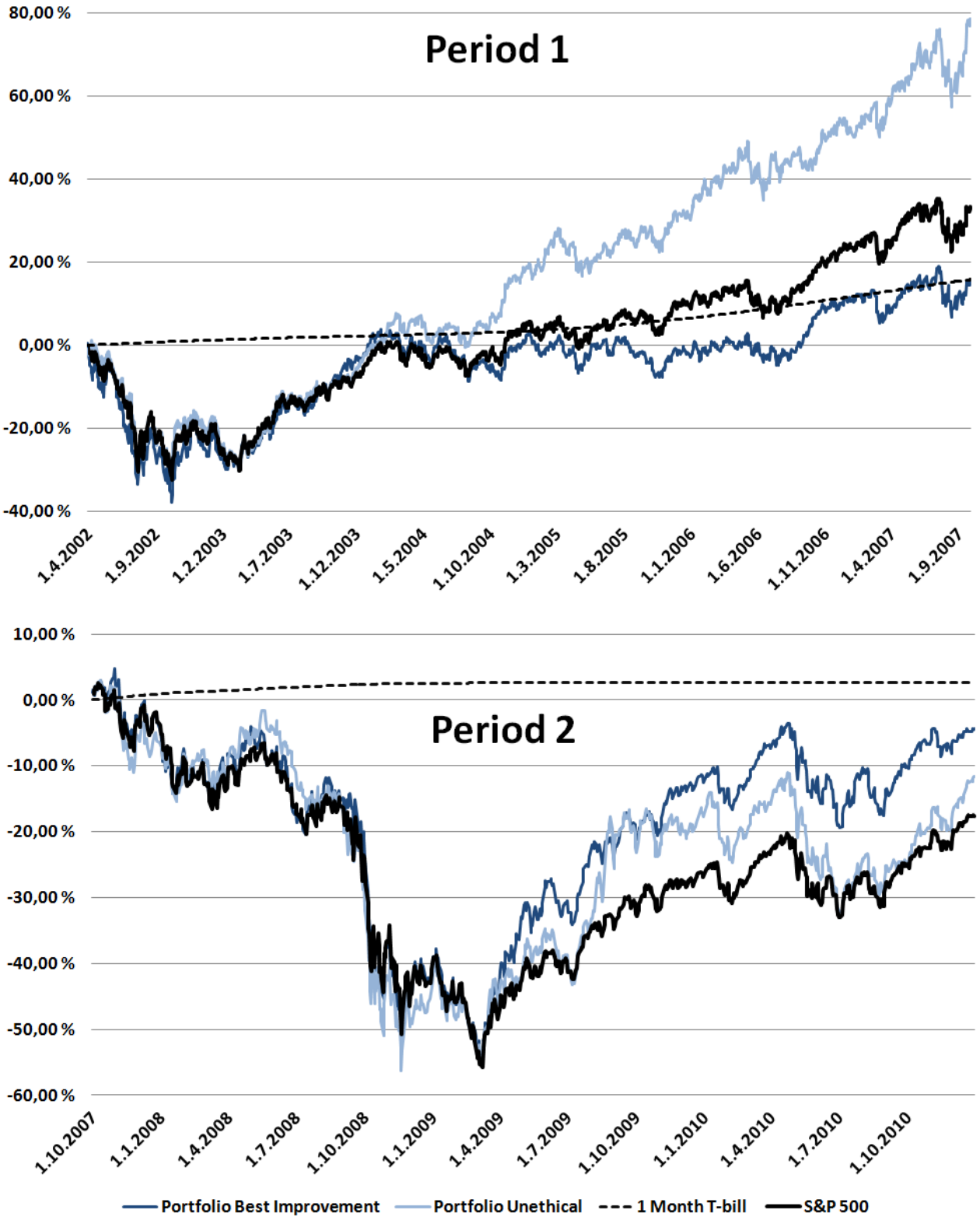

Figure 6. The cumulative daily returns of the Unethical and Best Improvement portfolios in respect to the benchmark and the risk-free rate.

Up until the end of 2003 all 3 portfolios followed a very similar trend after which the unethical portfolio started its fast growth while the Best Improvement portfolio started to lag behind the S&P 500 Index. The cumulative T-bill return shows that the government kept the rates at a very low level long after 9/11, and that only after 2004 investors were able to get proper returns from T-bills. It seems that the Best Improvement portfolio did not fully recover from the bear market resulting from 9/11 and by the end of the period it had produced only a 14,99% return, which is less than any other portfolio or the T-bill (15,84%) for that matter. When observing the returns in period 2, it seems that the stock market dive affects all portfolios quite similarly. The distinctions between the portfolio returns appear after the market turns. Unexpectedly, the Best Improvement portfolio recovers the quickest. In 2010 the double dip seems to have most effect on the unethical portfolio. Again the T-bill rate reflects the government's actions regarding the recession. By the end of 2008 the rate is lowered to a level where no actual returns can be expected, nevertheless, the T-bill produces the highest cumulative returns for period 2. The Best Improvement portfolio has the best cumulative return in period 2 with -4,42% while the unethical portfolio produced -11,60%.

The findings especially concerning the unethical portfolio are unexpected. Prior literature would suggest that the bear market would be best suited for companies which are considered unethical. Despite this the unethical portfolio produced phenomenal returns in the bull market defeating all SRI portfolios and the market. However in the bear market the portfolio was barely able to defeat the market and 3 of the SRI portfolios produced higher returns. Some of the SRI portfolios were able to defeat the market in both periods, but the evidence seems to suggest that although socially responsible companies recover quickly from downturns, they tend to underperform in steadier times.

7.2 Portfolio risk

The portfolio risk is investigated through two different measures, volatility and tracking error. Figure 7 depicts the annualized volatility for each month of the two observation periods. First we can observe that the beginning of the period was fairly volatile for each of the portfolios. The volatility peak of the period was measured for portfolio P15 in November 2002.

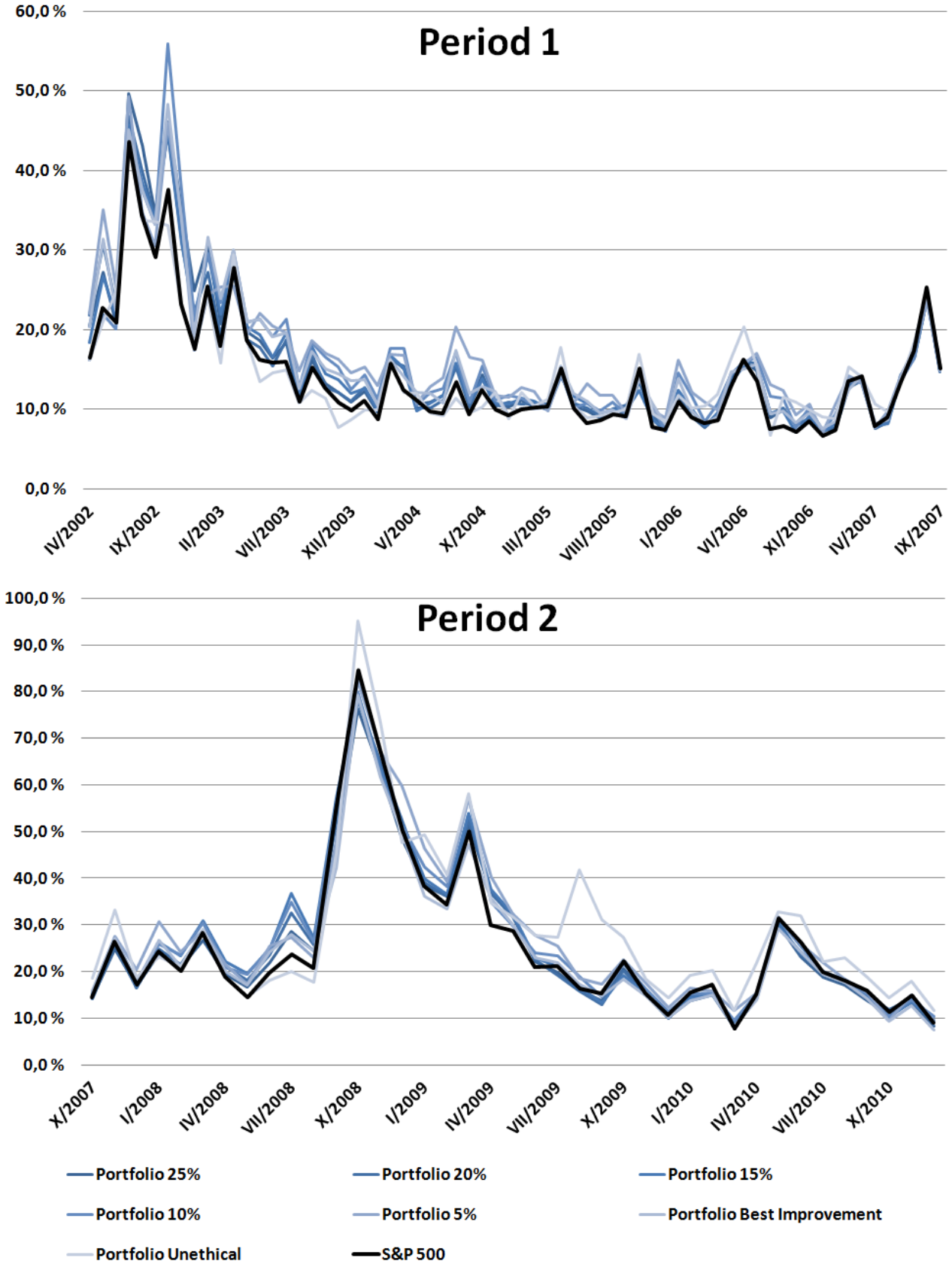

Figure 7. Annualized volatility for all seven portfolios and the benchmark.

From the figure we can also observe that all portfolios have a very similar volatility trend as the S&P 500 index. By the end of 2003 the market seems to calm down as the volatility descends to 10% – 20% levels. In period 2 the volatility starts to rise again as the market uncertainty increases due to the unraveling of the financial crisis. The volatility peaks in November 2008 for all portfolios with levels over 70%, the highest volatility is measured for the unethical portfolio with 95,13%. We may also note that after the peak the market starts to calm, but the S&P index no longer has the lowest volatility when compared to other portfolios.

If we take a closer look at the overall volatility of the portfolios, we find that the market cycles seem to disrupt the risk profiles of the portfolios. Figure 8 presents the overall annualized volatility of the stringency portfolios for periods 1 and 2. We may first note that in the first period there seems to be a curvilinear relationship between volatility and screening stringency. This relationship seems to be consistent with the findings of Lee et al. (2010), however in the second period the phenomenon no longer occurs. It seems that the level of total risk in period 2 increases at an almost linear fashion when compared to screening stringency. Lee et al., in their study, intensify screening by adding more specific screens on the portfolios, which makes their approach somewhat different. Another possible explanation for the difference between periods is that the market uncertainty in the second period transformed the risk profiles of the portfolios. Indeed from figure 8 we may see that the overall volatility levels in period 2 are nearly double from period 1.

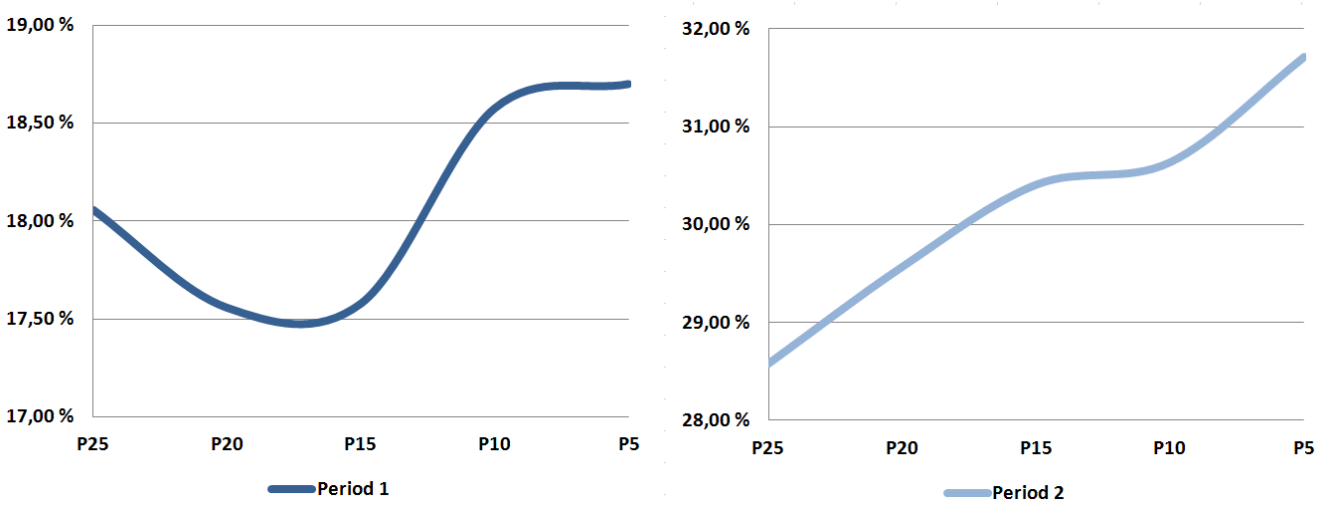

Figure 8. The impact of screening stringency on annualized portfolio volatility.

The S&P 500 index, which act as proxy for the market portfolio, delivers the second lowest overall volatility (15,82%) for period 1. In the second period the volatility reaches 29,39%, which is higher than for portfolio P25 (28,58%) and the best improvement portfolio (28,48%). In period 1 the best improvement portfolio has a volatility of 18,24%. The lowest volatility of the first period was measured for the unethical portfolio (15,82%) However in period 2 the unethical portfolio delivered by far the highest volatility (33,24%). The finding is quite intriguing since investing in vice has been marketed as "recession-proof".

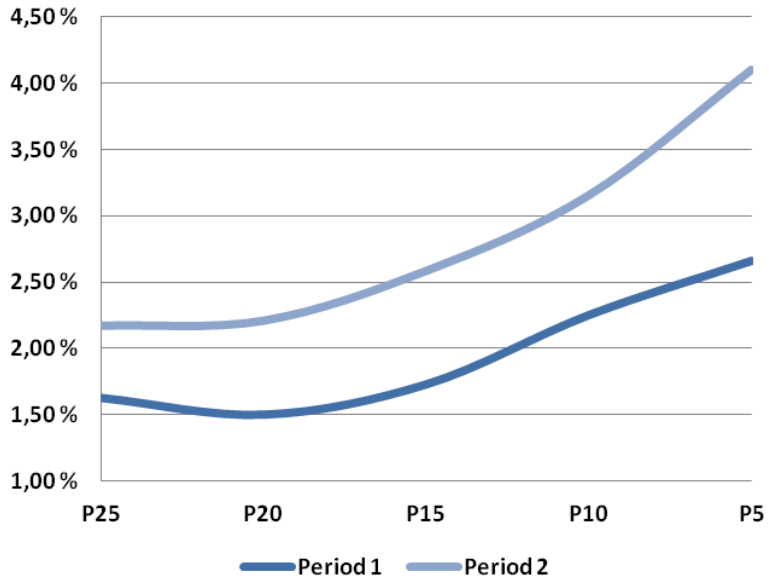

Figure 9. The Impact of screening stringency on the tracking error of monthly returns.

The Ex post tracking error measures the active risk of the portfolios past returns. Figure 9 shows how the screening stringency affects the tracking error of monthly returns. We may note that the tracking error increases together with the screening stringency. From the figure we can also observe that the tracking error in period 2 is relatively higher than in period 1. Evidently the market was much more volatile in the second period, which may explain the higher tracking error. It seems that the level of tracking error is fairly stable when social screening is limited to 25% and 20% of the total portfolio. The level starts to increase when 15% of the sample is screened. In period 2 it even seems that the tracking error increases at an accelerating rate when the screens become more stringent. It would be interesting to see whether this trend would continue for even stringier screens, but unfortunately the sample size does not allow this without significantly distorting the results. The highest tracking error for the SRI portfolios, is measured for portfolio P5 in periods 1 (2,66%) and 2 (4,10%).

However the unethical portfolio measures the highest tracking error (4,44%) of all the portfolios in period 2, while its tracking error in period 1 is the lowest (1,81%). The tracking error for the Best Improvement portfolio is 1,97% in period 1 and 3,02% for period 2. The results are slightly lower than those measured for portfolio P10, which has the same number of observations as the Best Improvement portfolio.

It is important to note that simple measures of risk must be evaluated together with other information regarding the portfolios and are hence only one of the elements of portfolio performance. Sauer (1997) observed that volatility, which measures total risk, is a more effective measure of SRI portfolio risk in comparison to unsystematic risk. Volatility is also an important reference of market uncertainty. Evidently figure 8 depicts the market turmoil in general, rather than the riskiness of a specific portfolio. If we take a look at how screening stringency affects the portfolio riskiness we have mixed results. Nonetheless, the results do indicate that after a certain point additional screening can only heighten the total risk. It also seems that adequate diversification is especially necessary when the whole market is in a volatile state.

Tracking error, on the other hand, points out the fluctuations in respect to the market. Although it seems that screening stringency is not the only factor to have an effect on tracking error, it undeniably is an important one. The study has been conducted in a manner in which the number of observations for the most stringent portfolios is rather small. The decreasing number of observations surely has an effect on tracking error. Then again the overall tracking error in period 1 is lower although the number of observations in period 1 is relatively smaller than in period 2. This would suggest that the bias resulting from the sample size is not very significant.

All in all the results imply that at approximately 15% the tracking error starts to increase more sharply (Point A in figure 1). The number of observed companies in these portfolios is 12 or less in the beginning of period 1 and 35 or less by the end of period 2. It also seems that from that point on the level of volatility only grows. Evidently the subject would require a more detailed analysis before direct conclusion can be drawn. However, based on the findings the hypothesis $H2$ can be confirmed. More stringent screens do result in a greater level of portfolio risk.

7.3 Regression analysis

This chapter presents the results gained by implying CAPM and 3-factor regression models and tests on the calculated daily returns. Tables 4 – 7 present the regression results for all seven portfolios. "Alpha α" is the constant coefficient in the regression analysis and operates as a risk-adjusted performance benchmark in the models. Alpha indicates by how much the daily returns of the portfolio are above or below market returns. "Annualized α" represents the alpha coefficient in an annualized form. The beta (β) coefficient denotes the sensitivity of the portfolio to the factor in question. The statistical significance of the results are reviewed in the significance levels of 1 %, 5 % and 10 % (marked by ***, ** and * respectively) and the t-ratio, which is in parentheses. "Adj. R^2" is the adjusted R^2, it describes the explanatory power of the model. "Durbin-Watson" is a test which detects the presence of autocorrelation. All results are attained with Gretl 1.9.6 Econometrics Software.

Table 4. CAPM regression results for period 1.

	Alpha α	Annualized α	Rm-Rf β	Adj. R^2	Durbin-Watson
P25	-1,72E-05 (-0,1834)	-0,43 %	1,0860 *** (115,1335)	90,47 %	2,0625
P20	-5,83E-05 (-0,6525)	-1,47 %	1,0583 *** (118,0362)	90,89 %	2,0154
P15	-2,06E-05 (-0,2156)	-0,52 %	1,0522 *** (109,8057)	89,62 %	2,1014
P10	-3,77E-05 (-0,3069)	-0,95 %	1,0804 *** (87,5427)	84,58 %	2,1587
P5	3,71E-05 (0,2414)	0,93 %	1,0328 *** (66,9936)	76,26 %	2,0316
BI	-9,94E-05 (-0,8951)	-2,50 %	1,0757 *** (96,4955)	86,95 %	2,0747
UE	2,23E-04 ** (1,9876)	5,62 %	0,9340 *** (82,9192)	83,11 %	1,9374

Table 4 presents the CAPM regression results for period 1. We can first note that there is a positive alpha (3,71E-05 and 2,23E-0,4 respectively) only for the Top 5% -portfolio (P5) and the unethical portfolio (UE), however the t-ratio reveals that the result is significant at a 5% -level for UE (1,9876), but not significant for P5 (0,2414). Another

important observation is that the CAPM beta is greater than 1 for all portfolios except the unethical portfolio, this implies a higher level of systematic risk for SRI-portfolios. Adjusted R^2 indicates that the model has a fairly high level of explanatory power, although the level decreases for portfolios which have fewer observations.

Table 5. Fama-French 3-factor model regression results for period 1.

	Alpha α	Annualized α	Rm-Rf β	SMB β	HML β	Adj. R^2	Durbin-Watson
P25	3,34E-05 (0,3709)	0,84 %	1,0481 *** (108,1000)	0,0367 ** (2,0590)	-0,2845 *** (-10,8600)	91,25 %	2,0860
P20	-7,14E-06 (-0,08316)	-0,18 %	1,0220 *** (110,7000)	0,0128 (0,7525)	-0,2721 *** (-10,9000)	91,61 %	2,0569
P15	3,55E-05 (0,3887)	0,90 %	1,0119 *** (102,9000)	0,0191 (1,0590)	-0,3017 *** (-11,3600)	90,51 %	2,1262
P10	6,49E-06 (0,0538)	0,16 %	1,0465 *** (80,6200)	0,0424 * (1,7730)	-0,2546 *** (-7,2570)	85,18 %	2,1915
P5	9,46E-05 (0,6261)	2,38 %	0,9907 *** (61,0100)	0,0305 (1,0200)	-0,3159 *** (-7,1970)	77,12 %	2,0358
BI	-4,90E-05 (-0,4511)	-1,24 %	1,0408 *** (89,0700)	0,0017 (0,0805)	-0,2613 *** (-8,2730)	87,55 %	2,1004
UE	1,83E-04 * (1,6520)	4,60 %	0,9633 *** (81,0300)	-0,0187 (-0,8571)	0,2200 *** (6,8460)	83,66 %	1,9346

Table 5 present the Fama-French 3-factor regression results also for period 1. At first we can observe that the explanatory power or the model is slightly higher than that of the CAPM. The Durbin-Watson test values have distanced from 2 for all portfolios in comparison to CAPM, but still imply very little autocorrelation. The Alpha has turned positive for portfolios P25, P15 and P10. Portfolio P5 has a higher Alpha (9,46E-05) when compared to CAPM, but the results remain insignificant for all SRI portfolios. The Alpha for the unethical portfolio has reduced to 1,83E-04 and is now significant only at a 10% -level (1,652). The market beta for P5 has dropped below 1 and the systematic market risk has reduced for all other SRI portfolios as well. The SMB –factor is positive for SRI portfolios and negative for the unethical portfolio, however the factors are significant only for P25 (2,0590) and P10 (1,7730). It was to be expected that SRI-portfolios tend to behave similarly as small companies and that large companies often struggle with SRI issues, which would therefore put them in the unethical category. Also the HML –factor reveals expected results SRI-portfolios seem to behave in a

similar fashion as growth stocks, the unethical portfolio as value stocks. In addition al results are significant at 1%-significance level. These findings are consistent with previous studies.

Table 6. CAPM regression results for period 2.

	Alpha α	Annualized α	Rm-Rf β	Adj. R^2	Durbin-Watson
P25	8,99E-05 (0,7470)	2,27 %	0,9544 *** (146,6870)	96,28 %	1,8573
P20	1,12E-04 (0,8322)	2,82 %	0,984281 *** (135,4067)	95,66 %	1,8897
P15	8,07E-05 (0,5088)	2,03 %	1,00498 *** (117,3022)	94,30 %	1,9125
P10	8,15E-05 (0,4482)	2,05 %	1,00345 *** (102,1068)	92,61 %	1,9148
P5	2,17E-05 (0,0933)	0,55 %	1,01635 *** (80,6887)	88,67 %	1,9446
BI	1,61E-04 (0,8565)	4,05 %	0,924155 *** (91,1823)	90,90 %	1,9587
UE	1,36E-04 (0,4551)	3,42 %	1,03116 *** (63,9181)	83,08 %	2,0155

Period 2 in this study starts from the first turbulences of the financial crisis and extends through very volatile times with both bear and bull markets. Table 6 presents the CAPM regression results for this period. At first we can note that Alpha is positive for each portfolio although the results lack statistical significance. The highest alpha (1,61E-04) can be found from the Best Improvement -portfolio (BI), which had the worst performance in period 1. The lowest Alpha on the other hand can be found from P5, which had the highest Alpha of all SRI-portfolios in period 1. The findings regarding the market beta are no longer quite as consistent as in period 1. Portfolios P15, P10, P5 and UE have a beta greater than 1, whilst portfolios P25, P20 and BI have a beta below 1. Again all results concerning the market beta are highly significant. Also the explanatory power has increase in comparison to the previous period.

Table 7. Fama-French 3-factor model regression results for period 2.

	Alpha α	Annualized α	Rm-Rf β	SMB β	HML β	Adj. R^2	Durbin-Watson
P25	5,06E-05 (0,4446)	1,28 %	0,9330 *** (125,5000)	0,1278 *** (7,9530)	0,0905 *** (5,7050)	96,68 %	1,9107
P20	6,82E-05 (0,5373)	1,72 %	0,9586 *** (115,6000)	0,1407 *** (7,8500)	0,1077 *** (6,0870)	96,14 %	1,9546
P15	3,88E-05 (0,2553)	0,98 %	0,9740 *** (98,2300)	0,1300 *** (6,0650)	0,1271 *** (6,0070)	94,77 %	1,9725
P10	2,98E-05 (0,1696)	0,75 %	0,9852 *** (85,9900)	0,1756 *** (7,0880)	0,0817 *** (3,3440)	93,13 %	1,9507
P5	-2,50E-05 (-0,1092)	-0,63 %	1,0356 *** (69,3700)	0,1852 *** (5,7390)	-0,0610 * (-1,9140)	89,11 %	1,9629
BI	1,06E-04 (0,5970)	2,67 %	0,9582 *** (82,5700)	0,2247 *** (8,9550)	-0,1148 *** (-4,6360)	91,84 %	1,9204
UE	1,33E-04 (0,4458)	3,36 %	1,0377 *** (53,1700)	0,0142 (0,3367)	-0,0242 (-0,5806)	83,05 %	2,0177

Table 7 present the Fama-French 3-factor regression results for period 2. Again we can note that the explanatory power or the model has increased for all portfolios except UE when compared to CAPM. The Alpha has decreased for every portfolio and P5 has now a negative alpha, implying underperformance in respect to the benchmark. However direct conclusions cannot be drawn from the results as they are not significant at any of the levels set. The market beta is also slightly different. A beta greater than 1 can only be observed for portfolios P5 and UE, which also have the lowest and highest Alpha coefficients respectively. The SMB –factor in period 2 is positive for all portfolios, also the unethical portfolio. The factor loadings are highly significant for all SRI portfolios, but insignificant for the unethical portfolio. The HML –factor, however, presents unexpected results. Portfolios P25, P20, P15 and P10 all have positive sensitivities to the HML –factor, which would now put them in the value-stock category, moreover the factor loadings are highly significant. The Best Improvement –portfolio, on the other hand, has a highly significant negative coefficient. Also P5 has a negative coefficient, which is significant at a 10% level (-1,9140). The Unethical portfolio has also a negative sensitivity to the HML –factor oppositely to period 1, but the result is not significant (-0,5806). The Durbin-Watson test suggest that there is very little autocorrelation between variables in both regression from period 2.

7.4 Portfolio performance

The risk-adjusted performance metrics are also important tools, because they allow direct comparison between the portfolios. Table 8 shows the results for on all the performance measure for both periods. The portfolios are ranked based on their scores and the benchmark is included in the results for reference if a measure is available. When observing the rankings in period 1, we may note that all metrics place the portfolios in the exact same order. The only exception is that the S&P Index is ranked 3rd by Sharpe ratio (and Modified Sharpe ratio) and 4th by Treynor ratio. Evidently we can draw the conclusion that the Unethical portfolio is the superior performer in period 1, while the P5 portfolio is the best SRI portfolio. Jensen's Alpha and the Information ratio place portfolios P10, P20 and BI under the benchmark as they score negative values. Due to a different calculation method, Jensen's Alpha has different values than the Alpha coefficient presented in the previous chapter.

In period 2 all portfolios produced negative returns, which makes interpretation harder for Sharpe ratio and Treynor ratio. When the returns are negative a larger denominator (indicating higher level of risk) results in a value closer to zero, hence expressing better performance. However the bias may not be of significance, if the difference between the portfolios is mostly displayed in the numerator (indicating the risk-adjusted return). At that, the ranking between the portfolios seems to be rather consistent with other performance measures, which would suggest the latter. Nevertheless one should be wary of the results. The problem does not affect Jensen's Alpha and Information ratio as they compare the performance primarily against the benchmark.

First we may note that in period 2 the S&P Index performs much worse than in period 1. Only portfolio P5 scores slightly lower values than the benchmark. The top performer of period 2 is the Best Improvement portfolio, which correspondingly was the worst performer in the first period. Other SRI portfolios performed also exceptionally well in period 2, according to Information ratio most of them performed even better than the Unethical portfolio. Modified Sharpe ratio rankings are nearly identical to Sharpe ratio rankings, which suggests that the sample distribution bias is quite insignificant.

Table 8. Portfolio rankings according to different performance metrics.

Period 1			Period 2		
Jensen's Alpha					
Rank	Portfolio	Value	Rank	Portfolio	Value
1	UE	0,0050	1	BI	0,0028
2	P5	0,0012	2	P20	0,0017
3	P25	0,0001	3	UE	0,0014
4	P15	0,0000	4	P25	0,0012
5	P10	-0,0004	5	P15	0,0007
6	P20	-0,0010	6	P10	0,0007
7	BI	-0,0016	7	P5	-0,0001
Sharpe ratio					
Rank	Portfolio	Value	Rank	Portfolio	Value
1	UE	0,1873	1	BI	-0,0100
2	P5	0,0841	2	P20	-0,0271
3	S&P	0,0780	3	UE	-0,0303
4	P25	0,0652	4	P25	-0,0319
5	P15	0,0643	5	P10	-0,0371
6	P10	0,0536	6	P15	-0,0396
7	P20	0,0434	7	P5	-0,0445
8	BI	0,0267	8	S&P	-0,0601
Modified Sharpe ratio					
Rank	Portfolio	Value	Rank	Portfolio	Value
1	UE	0,0711	1	BI	-0,0039
2	P5	0,0368	2	P20	-0,0108
3	S&P	0,0266	3	P25	-0,0125
4	P25	0,0225	4	UE	-0,0125
5	P15	0,0219	5	P10	-0,0147
6	P10	0,0187	6	P15	-0,0155
7	P20	0,0149	7	P5	-0,0167
8	BI	0,0086	8	S&P	-0,0225
Treynor's ratio					
Rank	Portfolio	Value	Rank	Portfolio	Value
1	UE	0,0079	1	BI	-0,0008
2	P5	0,0040	2	P20	-0,0020
3	P25	0,0028	3	UE	-0,0024
4	S&P	0,0027	4	P25	-0,0024
5	P15	0,0027	5	P15	-0,0030
6	P10	0,0024	6	P10	-0,0030
7	P20	0,0018	7	S&P	-0,0037
8	BI	0,0011	8	P5	-0,0039
Information ratio					
Rank	Portfolio	Value	Rank	Portfolio	Value
1	UE	0,2717	1	BI	0,0983
2	P5	0,0457	2	P20	0,0818
3	P25	0,0132	3	P25	0,0689
4	P15	0,0006	4	P15	0,0304
5	P10	-0,0109	5	UE	0,0284
6	P20	-0,0608	6	P10	0,0235
7	BI	-0,0774	7	P5	-0,0063

It seems that the overall rankings between the portfolios have been reversed when moving from period 1 to period 2. This phenomenon may be due to the fact that the portfolios which performed well included more inflated stocks and hence, had the highest fall. Then again it may be due to the arbitrary selection of observation periods for the study. Be that as it may, the performance metrics do provide important information regarding performance comparison between portfolios and economic cycles.

Recapping all results on return, risk, regression and performance metrics, we may establish a certain consistency in results. All results from period 1 have many similarities with findings from previous studies. Results from period 2, however, seem to show that market turbulences may induce discrepancies in portfolio attributes. Nevertheless some deductions can be drawn from the findings. The result show conclusively that in both periods some of the SRI portfolios were able to perform better than the market index, some performed worse. The regression statistics show however that any over- or underperformance is not statistically significant, which is consistent with prior literature (e.g. Hamilton, Jo & Statman 1993; Sauer 1997; Lobe, Rothmeier & Walkshäusl 2009). Under the circumstances we may discard hypothesis $H1_A$ and confirm hypothesis $H1_B$: The performance of socially responsible investments does not significantly differ from the market performance.

When it comes to the unethical portfolio, the results are again consistent with prior studies (e.g. Kim & Venkatachalam 2006; Hong & Kacperczyk 2009). Although the performance of the portfolio in period 2 was quite meager in comparison to period 1, the portfolio was able to beat the market in both periods. Hence hypothesis $H3$ can certainly be confirmed, the unethical portfolio did outperform the market.

7.5 Sensitivity to industries

The last phase of the study is concentrated on the relationship between the portfolios and different industries. First it was imperative to find out which industries excelled in social responsibility and which did not. Table 9 shows the social responsibility rankings of all 12 industries for both periods. The score implies the Ehical Quote industry score for the period (ISP). The observations column shows the number of observed companies in each industry at the beginning of the period and at the end of the period.

Table 9. Social responsibility rankings of industries in periods 1 & 2.

Period 1				Period 2			
Rank	**Industry**	**Score**	**Observations**	**Rank**	**Industry**	**Score**	**Observations**
1	NoDur	5,0	10 - 23	1	Durbl	8,8	3 - 4
2	Durbl	3,5	3 - 3	2	BusEq	8,6	23 - 23
3	BusEq	3,4	14 - 23	3	NoDur	7,0	23 - 23
4	Hlth	2,5	7 - 13	4	Telcm	5,6	10 - 11
5	Shops	1,2	12 - 28	5	Manuf	4,4	21 - 22
6	Manuf	1,1	6 - 20	6	Shops	3,8	28 - 29
7	Finance	1,0	8 - 40	7	Utilities	3,8	15 - 16
8	Chemicals	0,8	8 - 12	8	Chemicals	2,8	12 - 13
9	Utilities	0,5	1 - 15	9	Others	2,0	22 - 25
10	Telcm	0,4	2 - 9	10	Finance	1,1	41 - 44
11	Others	0,0	5 - 22	11	Hlth	0,5	13 - 13
12	Energy	-1,7	4 - 12	12	Energy	-1,5	12 - 13

The abbreviations are derived from Kenneth French's data library. NoDur refers to consumer non durables, Durbl to consumer durables, Manuf to manufacturing, BusEq to business equipments, Telcm to telecommunications and Hlth to healthcare. For more detailed information regarding industry specifications and sic-codes, see appendix 3.

Unexpectedly consumer non durables take the lead in period 1 although they include companies involved in tobacco and alcohol production. It seems that this broad specification also holds sub-industries, which neutralize the negative effects of the unethical ones. We may also note that the number of observations varies a lot between industries. Since Covalence selects the observed companies based on their

market capitalization, it s only natural that some industries have a more significant presence. For instance consumer durables and telecommunications have very few observations whereas finance covers nearly one fifth of all observations. If we compare the scores between the two periods we can note that healthcare takes a sudden drop in period, while telecommunications rises towards the top. Other industries more or less hold their position. In the second period the average scores grow relatively from period 1. It is possible that along the observation periods Covalence has modified their data collection methods or simply that the number of sources has grown. Evidently the energy industry is the only one to score negative values for both periods. This observation of course implies that the energy industry has neglected social responsibility issues and hence been subjected to negative media exposure. However the observation also points out that a vast majority of news items regarding social responsibility are interpreted as positive. In fact the mean score is 1,5 in period 1 and 3,9 in period 2.

After calculating the industry scores the next step was to see how industry portfolios with similar specifications would correlate with the SRI portfolios. Tables 10 and 11 present the correlation coefficients between all portfolios and 12 industry portfolios. The highest and lowest correlations for the SRI portfolios are cropped with borders. The correlation coefficients were also subjected to a t-test and since all results were significant at 10%, 5% and 1% -levels respectively, they are not presented in the tables.

As expected the energy industry bares the lowest correlation with all SRI portfolios, but interestingly also with the market portfolio. All SRI portfolios have also the highest correlation with the same industry, which is business equipments. Other industries with high correlation are others, manufacturing, finance, consumer durables and telecommunications. The general lineup between industry scores (table 9) and correlations is quite similar although not exact, especially telecommunications and others deviate from the order. There are a number of reasons which can explain this diversion. As mentioned the difference in the number of observations between industries might most certainly skew the results. Secondly the industry portfolios are derived from the whole US market so it probably differs from our sample in terms of composition and especially company size. In addition “others” includes miscellaneous companies that are not compliant with any of the specified industries and therefore its composition may be completely different from the sample. We may also observe that the correlations decrease in a linear fashion as the screening stringency becomes stronger. Unexpectedly the order in how well the industries correlate with the

unethical portfolio is not reversed in comparison to SRI portfolios. The sensitivities, in fact, are quite close to each other. Only the correlation with business equipments is notably lower.

Table 10. Correlation matrix between the portfolios and industries in period 1.

	S&P	BP25	BP20	BP15	BP10	BP5	BPbi	BPue
NoDur	79,6 %	69,9 %	71,2 %	72,0 %	69,5 %	67,6 %	70,2 %	80,7 %
Durbl	84,1 %	82,5 %	82,7 %	82,8 %	82,4 %	76,1 %	82,2 %	77,3 %
Manuf	91,3 %	86,4 %	86,5 %	86,0 %	84,0 %	80,2 %	84,7 %	**86,1 %**
Energy	**64,0 %**	**53,7 %**	**53,3 %**	**52,4 %**	**50,4 %**	**49,0 %**	**52,3 %**	72,4 %
Chemicals	82,8 %	74,9 %	76,2 %	77,1 %	75,0 %	73,6 %	75,6 %	80,5 %
BusEq	87,7 %	**93,0 %**	**92,4 %**	**91,4 %**	**88,8 %**	**82,4 %**	**88,9 %**	72,6 %
Telcm	85,0 %	84,0 %	83,1 %	81,1 %	78,8 %	74,1 %	80,1 %	75,4 %
Utilities	68,2 %	60,0 %	60,5 %	59,4 %	59,4 %	56,8 %	60,2 %	**63,1 %**
Shops	87,2 %	81,5 %	81,6 %	81,3 %	78,4 %	73,1 %	79,8 %	82,1 %
Hlth	83,3 %	78,2 %	79,6 %	80,4 %	79,2 %	79,0 %	80,0 %	72,7 %
Finance	**93,5 %**	85,8 %	85,9 %	85,0 %	82,2 %	77,2 %	83,9 %	84,8 %
Others	93,6 %	89,5 %	89,6 %	88,4 %	86,1 %	81,4 %	87,3 %	84,8 %

The first important observation in regard to the previous period is that the overall correlation coefficients are significantly higher. This may be due to a larger number of observations, but also due to the exceptional market conditions of period 2. However it seems that the sensitivities have not changed drastically. The order is not as conclusive as in period 2 and there is more dispersion between portfolios. Nevertheless business equipments still take the lead together with manufacturing, consumer durables and others. Finance, which suffered a major drop in social responsibility scores, is no longer at the top. Considering that the stock market crash was primarily induced by the financial sector, this is not surprising. This might also explain why the finance industry correlates relatively poorly with the unethical portfolio. Oddly enough, healthcare industry which took a dive in social responsibility scores has the lowest correlation with the unethical portfolio. The energy industry, together with utilities, has still the lowest correlation with SRI portfolios. Although there are some discrepancies between the social responsibility scores and correlations the evidence seems to point out that industries which have poor ethical scores have also a lower correlation with SRI portfolios. Hence, we may confirm hypothesis $H4$.

Table 11. Correlation matrix between the portfolios and industries in period 2.

	S&P	BP25	BP20	BP15	BP10	BP5	BPbi	BPue
NoDur	91,1 %	90,1 %	89,4 %	88,3 %	87,3 %	84,7 %	89,2 %	83,3 %
Durbl	90,5 %	93,1 %	93,3 %	93,2 %	93,6 %	92,8 %	93,1 %	83,4 %
Manuf	**95,5 %**	**94,4 %**	93,8 %	93,0 %	93,1 %	93,0 %	92,9 %	**90,7 %**
Energy	86,2 %	**78,8 %**	**77,9 %**	**76,7 %**	**76,6 %**	78,1 %	**76,3 %**	87,4 %
Chemicals	93,2 %	91,1 %	90,3 %	89,2 %	89,0 %	88,6 %	89,1 %	87,3 %
BusEq	94,3 %	93,6 %	93,6 %	93,2 %	**94,0 %**	**94,4 %**	**94,4 %**	85,5 %
Telcm	93,3 %	92,2 %	91,7 %	90,9 %	90,6 %	88,6 %	90,7 %	84,1 %
Utilities	**85,8 %**	81,8 %	80,4 %	78,8 %	78,0 %	**77,3 %**	78,9 %	81,2 %
Shops	90,9 %	92,7 %	92,6 %	92,1 %	91,4 %	87,1 %	92,2 %	80,2 %
Hlth	87,9 %	85,3 %	84,6 %	83,0 %	81,7 %	78,2 %	81,7 %	**77,7 %**
Finance	90,1 %	90,5 %	90,7 %	90,5 %	88,3 %	83,6 %	84,6 %	79,0 %
Others	94,1 %	93,9 %	**93,9 %**	**93,5 %**	93,5 %	92,3 %	92,1 %	87,8 %

8. CONCLUSIONS

For several years socially responsible investing has been a growing trend in the United States and against all expectations it has continued to grow during the latest economic downturn. The phenomenon has been widely investigated from the mid 90's onwards from a variety of perspectives. Although there have been some contradictory results, the general outline of the findings do have a certain consistency. Consequently this evidence has cumulated over the years and has set standards on expectations when it comes to new studies. Empirical evidence suggests that socially responsible investing does not differ from conventional investing, which might explain why investors are so keen on taking it into account. Nonetheless certain aspects of the phenomenon have been neglected and this study attempts to fill some of the gaps in the empirical evidence. The purpose of this study is to investigate the performance of socially responsible portfolios in the context of the modern portfolio theory, which per se is not out of the ordinary. The fresh approach comes from the applied methodologies and limitations. First of all prior studies have concentrated on professionally managed portfolios and indices, in this study the portfolios are constructed on purely ethical grounds. The performance of the portfolios is investigated through common methods, but the emphasis is on screening stringency and the differences between two distinctive periods which display different economic climates. The effect of industries has also been an ignored factor in prior literature. Therefore the social responsibility of a specific sector and its correlation to SRI portfolios is also investigated.

The empirical results are twofold. To some extent the findings are consistent with previous studies, however there are also indications that the financial crisis might have disrupted the expected behavior of SRI portfolios. The study also provides new information regarding social screening and the effects of industries. Risk and return are the first elements to provide performance related evidence. The findings regarding the cumulative returns reveal the ex-post yield of each portfolio. More importantly we may note that there seems to be consistency in how the SRI portfolios behave in different parts of the market cycle. Figures 5 and 6 show that all SRI portfolios have strong reactions to clear upward- and downward trends but their returns lag in steadier times. This is a finding that would deserve a more thorough research.
The risk is measured by volatility and tracking error and the emphasis in particular is in the screening stringency. We can observe that the risk profiles of the portfolios did shift in the downturn. A curvilinear relationship between total risk and screening

stringency can be spotted in period 1 but no longer in period 2. The tracking error, however, does display a growing curve for both periods. In accordance with Kurtz's (2005) assumptions it does indeed grow as the screening gets more stringent. Evidently the volatility is also higher for the portfolios with the most stringent screens. These findings imply that a diminishing universe of available investing opportunities does have a negative effect on the portfolio risk. In this study, however, the results may have been biased by a relatively small number of observations and therefore direct conclusions cannot be made. The effect of screening stringency on tracking error should be studied further from the perspective of SRI funds or other socially responsible and actively managed portfolios in order to attain more conclusive results.

The regression analysis expectedly produced more decisive results. The analysis was performed for capital asset pricing model and Fama-French 3-factor model derived OLS regressions. The regression statistics reveal that the explanatory power (Adjusted R^2) of each model is at a reasonable level and Durbin-Watson test did not detect any significant autocorrelation in residuals. None of the SRI portfolios outperformed nor underperformed the market at any significance level. In reference to prior empirical evidence this was an expected result. However the unethical portfolio was able to beat the market in the first period at a 5% significance level in CAPM regression and at a 10% level in Fama-French 3-factor model regression. Although the performance was remarkable in the first period, the unethical portfolio could not produce significant outperformance in period 2. This is another interesting discovery since prior studies indicate that unethical investments should perform especially well in hard times.

The beta for SRI portfolios is systematically higher in the first period, however in period 2 the beta falls under 1 for most SRI portfolios. Conversely the unethical portfolio, which has a beta under 1 in period 1, has an increased level of systematic risk in the second period. Again the results for period 1 are highly consistent with previous studies, but not for period 2. A similar oddity is discovered from the 3-factor model, the SMB and HML –factors display curious results. Normally SRI portfolios have had a positive sensitivity to the SMB factor and a negative sensitivity to the HML factor. For unethical portfolios the correlations have been opposite. The results meet these expectations in period 1, but strikingly the HML -factor delivers completely different results in the second period. The correlation becomes positive for most SRI portfolios and the unethical portfolio delivers insignificant results. The composition of the portfolios did not drastically change between the periods, so it cannot explain this phenomenon. The factors simply show how well the studied portfolios mimic SMB and

HML portfolios. It would therefore be reasonable to dig deeper and investigate how much the market capitalizations and Book-to-market ratios have altered.

The risk-adjusted performance metrics do deliver some final closure. Each measure conclusively shows that the unethical portfolio was undoubtedly the best performer in period 1. Moreover all metrics place the SRI portfolios in the same order. The second period results are a tad more scattered but the metrics share a coherent trend in the rankings. It seems that the portfolios which performed worse in the first period were the better performers of the second period. The unethical portfolio and at least some of the SRI portfolios performed better then market in both periods.

When studying the effect of the industries there is no clear point of reference due to the lack of prior research. The social responsibility rankings correspond to what could have been expected considering the background and strategies of socially responsible investing. The fairly low number of observations limited the study to quite broad sector specifications and therefore the traditional “sin-industries” are incorporated into other sectors. The correlations between industries and SRI portfolios did not match exactly with the social responsibility rankings, but the general outline was similar. The correlation coefficients however do provide an important piece of information. The industries which lack social responsibility tend to also have a lower correlation with SRI portfolios. This implies that SRI portfolios could be used as means of diversification for portfolios which have a strong focus in these sectors. The unethical portfolio did not seem to have similar attributes.

Consistent with the majority of prior research, this study confirms that socially responsible investing does not significantly differ from conventional investing. The screening stringency would require more study, but the evidence does point out that there is a limit after which the portfolio risk starts to grow gradually. The study however does leave some open questions. For instance the reason why the risk profiles of the portfolios altered when moving from an economic cycle to another is unclear. It is possible that the selected observation periods did not reflect different cycles effectively, for both periods did include downward and upward trends. It would be interesting to study the sensitivities of SRI portfolios on different parts of the economic cycle. Further research could also be targeted in investigating the financial performance of companies with reputable SRI standards.

As a final remark the empirical evidence from the study indicates that socially responsible investing should not lead to a direct performance penalty. Therefore investors may utilize SRI rankings as part of their overall decision making process. The evidence however suggests that investors should avoid investment vehicles that apply a too stringent screening process. It is naturally left for the investor to judge whether a ranking or a set of screens is in line with his or hers personal values. However, there are no signs that the trend of socially responsible investing would ware off. Thus, investors will probably have enough relevant information and options to be able to fit their own financial ambitions to individual ethical spectrums.

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APPENDIX 1. Covalence Criteria of Business Contribution to Human Development

	A. Working conditions	Universal Declaration of Human Rights 1948	OECD Guidelines for Multinational Enterprises 1976	ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy 1977	Rio Declaration on Environment and Development 1992	Copenhagen Agreements on Social Development 1995	United Nations Global Compact 2000	UN Millenium Declaration & Millenium Goals 2000
1. Labour standards	Criteria 1. Labour standards covers labour issues taking place within the company. It is inspired by the ILO Declaration on Fundamental Principles and Rights at Work, dealing with freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labour; the effective abolition of child labour; and the elimination of discrimination in respect of employment and occupation.	Articles 4, 6, 20, 23.1, 23.3, 23.4, 24	II. General policies 1-5 ; IV Employment and Industrial Relations 1-5	Paragraphs 8, 21, 36		Declaration 8	Principles 3, 4, 5, 6	Millenium Goals No. 8
2. Wages	Criteria 2. Wages looks at how the company manages the level of wages paid to employees and executives.	Articles 23. 1., 23.2	II. General policies 1	Paragraphs 3, 34	Principle 3.		Principles 3, 4, 5, 6	Millenium Declaration I.5 Millenium Goals No. 1
3. Social benefits	Criteria 3. Social Benefits looks at measures taken internally or externally by the company regarding social benefits and advantages for employees and families.	Article 23.3	II. General policies 1					Millenium Declaration III.19
4. Training and insertion	Criteria 4. Training and insertion looks at how the company takes measures regarding training employees, continued formation, stabilisation of jobs and social plans in case of lay-offs.	Article 26	II. General policies 1, 4	Paragraphs 24, 26, 30, 31		Programme of action 8		Millenium Goals No. 2

5. Women	Criteria 5. Women describes working conditions for women and the coordination of professional and private life.	Article 23.1, 23.2	II. General policies 1	Paragraph 21	Principle 2.	Declaration 7		Millenium Declaration I.6, Millenium Declaration III.13, Millenium Goals No.
6. External working conditions	Criteria 6. External working conditions, covers working conditions outside the analyzed company. It pertains to the working conditions of its suppliers, subcontracters and other professional partners, and the measures the company has taken to improve upon them.	Articles 4, 6, 20, 23.1, 23.3, 23.4, 24	I. Principles 2,4 ; II General Policies 1, 4, 5, 10 ; IV Employment and Industrial Relations 1-5	Paragraphs 8, 21, 36	Principle 3.	Declaration 8	Principles 3, 4, 5, 6	Millenium Goals No. 8
	B. Impact of production							
7. Sales	Criteria 7. Sales describes where a company sells its products / services and how these sales benefit people and the environment.		II. General policies 1					
8. Link with official development aid	Criteria 8. Link with official development aid highlights when a company collaborates with, or benefits from, a governmental development aid program.					Programme of action 11 (h)		Millenium Declaration I.6
9. Export risk guarantee	Criteria 9. Export risk guarantee describes a situation when a government covers the risks taken by a national company investing abroad							Millenium Goals No. 8
10. International presence	Criteria 10. International presence describes the impact of the company's foreign direct investments and related policies. More broadly, it deals with how the international presence of a company is perceived. When details are lacking, criteria 10 is used to express a general feeling, positive or negative, about a company's presence in foreign countries.		II. General policies 1, 3	Paragraphs 1, 10		Programme of action 9	Principles 3, 4, 5, 6	

11. Joint ventures	Criteria 11. Joint ventures receives information about multinational companies investing together with other companies to create a new company and the economic, social and environmental impacts of such joint ventures.		II. General policies 1, 3, 5	Paragraph 1		Programme of action 8, 12		Millenium Declaration III.20, Millenium Goals No. 8
12. Economic impact	Criteria 12. Economic impact of production deals with how a company's investments influence local industries in terms of job creation, access to markets, competition, economic growth.	Articles 22, 25	II. General policies 1, 3 ; IX. Competition 1	Paragraph 1, 40	Principle 3.	Declaration 7, 9	Principle 1	Millenium Declaration III.11, Millenium Goals No. 1
13. Social impact	Criteria 13. Social impact receives information on how the company's operations influence the implementation of local laws relating to social areas c.f. social protection, public health, employee relations or fiscal relations.	Articles 7, 22	II. General policies 1, 3		Principle 3.	Declaration 9, PA 8, 12 (i)		Declaration 9. Programme of Action 12 (i)
14. Job stability	Criteria 14. Job stability looks at the turn-over of the company's employees n the different countries / regions where it is active.		II. General policies 1, 4	Paragraphs 13, 14				Programme of Action. 8.
15. Local employees	Criteria 15. Local employees looks at the number and the proportion of local employees in the company in the different countries / regions where it is active.	Article 23.1	II. General policies 1, 4	Paragraph 18				Millenium Goals No. 8
16. Local executives	Criteria 16. Local executives looks at the number and the proportion of local executives in the company in the different countries / regions where it is active.	Article 23.1	II. General policies 1, 4	Paragraph 18				Millenium Goals No. 8
17. Women employed	Criteria 17. Women employed looks at the proportion of women among the company's employees and among the company's executives.	Articles 23. 1., 23.2	II. General policies 1, 4	Paragraph 21		Declaration 7		Millenium Declaration I.5

18. Downsizing	Criteria 18. Downsizing is used to code information that relates to factory closures, the transfer of production to another country, and measures taken to minimize negative social effects of such decisions.		II. General policies 1, 4 ; IV. Employment and Industrial Relations. 6	Paragraphs 24, 26		Millenium Goals No. 3
19. Infra-structures	Criteria 19. Infrastructures describes when a company is (co-) financing public infrastructures in a country where it is investing.	Article 22	II. General policies 1, 3			
20. Local sourcing	Criteria 20. Local sourcing highlights when a company is buying / sourcing directly to a local producer, farmer.	Articles 22, 25	II. General policies 1, 3	Paragraph 20		Millenium Declaration I.5
21. Stability of prices	Criteria 21. Stability of prices describes how a company manages prices of raw materials on international commodity markets (not direct sourcing).	Articles 22, 25	II. General policies 1, 3		Programme of action 11	Millenium Declaration I.5
22. Technical assistance	Criteria 22. Technical assistance highlights when a company transmits skills, knowledge, technologies to another company / partner.	Articles 22, 25, 26	II. General policies 1, 3 ; VIII. Science and Technology 2, 3	Paragraph 19	Programme of action 8, 9, 12	Millenium Goals No. 8
23. Intellectual propriety rights	Criteria 23. Intellectual property rights describes how a company manages its own intellectual propriety rights vis-à-vis other companies and countries. Has the company taken measures that promote human and economic development, the protection of biodiversity, respect of traditional knowledge and local natural resources, for example through research & development, voluntary licenses, agreements, cooperation with research institutes and local communities?	Articles 17, 25, 27.2	II. General policies 1, 3 ; VIII. Science and Technology 2, 4			Millenium Declaration I.5

24. Local innovation	Criteria 24. Local innovation highlights when a company helps another company to develop a new product	Articles 22, 25	II. General policies 1, 3 ; VIII. Science and Technology 3, 5				Millenium Goals No. 8
25. Fiscal contributions	Criteria 25. Fiscal contributions looks at the following questions: Does the company pay taxes ? Where ? How much? What can the company say about its fiscal relations policy ? How can the company assess the impact of its fiscal contributions to local economic and social development ?	Articles 22, 25	II. General policies 1, 3, 5 ; X. Taxation.		Programme of action 9		Millenium Declaration I.5
26. Environ-mental impact	Criteria 26. Environmental impact of production is used to categorize information that relates to how a company's production activities are impacting the environment, nature, animals and biodiversity.		II. General policies 1, 5 ; V. Environment.	Principle 4, 10.	Declaration 6	Principle 8	Millenium Goals No. 7
	C. Impact of product						
27. Product human risk	Criteria 27. Product human risk describes when a product or service is perceived to be risky to man or nature and when a company reduces such risks.	Articles 3, 25	II. General policies 1, 5 ; VII. Consumer Interests.				
28. Product social utility	Criteria 28. Product Social Utility serves to describe when a company offers, or is being asked to provide, products or services that respond to needs related to human, social and economic development.	Articles 22, 25	II. General policies 1 ; VII. Consumer Interests ; VIII. Science and Technology		Declaration 9		
29. Product relation to culture	Criteria 29. Product relation to culture describes the relation between a product and a culture: how a product valuates culture and traditions?	Articles 22, 26, 27	II. General policies 1 ; VII. Consumer Interests.	Principle 22.	Programme of action 8		Millenium Declaration I.5

30. Socially innovative product	Criteria 30. Socially innovative product reflect communications regarding the research & development (R&D) of products or services that present a particular interest for responding to human needs and contributing to economic and social development.	Articles 22, 25	II. General policies 1 ; VII. Consumer Interests ; VIII. Science and Technology					
31. Product environmental risk	Criteria 31. Product Environmental Risk reflects communications found about a product or service described to be risky to nature, animals, the environment and biodiversity by itself or by its implications. It also reflects measures taken by companies to minimize such risks.	Article 3	II. General policies 1, 5 ; V. Environment; VII. Consumer Interests ; VIII. Science and Technology	Principle 4, 10.	Declaration 9	Principle 7	Millenium Declaration I.5	
32. Waste management	Criteria 32. Waste management describes action / lack of action in waste management. Has the company taken particular measures relatively to the management of waste due to its products and production?		II. General policies 1, 5 ; V. Environment.	Principle 4, 10.	Programme of action 8		Millenium Declaration I.5, Millenium Goals No. 7	
33. Eco-innovative product	Criteria 33. Eco-innovative product covers information regarding new products or services offered by the company that are friendly to nature, animals, the environment and biodiversity.		II. General policies 1, 5 ; V. Environment	Principle 4, 10.	Declaration 6, Programme of action 8	Principle 9	Millenium Goals No. 7	
34. Information to consumer	Criteria 34. Information to consumer looks at how companies are, or aren't, providing the public and consumers with information regarding product or services, the impact of production, working conditions or institutional impact.	Articles 3, 25	II. General policies 1 ; VII. Consumer Interests.		Declaration 9		Millenium Declaration V.25	

35. Pricing / needs	Criteria 35. Pricing / needs looks at which price does a company sell its products considering their social utility and capacity to respond to essential human needs.	Articles 3, 25	II. General policies 1 ; IX. Competition.	Principle 5, 6.			Millenium Declaration I.5, Millenium Goals No. 1
36. Cause related marketing	Criteria 36. Cause related marketing highlights when the support to social / environmental projects is linked to the selling of a product						Millenium Declaration I.5
	D. Institutional impact						
37. Social sponsorship	Criteria 37. Social sponsorship pertains to information about a company's donation of money or goods to an external organization in the pursuit of social or environmental objectives.						Millenium Declaration I.5
38. Anti-corruption policy	Criteria 38. Anti-corruption policy covers material presenting how companies are acting, or failing to act, against corruption.	Articles 22, 25	II. General policies 1, 2, 5 ; VI. Combating Bribery.		Declaration 4, rogramme of action 11, 13	Principle 10	Millenium Declaration II.9, Millenium Goals No. 8
39. Humanitarian policy	Criteria 39. Humanitarian policy describes how a company behaves in and about emergency situations such as wars, civil wars and natural disasters.	Articles 3, 28	II. General policies 1, 2.	Principle 23, 24, 25.	Declaration 5		Millenium Declaration I.5
40. Human rights policy	Criteria 40. Human Rights Policy is used to code information that pertains to how a company deals, or should deal, with the respect for, and promotion of human rights, internally and externally. In addition, it is used to code information that relates to how the company deals, or should deal, with governments and their individual human rights policy.	Articles 3, 5, 9, 19	II. General policies 1, 2.	Principle 23.		Principles 1, 2	Millenium Declaration I.2

41. Relations with United Nations	Criteria 41. Relations with United Nations describes how a company discusses and collaborates with programmes or agencies of the United Nations, or UN-supported projects, such as the Global Compact, UNEP, UNDP, the Global Reporting Initiative, etc.				Principles 1-9	Millenium Declaration I.3
42. Boycott policy	Criteria 42. Boycott Policy describes how a company deals with calls to boycott certain countries and governments because of the human rights situation		II. General policies 1, 2			Millenium Declaration I.5
43. Social stability	Criteria 43. Social stability describes when a company helps, or fails to help, promote local social stability in a community where it is active. A company may do this by offering training, subsidies, or by engaging in some other means of direct involvement in matters related to education, health, the environment, security.	Articles 25, 26		Programme of action 8		Millenium Declaration I.4
44. Support to political actors	Criteria 44. Support to Politicians compiles information describing relations of a company with political actors, such as financial support.		II. General policies 1, 5, 6, 11			Millenium Declaration I.5
45. Lobbying practices	Criteria 45. Lobbying Practices covers material describing lobbying activities of companies: activities aiming at influencing decisions taken by governments at the national and international levels.	Article 30	II. General policies 1, 5, 6, 7, 8, 9, 11	Principle 27.	Principle 1	Millenium Declaration III.13

APPENDIX 2. List of US Companies Monitored by Covalence

Company	Primary SIC-code	Industry	Stock Market
3M Co.	3841	Healthcare	NYSE
Abbott Laboratories	2834	Healthcare	NYSE
ACE Limited	6331	Finance	NYSE
Aetna Inc.	6324	Finance	NYSE
AFLAC Inc.	6321	Finance	NYSE
Air Products & Chemicals Inc.	2810	Chemicals	NYSE
Alcoa Inc.	3350	Manufacturing	NYSE
Allstate Corp.	6331	Finance	NYSE
Altria Group Inc.	2111	Consumer NonDurables	NYSE
American Electric Power Co. Inc.	4911	Utilities	NYSE
American Express Company	6199	Finance	NYSE
American International Group Inc.	6331	Finance	NYSE
Ameriprise Financial Inc.	6282	Finance	NYSE
Amgen Inc.	2836	Healthcare	NASDAQ
Anadarko Petroleum Corp.	1311	Energy	NYSE
Analog Devices Inc.	3621	Manufacturing	NYSE
Apache Corp.	1311	Energy	NYSE
Apple Inc.	3571	Business Equipment	NASDAQ
Applied Materials Inc.	3674	Business Equipment	NASDAQ
Archer Daniels Midland Company	2070	Consumer NonDurables	NYSE
AT&T Inc.	4813	Telephone	NYSE
Automatic Data Processing Inc.	7374	Business Equipment	NYSE
Avery Dennison Corporation	2670	Manufacturing	NYSE
Avon Products Inc.	2844	Chemicals	NYSE
Baker Hughes Incorporated	3533	Manufacturing	NYSE
Bank of America Corporation	6021	Finance	NYSE
Baxter International Inc.	3841	Healthcare	NYSE
Becton Dickinson and Company	3841	Healthcare	NYSE
Bed Bath & Beyond Inc.	5700	Shops	NYSE
Best Buy Co. Inc.	5731	Shops	NYSE
Boeing Co.	3721	Manufacturing	NYSE
Boston Scientific Corporation	3841	Healthcare	NYSE
Bristol-Myers Squibb Co.	2834	Healthcare	NYSE
Bunge Ltd.	2070	Consumer NonDurables	NYSE
Cablevision Systems Corporation	4841	Telephone	NYSE
Campbell Soup Co.	2000	Consumer NonDurables	NYSE
Capital One Financial Corp.	6022	Finance	NYSE
Cardinal Health Inc.	5122	Shops	NYSE
Carnival Corp.	4400	Other	NYSE
Caterpillar Inc.	3531	Manufacturing	NYSE
Charles Schwab Corp.	6211	Finance	NASDAQ
Chevron Corp.	2911	Energy	NYSE
CIGNA Corp.	6324	Finance	NYSE
Cisco Systems Inc.	3674	Business Equipment	NASDAQ
Citigroup Inc.	6021	Finance	NYSE
Clear Channel Outdoor Holdings Inc.	7371	Business Equipment	NYSE

Clorox Corporation	2842	Chemicals	NYSE
CME Group Inc.	6200	Finance	NASDAQ
Coach Inc.	3100	Consumer NonDurables	NYSE
Coca-Cola Enterprises Inc.	2080	Consumer NonDurables	NYSE
Colgate-Palmolive Co.	2844	Chemicals	NYSE
Comcast Corporation	4841	Telephone	NASDAQ
ConAgra Foods Inc.	2000	Consumer NonDurables	NYSE
ConocoPhillips	2911	Energy	NYSE
Constellation Energy Group Inc.	4911	Utilities	NYSE
Corning Inc.	3357	Manufacturing	NYSE
Costco Wholesale Corporation	5331	Shops	NASDAQ
CVS Caremark Corporation	5912	Shops	NYSE
Darden Restaurants Inc.	5812	Shops	NYSE
Deere & Co.	3523	Manufacturing	NYSE
Dell Inc.	3571	Business Equipment	NASDAQ
Devon Energy Corporation	1311	Energy	NYSE
DIRECTV Group Inc.	4899	Telephone	NASDAQ
Dish Network Corp.	4841	Telephone	NASDAQ
Dominion Resources Inc.	4911	Utilities	NYSE
DR Horton Inc.	1531	Other	NYSE
Duke Energy Corporation	4931	Utilities	NYSE
E.ON AG	4911	Utilities	NYSE
eBay Inc.	7389	Other	NYSE
EchoStar Corp.	3663	Business Equipment	NASDAQ
Ecolab Inc.	2840	Chemicals	NASDAQ
Edison International	4911	Utilities	NYSE
EI DuPont de Nemours & Co.	2820	Chemicals	NYSE
Electronic Arts Inc.	7372	Business Equipment	NASDAQ
Eli Lilly & Co.	2843	Chemicals	NYSE
EMC Corporation	3572	Business Equipment	NYSE
Emerson Electric Co.	3600	Manufacturing	NYSE
Entergy Corporation	4911	Utilities	NYSE
Equity Residential	6798	Finance	NYSE
Exelon Corp.	4931	Utilities	NYSE
Exxon Mobil Corp.	2911	Energy	NYSE
Fannie Mae	6798	Finance	NYSE
FedEx Corporation	4513	Other	NYSE
Fifth Third Bancorp	6022	Finance	NASDAQ
FirstEnergy Corp.	4911	Utilities	NYSE
Fluor Corporation	1600	Other	NYSE
Ford Motor Co.	3711	Consumer Durables	NYSE
Fortune Brands Inc.	3430	Manufacturing	NYSE
Foster Wheeler AG	1600	Other	NASDAQ
FPL Group Inc.	4911	Utilities	NYSE
Franklin Resources Inc.	6282	Finance	NYSE
Freddie Mac	6798	Finance	NYSE
Freeport-McMoRan Copper & Gold Inc.	1000	Other	NYSE
Gannett Co. Inc.	2711	Consumer NonDurables	NYSE
Gap Inc.	5651	Shops	NYSE
General Dynamics Corp.	3730	Manufacturing	NYSE

General Electric Co.	6141	Finance	NYSE
General Mills Inc.	2040	Consumer NonDurables	NYSE
General Motors	3711	Consumer Durables	NYSE
Genuine Parts Co.	5013	Shops	NYSE
Gilead Sciences Inc.	2836	Healthcare	NASDAQ
Goldman Sachs Group Inc.	6211	Finance	NYSE
Google Inc.	7370	Business Equipment	NASDAQ
Halliburton Company	1389	Energy	NYSE
Harley-Davidson Inc.	3751	Consumer Durables	NYSE
Hartford Financial Services Group Inc.	6331	Finance	NYSE
Hershey Co.	2060	Consumer NonDurables	NYSE
Hess Corporation	2911	Energy	NYSE
Hewlett-Packard Company	3570	Business Equipment	NYSE
HJ Heinz Co.	2030	Consumer NonDurables	NYSE
Honeywell International Inc.	3741	Manufacturing	NYSE
Illinois Tool Works Inc.	3560	Manufacturing	NYSE
Intel Corporation	3674	Business Equipment	NASDAQ
International Business Machines Corp.	3570	Business Equipment	NYSE
International Game Technology	3990	Consumer Durables	NYSE
International Paper Co.	2621	Manufacturing	NYSE
Invesco Ltd.	6282	Finance	NYSE
J. C. Penney Company Inc.	5311	Shops	NYSE
Jacobs Engineering Group Inc.	1600	Other	NYSE
Johnson & Johnson	2834	Healthcare	NYSE
Johnson Controls Inc.	2531	Manufacturing	NYSE
JPMorgan Chase & Co.	6021	Finance	NYSE
Kellogg Company	2040	Consumer NonDurables	NYSE
Kimberly-Clark Corporation	2670	Manufacturing	NYSE
Kohl s Corp.	5311	Shops	NYSE
Kraft Foods Inc.	2000	Consumer NonDurables	NYSE
Kroger Co.	5411	Shops	NYSE
Las Vegas Sands Corp.	7011	Other	NYSE
Liberty Media Capital	4841	Telephone	NASDAQ
Limited Brands Inc.	5632	Shops	NYSE
Lincoln National Corp.	6311	Finance	NYSE
Lockheed Martin Corporation	3760	Manufacturing	NYSE
Loews Corporation	6331	Finance	NYSE
Lorillard Inc.	2111	Consumer NonDurables	NYSE
Lowe s Companies Inc.	5211	Shops	NYSE
Macy s Inc.	5311	Shops	NYSE
Marathon Oil Corporation	2911	Energy	NYSE
Marriott International Inc.	6798	Finance	NYSE
Marsh & McLennan Companies Inc.	6411	Finance	NYSE
Masco Corporation	2430	Other	NYSE
MasterCard Inc.	7389	Other	NYSE
Mattel Inc.	3942	Consumer NonDurables	NYSE
McDermott International Inc.	3443	Manufacturing	NYSE
McDonald s Corp.	5812	Shops	NYSE
McKesson Corporation	5122	Shops	NYSE
MedcoHealth Solutions Inc.	5912	Shops	NYSE

Medtronic Inc.	3845	Healthcare	NYSE
Merck & Co. Inc.	2834	Healthcare	NYSE
MetLife Inc.	6311	Finance	NYSE
Microsoft Corporation	7372	Business Equipment	NASDAQ
Monsanto Co.	2870	Chemicals	NYSE
Morgan Stanley	6211	Finance	NYSE
Mosaic Co.	2870	Chemicals	NYSE
Motorola Inc.	3663	Business Equipment	NYSE
Newmont Mining Corp.	1040	Other	NYSE
News Corp.	2711	Consumer NonDurables	NYSE
Nike Inc.	3021	Manufacturing	NYSE
Northrop Grumman Corporation	3812	Business Equipment	NYSE
Nucor Corporation	3312	Manufacturing	NYSE
NYSE Euronext Inc.	6200	Finance	NYSE
Occidental Petroleum Corporation	1311	Energy	NYSE
Omnicom Group Inc.	7311	Other	NYSE
Oracle Corp.	7372	Business Equipment	NASDAQ
Peabody Energy Corp.	1221	Energy	NYSE
Pepsico Inc.	2080	Consumer NonDurables	NYSE
Pfizer Inc.	2834	Healthcare	NYSE
PG & E Corp.	4931	Utilities	NYSE
Philip Morris International Inc.	2111	Consumer NonDurables	NYSE
PPG Industries Inc.	2851	Chemicals	NYSE
PPL Corporation	4911	Utilities	NYSE
Praxair Inc.	2810	Chemicals	NYSE
Procter & Gamble Co.	2840	Chemicals	NYSE
Progressive Corp.	6331	Finance	NYSE
Prudential Financial Inc.	6311	Finance	NYSE
Public Service Enterprise Group Inc.	4931	Utilities	NYSE
QUALCOMM Inc.	3663	Business Equipment	NASDAQ
Qwest Communications International Inc.	4813	Telephone	NYSE
Raytheon Co.	3812	Business Equipment	NYSE
Reynolds American Inc.	2111	Consumer NonDurables	NYSE
Royal Caribbean Cruises Ltd.	4400	Other	NYSE
Safeway Inc.	5411	Shops	NYSE
Sara Lee Corp.	2000	Consumer NonDurables	NYSE
Schlumberger AG	1389	Energy	NYSE
Sears Holdings Corporation	5311	Shops	NASDAQ
Sempra Energy	4932	Utilities	NYSE
Sherwin-Williams Co.	5200	Shops	NYSE
Simon Property Group Inc.	6798	Finance	NYSE
SLM Corp.	6141	Finance	NYSE
Southern Company	4911	Utilities	NYSE
Southwest Airlines Co.	4512	Other	NYSE
Sprint Nextel Corp.	4813	Telephone	NYSE
Staples Inc.	5940	Shops	NASDAQ
Starbucks Corp.	5810	Shops	NASDAQ
Starwood Hotels & Resorts Worldwide Inc.	7011	Other	NYSE
State Street Corp.	6022	Finance	NYSE
Sysco Corp.	5140	Shops	NYSE

T. Rowe Price Group Inc.	6200	Finance	NASDAQ
Target Corp.	5331	Shops	NYSE
Texas Instruments Inc.	3674	Business Equipment	NYSE
The Bank of New York Mellon Corporation	6022	Finance	NYSE
The Chubb Corporation	6331	Finance	NYSE
The Coca-Cola Company	2080	Consumer NonDurables	NYSE
The Dow Chemical Company	2821	Chemicals	NYSE
The Home Depot Inc.	5211	Shops	NYSE
The McGraw-Hill Companies Inc.	2731	Consumer NonDurables	NYSE
The TJX Companies Inc.	5651	Shops	NYSE
The Travelers Companies Inc.	6331	Finance	NYSE
Time Warner Cable Inc.	4841	Telephone	NYSE
Time Warner Inc.	7812	Other	NYSE
Tribune Co.	2711	Consumer NonDurables	NYSE
Tyco International Ltd.	7380	Other	NYSE
Union Pacific Corp.	4011	Other	NYSE
United Parcel Service Inc.	4210	Other	NYSE
United States Steel Corp.	3312	Manufacturing	NYSE
United Technologies Corp.	3724	Manufacturing	NYSE
Unitedhealth Group Inc.	6324	Finance	NYSE
US Bancorp	6021	Finance	NYSE
Valero Energy Corp.	2911	Energy	NYSE
Walgreen Co.	5912	Shops	NYSE
Wal-Mart Stores Inc.	5331	Shops	NYSE
Walt Disney Co.	7990	Other	NYSE
WellPoint Inc.	6324	Finance	NYSE
Wells Fargo & Company	6021	Finance	NYSE
Verizon Communications Inc.	4813	Telephone	NYSE
Weyerhaeuser Co.	6798	Finance	NYSE
Viacom Inc.	4841	Telephone	NYSE
Williams Companies Inc.	4922	Utilities	NYSE
Visa Inc.	7389	Other	NYSE
Vulcan Materials Company	1400	Other	NYSE
Wyndham Worldwide Corporation	7011	Other	NYSE
Wynn Resorts Ltd.	7011	Other	NASDAQ
Xerox Corp.	3577	Business Equipment	NYSE
Xilinx Inc.	3674	Business Equipment	NASDAQ
Yahoo! Inc.	7373	Business Equipment	NASDAQ
Yum! Brands Inc.	5812	Shops	NYSE
Zimmer Holdings Inc.	3842	Healthcare	NYSE

APPENDIX 3. Industry Specifications and SIC-codes

NoDur	Consumer NonDurables	Food, Tobacco, Textiles, Apparel, Leather, Toys	
0100-0999	2700-2749	3100-3199	
2000-2399	2770-2799	3940-3989	
Durbl	Consumer Durables	Cars, TV's, Furniture, Household Appliances	
2500-2519	3710-3711	3750-3751	3990-3999
2590-2599	3714-3714	3792-3792	
3630-3659	3716-3716	3900-3939	
Manuf	Manufacturing	Machinery, Trucks, Planes, Off Furn, Paper, Com Printing	
2520-2589	3200-3569	3715-3715	3830-3839
2600-2699	3580-3629	3717-3749	3860-3899
2750-2769	3700-3709	3752-3791	
3000-3099	3712-3713	3793-3799	
Energy	Energy	Oil, Gas, and Coal Extraction and Products	
1200-1399	2900-2999		
Chems	Chemicals	Chemicals and Allied Products	
2800-2829	2840-2899		
BusEq	Business Equipment	Computers, Software, and Electronic Equipment	
3570-3579	3694-3699	7370-7379	
3660-3692	3810-3829		
Telcm	Telecommunications	Telephone and Television Transmission	
4800-4899			
Utils	Utilities	Utilities	
4900-4949			
Shops	Shops	Wholesale, Retail, Laundries and Repair Shops	
5000-5999	7200-7299	7600-7699	
Hlth	Healthcare	Healthcare, Medical Equipment, and Drugs	
2830-2839	3840-3859		
3693-3693	8000-8099		
Finance	Finance	Financial sector, Banks, Insurance Companies	
6000-6999			
Other	Other	Mines, Constr, Trans, Hotels, Bus Serv, Entertainment	