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Socially Responsible Funds and Financial Sustainability: Effects of Investment Horizons on Fund Performance

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ABSTRACT

This paper investigates the effect of US domestic equity mutual funds' investment horizons on their abnormal returns during 1999 to 2014, and how the effect differs for funds dedicated to socially responsible investments (SRI) and conventional, non-SRI funds. Using average fund turnover as a proxy for the fund investment horizon, we find that SRI funds tend to have significantly longer horizons than non-SRI funds. Additionally, our analysis shows that long horizons have a positive impact on abnormal returns. Yet, SRI funds have no better abnormal returns than non-SRI funds on average. By interacting SRI and horizon, we find that the effect of investment horizon is opposite for SRI and non-SRI funds' abnormal returns, being negative for SRI funds. This may support theories in existing studies that SRI funds hold their assets longer for non-financial reasons, while short-term investors may face stronger downturn effects due to herding behavior. Furthermore, we find that the effect of temporarily increased activity is negative for SRI funds, but positive for non-SRI funds. Thus, SRI funds with a shorter horizon but fewer peaks in activity yield higher abnormal returns than SRI funds with a longer horizon and more frequent peaks in activity. The opposite is true for non-SRI funds. Despite varying expense ratios, the findings do not differ between gross and net returns. The study is based on a sample of 155 SRI funds and two different non-SRI control groups, namely a matched and a randomized sample, on which we perform several OLS as well as time FE regressions to isolate the effect of investment horizon and SRI.

Keywords: socially responsible investments, SRI, investment horizon, abnormal returns, churn ratio

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1. Introduction

Socially responsible investments (SRI) are growing rapidly, both in terms of numbers and as a share of total assets under management (AUM) in the main financial markets of the world. According to the United States Forum for Sustainable and Responsible Investment (US SIF), SRI received more than one out of six dollars under professional management in the US in the end of 2013, which accounts for more than $6.5 trillion invested in SRI strategies. This can be compared to $639 billion in 1995, showing a tenfold increase in less than 20 years. (US SIF 1997, 2014)

Closely related to social responsibility and sustainability is the encouragement of long-termism and long-sightedness in consumption and investments – also in financial markets. Despite the arguably close affiliation of social responsibility and long-termism, the connection between SRI and the horizon of investments on fund performance is virtually unexplored in the financial literature.

As regards investment horizons, US SIF (2001, 2003), Reeneboog et al. (2005) and Bollen (2007) find that SRI investors tend to be more "sticky" than investors in conventional funds. The net inflows to socially screened funds dropped by only 54% during the stock market downturn in the first nine months of 2001, compared to a 94% drop in all US mutual funds (US SIF 2003). Bollen (2007) finds that the volatility of money-flows in the US is lower for SRI funds than for conventional funds, and that SRI funds are less sensitive to lagged negative returns, but more sensitive to lagged positive returns, compared to conventional funds. This is consistent with the general perception in existing literature that SRI smoothens allocation decisions (Renneboog et al. 2008b). Renneboog et al. (2005) find that the money-flow sensitivity depends on the types and intensities of SRI screening activities. The different sensitivities and trading decisions may be explained as behaviorism in the prospect theory (see Theoretical Application).

Screenings commonly imply the exclusion of unethical business such as affiliations with alcohol, tobacco, weapons etc. However, some funds actively screen for investments in companies with superior Corporate Social Responsibility (CSR), governance and/or shareholder activism. The amount of effort associated with different screenings obviously varies immensely, but due to a lack of regulation is regularly disclosed only by funds themselves.

Aspects such as higher inflows during market downturns and low volatility in money flows can be understood as indicators for loyalty and the above mentioned "stickiness". It then seems intuitive that SRI funds have longer horizons than non-SRI mutual funds, but what effects does it have on performance? Previous studies only cover the effect of horizon on returns for mutual funds in general.

For instance, Pastor et al. (2015) show that funds have no better returns with higher activity than without; however, on fund level, each fund has higher returns when it trades more. Assuming that funds with longer horizons have a lower average activity over time, it seems that horizon could be beneficial for performance. However, to the best of our knowledge, no studies exist that investigate how this effect interacts with social responsibility.

In this thesis we intend to cover some of this research gap by studying not only the effects of SRI and horizon separately, but especially their interaction, on mutual fund abnormal returns. We compute net and gross abnormal returns monthly as the difference between the actual net/gross returns for each fund and the predicted net/gross return based on CAPM, the Fama-French (1993) three factor and the Carhart (1997) four factor model, respectively.

In accordance with Gaspar et al. (2005), Yan and Zhang (2009) and Cella et al. (2013), we take a fund's investment horizon for a perpetual variable which rarely changes over time. Hence, we are using the average of a fund's turnover over its total observations to compute average Churn Ratio ($\overline{CR}$), a constant variable that proxies a fund's investment horizon (compare ibid.). Fund turnover is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets of the fund, as calculated by The Center for Research in Security Prices (CRSP) and in various literature, with no or small alterations.

In contrast to a fund´s investment horizon, market conditions and profit opportunities are correlated with turnover on a time-variant basis. Hence, we establish the time-variant monthly CR as a proxy for active management connected to temporary profit (compare Pastor et al. 2015) and distinguish between the time-variant monthly CR (CR_t) and the constant $\overline{CR}$.

Using a matched as well as a randomized sample of US domestic equity mutual funds between 1999 and 2014, we find that SRI funds tend to have significantly longer horizons than non-SRI funds. Additionally, we find that longer horizons have a positive impact on abnormal returns. Yet, SRI funds have no better abnormal returns than non-SRI funds on average. Looking into the effect of horizon on abnormal returns for SRI and non-SRI funds, respectively, we find that longer horizons are positive only for non-SRI funds. For SRI funds, on the contrary, longer horizons have a negative effect on abnormal returns. Hence, SRI and non-SRI funds could both benefit when their investment horizons converge in terms of length.

In order to isolate the effect of horizon further, we additionally introduce time-variant trade activity of funds (CR_t) in our analysis. By controlling for CR_t, we allocate the effects of time-variant external influences to CR_t, making $\overline{CR}$ estimates a cleaner proxy for the constant investment horizon.

By adding CR_t in the empirical analysis, we find that temporarily increased trade activity is positive for non-SRI fund performance, but negative for SRI performance – the opposite effects to the horizon $\overline{CR}$. Thus, it seems like SRI funds are not good at identifying and exploiting time-varying profit opportunities and/or their trade activity is motivated by more diverse goals than financial performance, e.g. social factors.

SRI funds are “sticky”, or loyal, (comp. Reeneboog et al. 2005) but from a return-based point of view it seems as if they should more actively replace low yielding assets rather than staying with their investments. SRI funds would benefit from trading more on average, but with better market timing or skill of the fund manager to generate alpha than they currently show. Non-SRI funds, on the other hand, are good at identifying and exploiting time-varying profit opportunities, but maintain a too high trade activity in the absence of such opportunities.

Highlighting the different impacts of horizon and its interaction for the two fund groups, our results contribute to the existing research on SRI and investment horizons. However, as is usual with long-run abnormal return studies, the predictability is very low with adjusted R^2 below 1% in most of our regressions (comp. Sanchez 2007).

The remainder of this thesis is structured as follows. Section 2 provides a literature review with a brief background information on SRI and the SRI concept, as well as an overview of existing studies and theories, on which we base our hypotheses and methodology. Section 3 describes the data applied in the empirical analysis with general statistics and data quality discussions. Section 4 outlines our methodology for the empirical analysis, including definitions of our main variables and main statistical tests. Section 5 presents tables and interpretations of the results from the empirical analysis. Section 6 constitutes our conclusions and implications for future research. Additionally, we provide a list of references and an appendix with supplementary tables.

2. Literature Review

2.1 General Information on Socially Responsible Investments

Social investments have existed for long times: For instance, the Quakers refused to profit from the weapons and slave trade in the 17^{th} century and ethical restrictions on loans and investments have been imposed through religious laws for millennia. The first modern SRI mutual fund, the Pax World Fund, was founded in 1971 in the US for opponents to the Vietnam War – the funds avoided investments in weapon contractors (Renneboog et al. 2008b).

The interest for socially responsible investments (SRI) of different types is growing rapidly all around the world, regarding both research and investments (Renneboog et al. 2008b). Listed categories are ethical funds, ESG funds (environment, social and governance), social impact funds, green bonds and many more.

Investments are considered socially responsible – SRI – when making use of environmental, social or ethical screens. The screens are commonly termed negative, positive or a combination of the two, and often include an aspect of governance and shareholder activism as well. Negative screens imply the exclusion of unethical businesses from the fund, according to the fund's own criteria. This could for instance be companies involved in alcohol, tobacco, gambling or weapons, or companies with poor performance in labor conditions or environmental protection.

Positive screens imply that the fund invests only in companies that meet superior Corporate Social Responsibility (CSR) standards. Examples of common positive screens focus on corporate governance, labor conditions, environment and community involvement. A clear majority of the US SRI mutual funds use more than five screens (US SIF 2013).

While the total AUM of SRI strategies in the US grew vastly in recent years (see Introduction), the findings of Nofsinger and Varma (2013) are more interesting as a comparison to this thesis: Between 2000 and 2011, the total net assets in the US domestic equity mutual funds in their data increased by 305 percent for SRI funds, which can be compared to 65 percent for the non-SRI counterpart.

Those developments are not consistent with the dataset used in this thesis (see Data for details). Apart from deviations inherent to the choice of, especially SRI, funds in the data, the differences in AUM growth and even which funds count as SRI can also be explained by the lack of information and governing in the field of SRI.

As indicated in the examples of screenings above, funds admission their social responsibility themselves. There is no widely accepted institution or central group to test funds for their social responsibility, respectively accredit that status to them. Although a rating for impact investing, a subgroup of SRI, exists, it is understood more as a service for investors and not made publicly available. Hence, there is neither legal nor conventional regulation regarding what counts as socially responsible. From the perspective of financial investing, this is a stark contrast to the vast amount of timely information accessible for the public. Also, while auditing is required by law for the financials of larger companies, and rating agencies such as Standard & Poor's provide largely relied upon evaluations of companies and investment vehicles, no such instances exist within the field of SRI admission.

This lack of governance leads to highly different divisions of funds within the whole SRI group. For instance, a few funds may invest primarily for profit but exclude e.g. the weapons industry, while others may run expensive efforts to identify investments which work towards a socially positive outcome, their financial profitability secondary. Naturally, such a broad field of granularity brings about a heterogeneous group of SRI funds in its entirety. Furthermore, due to the limited information, the SRI sample size and characteristics differ vastly among studies, which may amplify the described heterogeneity as well as it may decrease it.

As inferred from those factors, the term SRI is used somewhat freely and describes funds which are regarded as socially responsible, ethical, or analogous, so also in this thesis. Self-accredited SRI funds are believed their status unless another source or behavior would indicate otherwise.

Nevertheless, several scholars have studied the financial performance of SRI funds compared to that of conventional funds in different geographical areas. Most of them fail to find any statistical difference between the risk-adjusted returns of SRI and conventional funds, while some studies, mainly made on continental Europe and Asia-Pacific, find that SRI on average underperform (Renneboog et al. 2008b).

2.2 Theoretical application

The vast growth of SRI described earlier is to a degree puzzling, as the attractiveness does not seem to be attributable to financial returns. Financial and economic theories on SRI and investment horizon, respectively, provide some insight and lay a foundation for our hypotheses and methodology.

2.2.1 Theories and Models regarding Socially Responsible Investments

2.2.1.1 Ethical Cost Theory

Many financial theorists, starting with Markowitz (1952), argue that screening for social or ethical aspects inflicts a cost for investors, since screens, whether positive or negative, impose limits to the scope of possible investments for a fund. Some financially attractive firms lie outside the accepted investment universe of an SRI fund, therefore decreasing its return or diversification prospects relative to a non-SRI fund. That will in turn shift the mean-variance frontier towards less favorable risk-return tradeoffs than those of conventional portfolios (Reeneboog et al. 2008b).

Table 2.1 illustrates the investment opportunities for conventional and SRI funds, respectively. A conventional fund would pick investments from (A) and (B), while an SRI fund would pick from (A) and maybe even from (C). Some SRI firms provide good returns, but having to abstain from other firms with good returns imposes a cost for the SRI investor.

Table 2.1. Investment Opportunities
Investment opportunities for conventional and SRI funds (Renneboog et al. 2008b)

	Positive NPV	Negative NPV
Positive CSR	*(A) both SRI and conventional funds invest*	*(C) only SRI funds with positive screens invest*
Negative CSR	*(B) only conventional funds invest*	*(D) neither conventional nor SRI funds invest*

Adler and Kritzman (2008) empirically estimate the cost of the self-imposed restrictions of SRI to lie between 0.08% and 2.71%, depending on the investor's skill and portfolio's diversification, in decreased returns per year. Also Renneboog et al. (2008a) find that, on average, investors pay a price for ethics.

Nofsinger and Varma (2013) note that several studies on SRI *firms* find that these outperform the benchmarks. In particular, firms focusing on environmental aspects often do well. Nonetheless, the same authors note that SRI funds in most studies are found to perform equal to or worse than conventional funds. Thus, it seems like social responsibility in many cases can be positive for the financial results at a firm level, but it nevertheless inflicts a limitation for funds, as shown above in Table 2.1.

2.2.1.2 Multi-variate Utility Model

The theories presented above offer explanations as to how SRI funds perform in comparison to conventional mutual funds, but not why they attract investors. According to the modern portfolio theory (MPT), the investors' objective is to maximize portfolio expected return for a given amount of portfolio risk. However, the basic assumptions of MPT have been challenged by behavioral economics in recent years, encouraging the analysis of alternative utility functions. For instance, Bollen (2007) introduces a multivariate utility function that also increases value through societal or ethical aspects. Investors in SRI funds are then expected to derive non-financial utility from their investments in socially responsible firms and funds.

The utility can be of a positive as well as negative nature. For instance, investors could exhibit an aversion to corporate behavior that is not inspired by CSR. As with risk aversion, these investors would require an additional return for investing in non-SRI. With a growing number of investors corresponding to this utility function, the required additional return for non-SRI, respectively conventional, funds increases (Reeneboog et al. 2008b).

The multi-attribute utility function also implies that SRI portfolio managers have a larger variety of aspects to consider, potentially competing for the managers' time and attention. This may weaken fund managers' performance in terms of risk-adjusted returns, which then increases potential agency costs and brings about lower average returns.

Renneboog et al. (2008b) also argue that if the SRI investors' utility-function is indeed multi-attribute, one should expect SRI growth even if the risk-adjusted returns are lower than they are in conventional funds. The different utility function also supports the expectation of more loyal or "sticky" SRI investors, with less sensitivity to past performance. This expectation is confirmed empirically by Reeneboog et al. (2005), Bollen (2007), Nofsinger and Varma (2013) and USSIF (2013).

2.2.1.3 Prospect Theory and Downside Protection

Another possible explanation to the increasing share of AUM directed to SRI, although this investment type seemingly fails to outperform the market, may be related to its dampening effect on market downturns. Nofsinger and Varma (2013) show that SRI mutual funds outperform matched conventional mutual funds in periods of market crises, providing a downside protection.

Under Kahneman and Tversky (1979) Prospect Theory, investors are more impacted negatively by losses than positively by a gain of similar magnitude. Thus, they are likely to choose a portfolio with asymmetric performance because the gain in utility for doing better in falling markets is larger than the loss in utility for underperforming in rising markets (Nofsinger & Varma 2013). Following this rationale, it seems conceivable that certain groups of investors contribute to the SRI growth with the expectation to give up a part of returns in normal times for better downside protection during crises. Empirically speaking, a point in case are certain UK investors: Cox et al. (2004) study 600 of the largest UK firms and find that long-term institutional investors, such as pension plans and life insurers, favor firms with strong corporate social performance (Nofsinger & Varma 2013).

2.2.1.4 Externalities and Stakeholder Theory

Most economic theories support the view that screening, which SRI funds per definition employ, cannot lead to higher returns than a strategy without restrictions in that regard. However, the Outperformance Theory advocates the opposite (Renneboog et al. 2008b). Supporters of this theory argue that SRI pays off in the long run due to a causal relationship between social behavior and generated value. In analogy, companies that do not act socially responsibly destroy shareholder value in the long term.

The destruction of shareholder value due to social irresponsibility is typically driven by accidents and public scandals, rather than by a smaller continuous cost, hence leading to e.g. reputation/brand damage and costs of litigation. Companies that are socially responsible, on the other hand, are less likely to experience this type of adverse events, thus avoiding the costs (Renneboog et al. 2008b). At fund level, the risk that a significant amount of the holdings will lose value due to social irresponsibility increases with time. Since SRI funds avoid such companies more likely than conventional funds, the thereby induced positive effect should increase with the investment horizon.

Similar conclusions are drawn by theories of externalities and stakeholder theory. Renneboog et al. (2008b) explain externalities as the external, by the agent uncontrollable, effect on costs and benefits, for instance pollution. Pollution can decrease the quality and quantity of e.g. fish caught by a fisherman. However, it is not the fisherman himself who stands for most of the pollution. As long as the externalities do not impose any costs to the entity creating them, optimizing financial returns may result in high amounts of negative externalities, whose costs are borne by other agents. Investing only in firms that are not creating negative externalities may therefore bring about a non-optimal financial return, at least in the short run, although the value created for all stakeholders in totality may be higher. Thus, maximizing the shareholder value may not be consistent with maximizing social and environmental benefits by reducing negative externalities. Similar ideas are discussed in the stakeholder theory.

The stakeholder theory presumes a conflict between shareholder value maximization on the one side, consisting of total profits and dividends, and stakeholder value maximizations on the other side, consisting of the total value created for employees, customers, local communities, environment etc. SRI funds can be seen to prioritize other stakeholders than the shareholders, meaning that performance should not be assessed only by returns on investments.

The conflict between shareholder value and stakeholder value can be mitigated by internalizing externalities, for instance by imposing regulations. Assuming a continued strong growth for SRI, access to capital can potentially be increasingly scarce and costly for non-SRI firms in the long run, also imposing a cost of creating negative externalities.

In summary, most theories which suggest that social responsibility bears a cost focus on short term profits, while the general perception is that social responsibility is beneficial in the long run. Thus, the effect of SRI on returns may be conditional on the corresponding horizon.

2.2.2 Theories and Models regarding Investment Horizons

2.2.2.1 Investment Horizon proxies in existing literature

Several studies investigate the effect of investment horizons on fund performance. Cella et al. (2013) show that the price of stock held by short horizon investors tend to plummet more dramatically than those held by long horizon investors during market crises. The selling pressure increases during the same periods of time when liquidity is most limited, causing the stocks' prices to drop below their fundamental values. This is followed by reversals, up until to the fundamental value of the stock in the long term. Meanwhile, stock held by long horizon investors experience less of a drop as well as less reversal, as long horizon investors tend to hold on to the shares and wait for the market to return. In conclusion, the stock price fluctuations are to a substantial extent driven by the horizon of the investors. (Cella et al. 2013)

This implication is in line with the findings of Yan and Zhang (2009), who study the informational role of investment horizons in stock markets and find empirical support for that short-term investors' trading forecasts future stock returns and earnings. Long-term investors' trading has no such predictive power.

The horizon is not usually observable, something these studies overcome by using a measure of the churn ratio as a proxy. However, the churn ratio not only indicates the horizon, but also active management. Thus, it is important to differentiate between the funds' normal, or average, churn ratio, which is a better indicator for horizon, and the funds' temporal deviations from their average churn ratio. (compare Introduction)

2.2.2.2 Coordination Failure Model

The increased selling pressure among short horizon investors, empirically tested by Cella et al. (2013), may be explained by the coordination failure model. The model implies that a non-optimal outcome is imposed by the inability to effectively coordinate the investors. Anticipation of weakening demand leads investors to expect others to divest. In order to avoid the risk of selling at a later point than other shareholders, consequently at a lower price, investors proactively sell their holdings, making the fear of falling prices a self-fulfilling prophecy.

The coordination failure model applies primarily to short horizon investors, as they are more likely to sell shares early due to liquidity requirements, thus before prices recover. Such investors thereby realize the higher expected value of selling quickly, at the average in-run price, compared to the lower expected value of selling the shares at the marginal post-run price (Bernardo & Welch 2004).

By doing so, the short horizon investors cause the run they fear themselves. Say Bernardo and Welch (2004: p. 1): "Liquidity runs and crises are not caused by liquidity shocks per se, but by the fear of future liquidity shocks". In contrast to such behavior, long horizon investors have a better ability to ride out the storm, and do not participate in creating or amplifying liquidity runs or crises to the same extent.

Consequently, the effects of trade activity, i.e. time-variant churn ratio deviations, on abnormal returns should be smaller for SRI funds, due to their longer horizons, than for non-SRI funds. In contrast, the effect of a change in the investment horizon, i.e. $\overline{CR}$, should be of higher magnitude for SRI funds, since their behavior is expected to become increasingly beneficial in the long term.

2.2.2.3 Trading decisions of long-term Investors

An additional explanation as to why the horizon of investors impacts the stock price fluctuations is offered by Chen et al. (2013). Their study shows that, in contrast to what is usually assumed, stock returns are considerably affected by cash flow news, in addition to news regarding the discount rates. The importance of cash flow news increases with the investment horizon, and becomes a higher priority than news about the discount rate for horizons longer than two years.

In tendency, we assume that long horizon investors act accordingly and base decisions more on cash flow expectations than short horizon investors. Fluctuations in market prices are therefore less likely to affect investment decisions for long horizon investors. This provides further support for the average and the time-variant churn ratio, respectively, having different effects on abnormal returns.

2.2.3 Net and Gross Returns in studies on Fund Performance

While most of the previous studies made on the performance of SRI funds are based on the funds' net returns, Bauer et al. (2005) find that the expense ratio is typically higher for SRI funds than non-SRI funds. The difference in expense ratios is likely to exaggerate the negative effect of social responsibility on fund performance found in many studies, although it indeed inflicts a higher cost for the investor.

Similarly, most research on horizons analyzes the effects on net returns. However, research on active management commonly includes analyses based on gross as well as net returns. According to some of these studies, active management (closely correlated with high fund turnovers) is on average positive for gross returns when the fund manager is skilled and well informed, but the generated alpha is not always large enough to cover the costs, thus resulting in negative abnormal net returns (Fama & French 2010, Pastor & Stambaugh 2015). These results are expected by Grossman and Stiglitz's (1980) model, which extends the rational expectations model introduced by Robert Lucas. According to their model, those who expend resources to obtain information require, and do receive, compensation. Grossman and Stiglitz's (1980) model implies that mutual funds with active management will yield positive gross returns on average.

However, other researchers contradict the rational expectations model, such as Jensen (1968) and Barber and Odean (2000), who find abnormal gross returns of zero, and negative abnormal net returns. These results confirm the theoretical models developed by Odean (1998), who states that investors and fund managers suffer from overconfidence and will trade to their detriment.

Assuming that the information obtained is mostly directed towards the presence or absence of short-term opportunities, a longer investment horizon, i.e. a lower $\overline{CR}$, would decrease the resources spent on gathering information. Then, under Grossman and Stiglitz's (1980) model, a longer investment horizon would have a negative effect on gross returns, but no effect on net returns. On the contrary, if the overconfidence model holds, a longer investment horizon would have either zero or positive effects on gross returns, and a positive effect on net returns, since fees tend to be higher for more active funds with short investment horizons.

In analogy, the higher expense ratios in SRI than in non-SRI funds may indicate greater skill or more resources spent on obtaining information. However, the obtained information may not always aid the fund's capacity to generate abnormal returns: the social screening may take a small or large amount of resources, but mostly conveys non-financial information. Yet, the corresponding cost is likely transferred, at least partly, to fund investors via higher expense ratios.

Therefore, we expect to see a different effect of $\overline{CR}$ on SRI gross and net returns. In order to overcome the uncertainty due to the different models' predictions on gross and net returns, we perform our empirical analysis accordingly for both gross and net returns.

2.3 Purpose of study and research questions

The theoretical models and empirical studies serve as explanations for investor behavior regarding investment horizons and SRI, and model their effects on returns. For instance, SRI funds' strong development in terms of growth is credited to various factors, above all social values, but also financial stability and hence better performance in the long run.

At the time of writing, social responsibility in production, consumption and investments acquire great attention in media, political debates as well as in research. The growth of AUM in SRI further underlines the timeliness of the topic. This attention and development spurred our interest in SRI as an increasingly relevant asset class. We deem SRI mutual funds particularly interesting as it is an investment type available to a broad investor base, ranging from individuals' private savings to large institutional funds. The US market seems appropriate due to its size and status globally as well as its relatively good data accessibility. We choose to look only at domestic equity funds in order to avoid complexity and noise related to currencies and diverse characteristics and developments of other markets.

The empirical analysis is based on previous research and theoretical reasoning as presented in the Theoretical Applications section. The financial performance of SRI has been subject to research quite frequently, focusing on different markets, time periods and applying different analytical methods. As explained more thoroughly in the previous section, empirical findings as well as theories support both stances - that social responsibility comes at the expense of financial returns and that social responsibility is beneficial also for financial performance, especially in the long run. We see a trend in that the Cost of Ethics theory focusses more on short term returns, while the Outperformance Theory focuses more on the long term returns.

Furthermore, although several studies investigate the effects of investment horizon on financial returns of mutual funds in general, we have not been able to find any studies focusing explicitly on the relation between horizon and the financial performance of SRI. This gave rise to our research topic, which focuses on the interaction between the investment horizon and SRI funds when estimating abnormal returns. We believe that social responsibility typically is related to sustainability, which cultivates a long term perspective by definition. Thus, the effects of social investments, i.e. SRI, may materialize only for investors with a long investment horizon, and we consequently expect to see a significant interaction effect of SRI and investment horizon. This is our main hypothesis, which we build on a few assumptions that we test before, in order to enable more well-grounded conclusions. We therefore build up our hypotheses in several steps, each step increasing the complexity.

2.3.1 Hypotheses

The universe of funds in this study consists of SRI and non-SRI US domestic equity mutual funds. They will henceforth be referred to as *SRI funds, non-SRI funds*, or merely *funds* when including both SRI and non-SRI.

First of all, we wish to test our assumption that social responsibility and sustainability are closely related. We believe this can be indicated by SRI on average having a longer investment horizon than non-SRI funds. This analysis also gives us critical insights to our data.

Hypothesis 1: SRI funds have longer horizons than non-SRI funds on average

Having established the effect of SRI on investment horizons, we look into the effect of the horizon on abnormal returns. We believe that the size of fees may be connected to the horizon, since shorter horizon investments may require more frequent evaluations and rebalancing. Hence, we analyze the effects on abnormal net returns and abnormal gross returns, respectively.

Hypothesis 2a: The length of the horizon has a negative effect on abnormal gross returns of funds

Hypothesis 2b: The length of the horizon has a positive effect on abnormal net returns of funds

Finally, we combine the previous hypotheses in order to investigate our main query, the effect of horizon on abnormal returns conditional on SRI. The sustainable nature of SRI, discussed in the previous section, leads us to expect a stronger effect of investment horizons for SRI funds than non-SRI funds, and thus a significant interaction effect of SRI and horizon.

Hypothesis 3: The length of the horizon has a stronger effect on abnormal returns (gross and net) of SRI funds than for non-SRI funds

In summary, the analysis investigates the relation between SRI and the investment horizon as well as their effects on fund performance, gross and net respectively, in both isolation and conjunction.

3. Data

The raw data used in this study is obtained via CRSP's Survivorship-Bias-Free US Mutual Fund Database and limits itself to observations from the 1st of January 1999 to 31st December of 2014. The additional constraints applied to date will be outlined below.

Ultimately, we are working with one SRI dataset and two control groups: a randomized sample that comprises, a randomly chosen, half of all US domestic equity mutual funds available in CRSP, and a matched sample consisting of 2 funds per SRI funds.

The process of constructing the samples is based on the following chronological steps. First, the identification of suitable SRI funds, second, the procurement of the actual data observations and third, the filtering, respectively modification, of the data.

The first step was obtained through extensive searches inspired from related literature, namely Statman (2000), Geczy et al. (2005), Bollen (2007), Renneboog et al. (2008a, 2008b) and Nofsinger and Varma (2013), as well as the US and European Forum for Sustainable and Responsible Investment (US SIF, EURO SIF). As indicated in the Literature Review, the availability of information regarding SRI funds is problematic; moreover, the number of SRI funds in 1999 and a few years onward was still much lower than today. Many studies referred to above have an SRI sample of fewer than 100 funds, and only Nofsinger and Varma have a significantly larger sample than we do, 240 SRI funds compared to our 155, in the same boundaries of US domestic equity.

Eventually, the list of US SRI mutual funds from the website socialfunds.org set the foundation for the sample. Having decided to limit the geographical boundaries of this study to the US, the SRI fund group was scaled up by lists from Morningstar, US SIF and a few small individual sources. After eliminating duplicates, this list was loaded into CRSP by using NASDAQ fund tickers as identifiers.

When the desired funds are selected, CRSP offers a date range on day level, and various variables for which observations are available either monthly, or quarterly/annually. Due to the requirements on the data for this study, we had to draft separate datasets with either quarterly or monthly observations per sample from CRSP. Namely, the variables given by the database are:

Table 3.1 Variables
Description of the variables included in the dataset and their frequency

Variable	Availability	Description
caldt	Q & M	Observation date in the form "01jan1901"
crsp_fundno	Q & M	Fund identifier generated by CRSP
mtna	M	Total net assets
net_ret	M	Net return per share as of month end
mnav	M	Monthly net asset value per share
mktrf	M	Excess return on the market (CAPM risk premium)
smb	M	Small-minus-Big return (Fama French factor)
hml	M	High-minus-Low return (Fama French factor)
umd	M	Momentum factor (Carhart factor)
rf	M	Risk-free return: one month treasury bill rate
fund_name	M	Fund name as reported or abbreviated by CRSP
first_offer_dt	M	Date the fund was first offered
end_dt	M	Date of latest NAV data
exp_ratio	Q	Expense ratio as of fiscal year-end
turn_ratio	Q	Fund turnover ratio (exact calculation below)
crsp_obj_cd	Q	Code for a fund's investment objective (details below)

In column “Availability“, Q stands for “quarterly” and M for “monthly”.

The two variables caldt and crsp_fundno are constant over the two separate datasets and were hence used as identifiers for merging those.

The exact calculation for CRSP’s turnover ratio is worth mentioning because of the variable’s centrality to the empirical analysis in this study: “Fund Turnover Ratio. Minimum (of aggregated sales or aggregated purchases of securities), divided by the average 12-month Total Net Assets of the fund.” (CRSP US Mutual Fund Guide 2014: p.9)

We use this turnover ratio as a proxy for churn ratio, which describes investment horizon as constant average turnover per fund, and activity as time-variant turnover. Compared to the other studies using churn ratio mentioned before, a few differences in the calculation can be identified.

Gaspar et al. (2005) as well as Cella et al. (2013) use the following formula to arrive at a churn ratio between 0 and 2, on which they base a constant average that is used as investment horizon.

$$CR_{i,t} = \frac{\sum_{j \in Q} \left| N_{j,i,t} P_{j,t} - N_{j,i,t-1} P_{j,t-1} - N_{j,i,t} \Delta P_{j,t} \right|}{\sum_{j \in Q} \frac{N_{j,i,t} P_{j,t} + N_{j,i,t-1} P_{j,t-1}}{2}}$$

CR=Churn Ratio
N=number of held securities

P=price of the indicated security
j=mutual fund
i=stock
t=time (=quarter)

The first important difference is that CRSP uses the minimum of aggregated buys or sells instead of the sum of changes in the holdings. According to Yan and Zhang (2009), using the minimum eliminates a potentially biasing effect of fund inflows or outflows; since all funds in our dataset grow considerably over the observed duration, this is a desired effect.

The second difference worth mentioning is that the above given formula works with market prices and therefore net asset value instead of total net assets, resp. AUM. Despite this differences, both Gaspar et al. and Cella et al. mention the similarity to CRSP's calculation, as do other studies such as the ones by Nofsinger and Varma (2013) and Yan and Zhang (2009). We deduct that it is common in existing literature to use iterations of this calculation.

Table 3.2. Churn Ratio
Descriptive statistics on the churn ratio by data sample, SRI status and tertile

	By SRI		By Tertile			
	SRI	Non-SRI	Tertile 1	Tertile 2	Tertile 3	Total
Matched Sample						
Nr of obs	17,616	36,406	18,056	18,022	17,944	54,022
mean	0.5781	0.8832	0.2639	0.6025	1.4888	0.7837
sd	0.3983	0.7735	0.1068	0.1104	0.7781	0.6895
min	0.0396	0.0568	0.0396	0.4200	0.8375	0.0396
max	2.9283	6.2741	0.4177	0.8374	6.2741	6.2741
Randomized Sample						
Nr of obs	18,849	836,028	285,008	284,921	284,948	854,877
mean	0.5710	1.0070	0.2651	0.6918	2.0355	0.9974
sd	0.3939	1.8360	0.1244	0.1330	2.8586	1.8177
min	0.0396	0.0000	0.0000	0.4686	0.9321	0.0000
max	2.9283	69.4717	0.4679	0.9314	69.4717	69.4717

The churn ratio is primarily used as a proxy for investment horizon, one of the main variables of interest in this thesis. Comparing the mean of the churn ratio for SRI and non-SRI fund, respectively, in Table 3.2, it is clear that SRI-funds have a considerably lower churn ratio on average, and thus a longer investment horizon than non-SRI funds. This is particularly articulate in the randomized sample. Also, the standard deviation is significantly smaller for SRI funds. This is already an important observation in itself.

Since the conversion from churn ratio to investment horizon measured in months or years is not straight forward, the funds are divided into tertiles based on the churn ratio. The tertile with the highest churn ratio can be viewed as short horizon funds, while the tertile with the lowest churn ratio can be seen as long horizon funds, with a mid-horizon tertile in between.

In the matched sample, the distance of one standard deviation of SRI and non-SRI funds in total can be sufficient to take a fund from the short horizon tertile to the long horizon tertile. The standard deviation of the SRI funds alone could only move a fund to an adjacent tertile. In the randomized sample the difference between the standard deviation for SRI funds and non-SRI funds is substantially larger, but a one standard deviation change of churn ratio for SRI is still just short of taking a fund from short horizon tertile to the long horizon tertile.

As regards the identification of domestic equity funds, the CRSP Style code is of importance (see CRSP US Mutual Fund Guide 2014 for details). It consists of up to four letters, with an increasing level of granularity from left to right. For the purpose of this study, especially the first two letters, which can define "Equity", resp. "Domestic", are of importance. The third and fourth letter are later used for matching, respectively as a control variable.

The expense ratio is the means to perform the empirics in this study on net and gross returns. The ratio comprises 12b-1 fund and management fees as well as waivers, if applicable. Overall, it is comparable to the industry-common total expense ratio (TER). It does not include front or rear loads of funds, which are ignored for this thesis. Existing studies either neglect loads generally when they only look at net returns or try to circumvent loaded funds in their data. Geczy et al. (2005) perform their analysis on a no-load sample and then add loaded funds to test robustness: "Our results to this point exclude funds with load fees because it is not clear how to account for these fees appropriately." (Geczy et al. 2005: p. 23)

More information on all variables can be found in CRSP's Survivorship-Bias-Free US Mutual Fund Guide For SAS and ASCII (2014).

Finally, all datasets were modified in the following standard procedure, before the SRI sample and control groups were adjusted more specifically.

3.1 Standard modification of data

3.1.1 Adjustments of data

The first step after merging the separate raw datasets was to match the missing monthly values of quarterly available variables. Since investment objectives are largely consistent over time, the quarterly entries were simply copied for the following two months. Missing values were replaced by the next entry of the same fund; hence a risk that some funds are falsely defined as equity and domestic exists. However, we assume that risk to be negligible since investment objectives rarely change, especially on such a large scale as the decision of equity instruments and domestic focus.

Expense ratio displays a number of missing values. We followed the CRSP knowledge base's advice in that regard: "It is reasonable to use the earliest known expense ratio as a 'proxy' alternative." (WRDS 2015)

Fund turnover was handled in a similar manner as investment objective, with the important difference that missing values were not replaced in any case. For the average turnover per fund, this measure would be negligible, but since activity proxies on the time-variant changes in turnover between observations, a replacement might have biased this variable.

3.1.2 Filtering of data

After the preparation of one consistent dataset, a standard filtering according to the needs of the empirical work was performed. All funds were already US-based, but with different investment geographies or types of securities. By means of the CRSP code, all observations that were not labelled equity and domestic were dropped. This may also include observations of a fund that changed its investment objective.

Furthermore, the data was filtered in order to maintain sufficient observations for estimating betas on fund level. In accordance with Bilinski and Lyssimachou (2014) and Damodaran (1999), we dropped all funds with less than 30 observations.

Finally, screening the filtered dataset yielded one fund with an extreme and economically unreasonable outlier in monthly returns; therefore, this fund was dropped completely.

3.1.3. Creation of variables

The last step in the standard data modification establishes the variables necessary for the empirical analysis. Table 3.3 gives a brief overview of the created variables. Detailed descriptions follow below.

Table 3.3. Created Variables
Description of additional variables created based on existing variables

Variable	Description
$\overline{CR}$	Constant Churn ratio as average turnover per fund
gross_ret	Gross return as "net_return + exp_ratio/12"
exret	Excess net return as "net_ret - rf"
exgross	Excess gross return as "gross_ret - rf"

Including the expense ratio in the dataset underlay the purpose of computing gross returns with its help. Since expense ratio shows the annualized percentage of total investment (total net assets), whereas net returns are per share and via net asset value, an approximation was required – number of fund shares is no available information in CRSP. Therefore, expense ratio was divided by 12, stored in the variable "exp_month" and subsequently added to net return. The rationale behind this calculation is to approximate NAV to TNA; it should be noted that this approach potentially overestimates gross returns of well-trading funds (NAV > TNA) and underestimates gross returns for poorer performances (NAV < TNA). However, we assume this to be in line with general procedure in existing studies, as most authors only disclose that they use expense ratios and net returns, not the calculation. Fama and French (2010) apply the same computation we did: "Gross returns are net returns plus 1/12th of a fund's expense ratio for the year." (Fama and French 2010: 1920)

Not included in the table above is the binary variable "SRI". It is used as an identifier for funds and is "1" when it belongs to the SRI sample, otherwise it is set to "0".

From this point on, data is modified specifically with regard to being SRI or control group samples.

3.2 SRI sample

After putting together a list from various sources as described in the introduction of this data section, we downloaded the observations from CRSP via NASDAQ tickers. The standard filtering and modification explained above led to a sample of 155 funds in total, which naturally do not have observations in every year during the whole period. To construct the matched sample (described below), seven out of the 155 total funds were dropped, leaving 148 funds for the SRI sample used among that control group. One of the advantages of the matched control group is that the ratio of 2:1 non-SRI to SRI funds stays largely constant throughout the years (see table below):

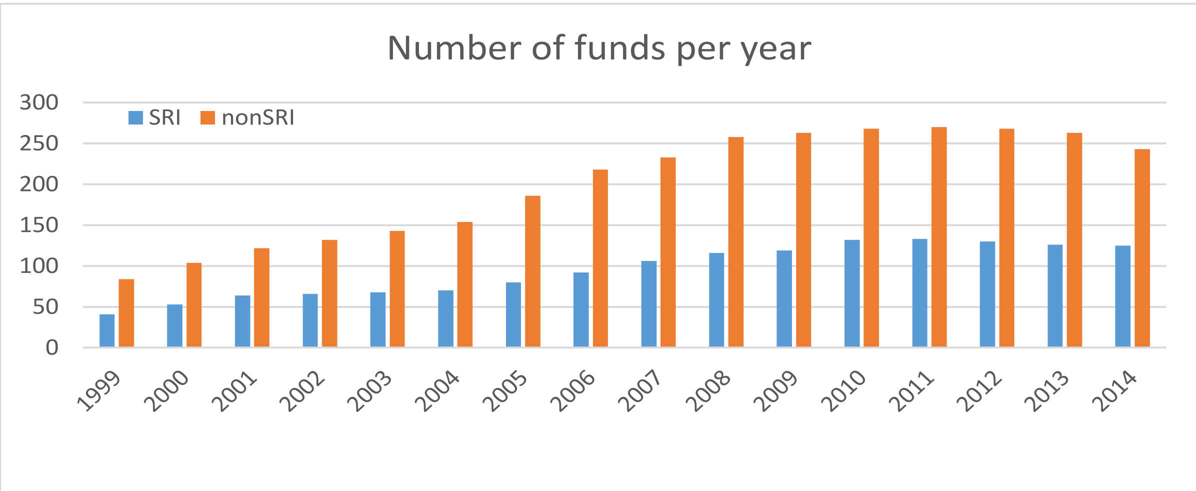

Fig. 3.1. Number of SRI funds and non-SRI funds respectively per year in our dataset

3.3 Control groups: Basic sample

This sample is based on all available mutual funds in CRSP for the given date range. After the standard filtering described above, we also eliminated the funds represented in the SRI sample. Although this procedure provides a data set which likely still contains SRI funds, the largest part is indeed non-SRI: in this study, the SRI sample's number of funds is about 1.6% of the number of non-SRI funds in the randomized sample (explained below). Therefore, we assume the effect of possibly missed SRI funds to be negligible.

After standard procedures, the dataset comprised almost 20,000 funds, resp. almost 2 million observations. Using this dataset, two different control groups were constructed, a randomized and a matched sample. The matched sample goes in line with existing studies, namely Statman (2000), Renneboog et al. (2005), Bollen (2007), and Nofsinger and Varma (2013) and makes effects more accountable to the difference being SRI or non-SRI, while the much higher number of observations in the randomized sample will confirm, respectively challenge, robustness as well as higher external validity.

The procedure for constructing the control groups is described below.

3.3.1 Control group 1: Randomized funds

Due to the size of the sample, the computers we had access experienced too much inertness when estimating the betas for the various market benchmarks. This caused us to make a decision for dropping about half of the funds. In order to avoid any potential biases, we created a random variable was created which assigned a random number between 0 and 1 to all observations on fund level – then, half of the funds were dropped and the remainder was sorted newly. This procedure eventually results in a data sample with 9,473 funds. We consider this size large enough to represent the universe of US domestic equity mutual funds, despite the previous cut of about half of the funds.

As regards the empirical analysis, the regressions on this control group were performed with the control variables size as total net assets, age as first offered date and investment objective (described in more detail in Methodology).

3.3.2. Control group 2: Fund matching

The idea behind this second control group is to create a sample which matches two funds to each one in the SRI group on the basis of size, age and investment objective. Therefore, the subsequent empirical analysis is carried out without controlling for those variables.

The matching code used looked for funds which show exactly the same four letters in the crsp_code, an average TNA over all available observations of +/- 20% and a First, resp. Last, Offered Date of +/- 2 years. The parameters were calibrated so as to find a reasonable trade-off between closeness of the matched funds' variables and number of SRI funds with no matches. Eventually, seven SRI funds had to be dropped because they matched zero or only one fund within the boundaries of above mentioned matching parameters.

Finally, the matched funds were looked up manually by the name as listed in CRSP to assure they are not SRI. This process regularly relied upon the managing company's website, SEC filings or the prospectus of the given fund; if unavailable, also other informational platforms within the finance industry such as Bloomberg, Yahoo Finance etc. were consulted.

Ultimately, this control group comprises 296 non-SRI funds matched to 148 SRI funds.

Table 3.4. Fund Size
Descriptive statistics on the fund size, measured as TNA, by SRI status and CR tertile

	By SRI		By CR Tertile			
	SRI	Non-SRI	CR Tertile 1	CR Tertile 2	CR Tertile 3	Total
Nr of obs	18,577	899,692	279,395	281,857	280,713	841,965
mean	873.91	404.53	796.57	281.14	176.16	417.18
median	41.20	31.00	46.20	26.80	20.70	29.00
sd	5322.19	2613.59	4566.71	1227.60	610.19	2760.86
min	0.00	0.00	0.00	0.00	0.00	0.00
max	73034.90	215908.50	215908.50	50520.00	23466.90	215908.50

Fund size is measured by Total Net Assets (TNA) which is given in millions of US dollars. In our randomized dataset, the SRI funds are on average substantially larger than the non-SRI funds, USD 873.9m compared to USD 404.5m. The largest individual funds, however, are non-SRI with TNA of USD 215,908.5m, far above the mean. The standard deviation is several times higher than the mean for all funds, indicating that the vast majority of the funds are relatively small, while there are a few extremely large funds. This can also be understood from the median size, which is USD 31.0m for non-SRI funds, and USD 41.2m for SRI funds. Size seems to be negatively correlated with churn ratio, as seen in the table where funds in the long investment horizon tertile, tertile 1, are considerably larger than those in the shorter horizon tertiles. Thus, it makes sense to match by or control for fund size in our analyses.

Table 3.5. Descriptive statistics of funds in the randomized sample
Descriptive statistics on the fund distribution over time

	Nr of active funds		Nr of new funds*		Avg. age in years		Size**	
Year	SRI	non-SRI	SRI	non-SRI	SRI	non-SRI	SRI	non-SRI
<1999			39	2353				
1999	47	2580	12	537	6.26	5.10	1555	441
2000	59	3220	11	724	5.80	4.89	1210	458
2001	70	3724	11	621	5.73	5.11	1042	413
2002	72	4162	1	559	6.53	5.40	1013	311
2003	74	4376	4	449	7.23	5.82	843	230
2004	76	4539	3	487	7.95	6.18	1157	324
2005	86	4837	15	602	7.60	6.41	1143	340
2006	98	5170	12	590	7.58	6.59	1063	368
2007	112	5392	14	520	7.59	6.94	1031	403
2008	123	6448	10	557	7.86	7.19	886	370
2009	126	6400	4	356	8.60	7.64	489	234
2010	139	6419	13	431	8.71	8.07	520	310
2011	140	6651	3	470	9.47	8.36	575	365
2012	137	6495	3	217	10.47	8.91	586	379
2013	133	6154	-	-	11.51	9.87	660	448
2014	132	5854	-	-	12.53	10.88	801	552
Total	1624	82421	155	9473	8.68	7.42	831	369

*First offer date the corresponding year, as of January
**TNA in millions of US dollars

The data in the table is based on the randomized sample. For the matched sample, as well as for more detailed statistics, see Appendix, Table 3.1-3.3. The number of active funds in our dataset is increasing over the years, quite similarly for SRI and non-SRI funds respectively. The largest number of new SRI funds was listed in the years prior to the financial crisis. There seems to be a trend where the on average large size of SRI funds is decreasing slightly over time. The same cannot be said about non-SRI funds.

The growth of number and size of funds over time in our dataset is not consistent with the development described by the US SIF (1997, 2014) and Nofsinger and Varma (2013) (see Introduction and Literature Review respectively). In our data, SRI funds display an Assets Under Management (AUM) growth of 76% between the year 2000 and 2014, whereas the non-SRI group grew by 144% in the same period. While the large disparity between the SRI groups might be explained by what funds were picked, we believe that the non-SRI development in our dataset provides a more accurate picture, since it comprises the universe of US domestic equity mutual funds that CRSP offers.

4. Methodology

The empirical analysis of the relationships between returns, investment horizon and SRI status is based on Ordinary Least Squares (OLS) and in some case Time Fixed Effects (FE) regressions using several different specifications and datasets. The study is limited to US domestic equity mutual funds. The US has steadily been ranked as a top three financial market when it comes to both importance and development since AUM in SRI funds started growing rapidly in the 1990's (World Economic Forum, The Financial Development Report 2012). It is hence important enough to study in isolation, but also likely to be representative for other developed financial markets.

In order to explore the different effects of horizons on gross returns and net returns, we make two parallel statistical analyses, one for gross returns and one for net returns. All calculations are performed on the matched as well as randomized sample of SRI and non-SRI funds. The main reason for the two different control groups is robustness.

4.1 Modelling of Abnormal Returns

The dependent variable, the abnormal returns (AR), is based on the funds' monthly returns above or below the expectations based on their benchmark returns. The benchmark is estimated via a market model, for which we first use CAPM, then the three-factor model of Fama and French (1993) and finally the four-factor model of Carhart (1997). This approach is a further robustness check, since we would expect similar results from the three of them when it comes to the direction of the effect, although the size and significance of the estimates may differ somewhat. The approach is inspired by Geczy et al. (2005), Fama and French (2010) and Nofsinger and Varma (2013). Geczy et al. (2005) study how the investors' prior beliefs about asset pricing models and stock-picking skill by fund managers affect returns. The abnormal returns are based on different views of what returns are "normal", which in turn depends on whether the investor believes in CAPM or - to some degree - in multi-factor models. The multi-factor models associate higher returns with exposures to size, value, and momentum factors, thus explaining more of the deviations that under CAPM are considered abnormal.

We estimate the funds' covariances with the benchmarks based on net and gross returns respectively, in order to create the abnormal returns. We do this since neither gross nor net returns provide a perfectly clean estimate: net returns are affected by fees *after* estimating the betas, while our gross returns are approximations (see Data). Provided that the funds' expense ratios are constant, the covariance should be the same. However, fees are not perfectly constant. Gross returns are probably still a cleaner estimate of a fund's covariance with the benchmark, while the vast majority of previous studies made on SRI or horizons include only net returns in their analysis, and thus estimate the funds' covariances with the benchmarks based on net returns. Hence, we calculate our abnormal gross and net returns based on differently estimated betas from the actual gross respectively net returns.

After estimating the predicted returns based on each fund's covariance with the benchmarks, the abnormal returns (AR) are calculated as the difference between the funds' actual returns and the predicted returns, as illustrated below.

CAPM

$$r_{j,t} = \alpha_{CAPM,j} + r_{f,t} + \beta_{CAPM,j}(r_{B,t} - r_{f,t}) + \varepsilon_{j,t}$$

$$AR_{CAPM,j,t} = r_{j,t} - (r_{f,t} + \beta_{CAPM,j}(r_{B,t} - r_{f,t}))$$

Fama-French three-factor model

$$r_{j,t} = \alpha_{FF,j} + r_{f,t} + \beta_{FF,j}(r_{B,t} - r_{f,t}) + b_{s,j} * SMB_t + b_{v,j} * HML_t + \varepsilon_{j,t}$$

$$AR_{FF,j,t} = r_{j,t} - (r_{f,t} + \beta_{FF,j}(r_{B,t} - r_{f,t}) \ + b_{s,j} * SMB_t + b_{v,j} * HML_t)$$

Carhart four-factor model

$$r_{j,t} = \alpha_{C,j} + r_f + \beta_{C,j}(r_{B,t} - r_{f,t}) + b_{s,j} * SMB_t + b_{v,j} * HML_t + b_{m,j} * UMD_t + \varepsilon_{j,t}$$

$$AR_{C,j,t} = r_{j,t} - (r_f + \beta_{C,j}(r_{B,t} - r_{f,t}) \ + b_{s,j} * SMB_t + b_{v,j} * HML_t + b_{m,j} * UMD_t)$$

$r_{j,t}$ = *Return of fund j in month t*

$r_{B,t}$= *Return of the benchmark (market) portfolio in month t*

$r_{f,t}$ = *Risk-free rate month t (one month US Treasury bills)*

$AR_{j,t}$ = *Abnormal monthly return of fund j based on the particular asset pricing model*

SMB_t, HML_t *and* UMD_t = *Monthly risk factors as specified by Fama & French (1993) and Carhart (1997)*

Tables with the average of the estimated coefficients for each factor for each benchmark calculated for gross and net returns are disclosed in the Appendix, Table 4.1A and 4.2A for matched and randomized sample, respectively. These tables also illustrate expected returns and abnormal returns based on each model. Table 4.3A provides more descriptive statistics for the abnormal returns.

4.2 Empirical analysis

4.2.1 Regressions

A number of regressions are run, with an increasing number of variables and different control variables. All regressions are performed for each of the three different AR measures, based on CAPM, Fama-French and Carhart benchmarks, respectively, as the dependent variable. In analogy to the different AR measures, we regress net and gross returns separately with the purpose of finding distinct effects regarding investment horizons.

For the following illustrated regressions, the glossary below is used:

SRI_j = binary variable assigning a fund j to the category SRI or non-SRI
$\overline{CR}_j$ = continuous variable describing the average churn ratio for fund j, constant over time
$CRt_{j,t}$ = continuous variable describing the annualized churn ratio of fund j at time t
$SRI_j*\overline{CR}_j$=Interaction term of SRI and average churn ratio of fund j, constant over time
$SRI_j*CRt_{j,t}$=Interaction term of SRI and annualized churn ratio of fund j at time t
$AR_{j,t}$ = continuous variable describing monthly abnormal returns for fund j at time t
$\overline{AR_j}$ = continuous variable describing average monthly abnormal returns for fund j, constant over time

For hypothesis 1, we regress the funds' average churn ratios on the binary variable SRI in a simple Ordinary Least Squares (OLS) regression, in order to assess whether the detected differences in churn ratio are economically and statistically significant. In a second step, we control for size by adding the funds' average TNA to the regression for the randomized sample. This is not necessary for the matched sample, since size is one of the matching criteria.

$$\overline{CR}_j = \beta_0 + \beta_1 SRI_j + \varepsilon \qquad \text{[Eq. 1]}$$

In order to test hypothesis 2, "the length of the horizon has a negative effect on gross returns (a), and a positive effect on net returns (b)" we run several regression. To begin with, we regress $\overline{AR}$ on the SRI status, to observe the effect as stand-alone. Next, we make a simple regression of $\overline{AR}$ on $\overline{CR}$. Finally we add the SRI variable back to see how the estimated effect of $\overline{CR}$ changes. We do this for gross and net returns respectively, using OLS.

$$\overline{AR_j} = \beta_0 + \beta_1 SRI_j + \varepsilon \qquad \text{[Eq. 2.1]}$$

$$\overline{AR_j} = \beta_0 + \beta_1 \overline{CR}_j + \varepsilon \qquad \text{[Eq. 2.2]}$$

$$\overline{AR_j} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 SRI_j + \varepsilon \qquad \text{[Eq. 2.3]}$$

Next, we re-specify our regressions above in order to isolate the horizon effect of the churn ratio. We do this by adding the monthly churn ratio as a control variable. Since we now have a time-variant explanatory variable, we use the time-variant, monthly AR as our dependent variable, setting the data up as a panel, instead of a cross-section as for the previous equations. We believe that the monthly churn ratio variable will absorb the effect of increased or decreased trade, associated mainly with market sentiment and fund specific temporary circumstances, thus making the average churn ratio a cleaner proxy for horizon. We analyze the regressions below, i.e. equation 2.4 and 2.5, using OLS as well as Time Fixed Effects, the latter in order to control for any time-specific impact affecting all of our funds equally that is not already captured by our benchmarks. The analyses are applied on gross and net abnormal returns, respectively.

$$\overline{AR}_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CRt_{j,t} + \varepsilon \quad \text{[Eq. 2.4]}$$

$$\overline{AR}_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CRt_{j,t} + \beta_3 SRI_j + \varepsilon \quad \text{[Eq. 2.5]}$$

As a last step, we control for fund size by adding (time-variant) TNA as a control variable to equation 2.4 and 2.5, which are first run without TNA. We perform the regressions 2.1 to 2.5 for the randomized control group as well. In contrast to the matched group, we add a version of the equations in which we control for TNA, first offer date and fund objective. In equation 2.1 to 2.3 we use average TNA since it is a cross-section with no variance in time.

Hypothesis 3, "The length of the horizon has a more positive effect on returns (gross and net) of SRI funds than for non-SRI funds", is tested by including an interaction variable to equation 2.3 and 2.5 above.

$$\overline{AR_j} = \beta_0 + \beta_1 CR_j + \beta_2 SRI_j + \beta_3 (CR_j * SRI_j) + \varepsilon \quad \text{[Eq. 3.1]}$$

$$AR_{j,t} = \beta_0 + \beta_1 CR_j + \beta_2 CRt_{j,t} + \beta_3 SRI_j + \beta_4 (CR_j * SRI_j) + \beta_5 (CRt_{j,t} * SRI_j) + \varepsilon \quad \text{[Eq. 3.2]}$$

The $\overline{CR}$ interaction variable is of particular interest in this regression; if it is negative and significant, it provides evidence in favor of the hypothesis that the length of a horizon has a more positive effect on returns for SRI funds than for non-SRI funds, regardless of the betas of the individual variables (since a low average churn ratio is associated with a long horizon). Nevertheless, the interaction variable is even more interesting when evaluated in combination with the individual variables, since it allows us to analyze the net effects. Remember, a low churn ratio is associated with a long horizon.

In resemblance with equations 2.4 and 2.5, equation 3.2 includes time-variant variables on both sides, and is calculated on panel data rather than cross-sectional data. The monthly churn ratio still represents the temporary deviations from the average trade volume, and the average churn ratio proxies the horizon. The monthly churn ratio interacted with SRI detects how the effect of temporary changes in volume of trade differs between SRI and non-SRI funds. This effect is thus taken out from the coefficient of the average churn ratio interaction, which thereby provides a cleaner measure of how the effect of horizon on abnormal returns differs between SRI and non-SRI funds.

Equation 3.1 is analyzed using OLS, while equation 3.2 is analyzed using both OLS and Time Fixed Effects, again in resemblance with the respective equations 2.1 to 2.5. Lastly, we control for the same factors in equation 3.1 and 3.2 as we did in equation 2.1 to 2.5, for the matched and the randomly selected sample respectively.

4.2.2 Residuals and Standard Errors

In all regressions based on cross-sectional data, i.e. equation 1, 2.1-2.3 and 3.1, we use robust standard errors to correct for deviations caused by heteroskedasticity.

In the regressions based on panel data, i.e. equation 2.4-2.5 and 3.2, we cluster the standard errors by fund. This is preferable to the heteroskedasticity robust standard errors approach, since the residuals are expected to be independent from month to month for each fund, leading to errors that are not independently and identically distributed across the panel. The clustering also implies heteroskedasticity robust errors.

4.2.3 Matching criteria and control variables

The only control variable we use for the matched sample is time-variant size, since the other factors may bias the estimators which are already accounted for in the matching procedure. Size is used as a matching criterion in terms of average size, but since the funds may grow at different speeds, it is also included as a control variable in the regressions made on panel data. Size is expected to bias the estimated impact of SRI on churn ratio since scholars previously have found it to be correlated with SRI, namely Statman (2000) and Geczy et al. (2005), as well as with horizon, Yan and Zhang (2009), and trade activity, Pastor et al. (2015). Thus, we include it in equation 1.

Furthermore, Pastor et al. (2015) show that size is negatively correlated with returns. Due to decreasing returns of scale associated with liquidity costs, larger funds are less able to exploit alpha generating opportunities, they argue, and show that the turnover-performance relation is stronger for funds that are smaller in size. This makes size an important factor to match by and also control for in equations 2.1-2.5 and 3.1-3.2. Size is measured by TNA.

In addition to size, we also match by, or control for in the case of the randomly selected control group, the funds' investment objective and age. We expect short horizon investment strategies, and thus high average churn ratios, to be more common for certain objectives, such as hedged and short style, than for others. We also find this to be true in our data sample. Similarly, SRI funds are more common in some objectives than others. For instance, they are virtually non-existing in hedged and short style, but relatively common for growth style, in which the churn ratio on average is lower.

The same reasoning goes for the correlation of fund objectives and AR. Some objectives are likely to yield better returns than others on average, something we find to be true in our sample.

The matching is furthermore picked by age, which is important due to its indication as to whether a fund has been able to be active during times of better or worse market sentiment and economic situation. As described in the Theoretical Application section, also monthly churn ratio is largely affected by market sentiment and economic situation. However, the average churn ratio does not change over time, nor is there a clear trend of increasing or decreasing churn ratios in our data. Since we only include funds with a minimum of 30 months of observations in our sample, market sentiment and economic situation should be somewhat diverse during each fund's life. Hence, we do not expect any correlation between average churn ratio and age.

In the randomized control group, we use first offer date as a proxy for age and accordingly control for it in all regressions performed on panel data.

Since we are using the abnormal returns derived from the CAPM, the Fama French three factor and the Carhart four factor model, respectively, the returns are sufficiently risk adjusted, so we believe that controlling for volatility is not necessary.

The different expectations of part a and b of hypothesis 2 are based on our belief that fund fees may be correlated with returns, horizon and maybe SRI. Since the analysis is performed for net and gross returns, a funds' expense ratio is not included as control variable, since it may remove some of the difference.

The control variables we have chosen to include in our regressions are generally used in existing research on horizon and SRI, respectively, among them Statman (2000), Kreander et al. (2005), Renneboog et al. (2005), Bollen (2007), Cella et al. (2013), Nofsinger and Varma (2013) and Pastor et al. (2015).

Many of the previous studies made on SRI use a matched sample of non-SRI funds as a control group. The method we use for matching is based on that of Bollen (2007) and Nofsinger and Varma (2013). Bollen (2007) argue that matching is a better approach than using a non-matched sample; even with controlling for the variables of importance in the regression analysis, the assumption of linearity may be inappropriate. Furthermore, using a matched sample in combination with the multi-factor models by Fama and French (1993) and Carhart (1997) is an effective way to overcome the benchmark problem many SRI studies suffer from.

5. Results

We present our findings chronologically in the order of hypotheses and furthermore according to the dimension of data, i.e. first cross-sectional, then panel data results. In general, we primarily conduct our analysis on the matched sample and test for confirmation, especially regarding robustness, in the randomized sample (see Methodology).

Our results provide empirical support that a longer horizon has a positive effect on abnormal returns for non-SRI funds, but a negative effect for SRI funds. These distinct properties of SRI funds have not been encountered before, as far as we know. Some caution in the interpretation of the results is, however, in place, since the adjusted R^2 are low in general, as should be expected when modeling long-run abnormal returns (comp. Sanchez 2007).

The type of sample is indicated in the tables as follows: The table header is named after the sample when showing only one sample's estimates. A few tables illustrate a direct comparison between the two samples, i.e. the matched and randomized control group, in which case the columns are labeled with the corresponding sample. Gross and net returns are reported next to each other when applicable, as indicated by column labels in the tables.

As described in the Methodology section, the panel data analyses use OLS as well as Time Fixed Effects. The columns in the results tables are named accordingly. The regressions made with control variables are marked as such in the column name, but can also be recognized by the coefficients on the respective control variable row. There are slightly fewer observations in the regressions for gross returns compared to net due to missing data for the expense ratio. Similarly, missing data for control variables decrease the number of observations somewhat when including controls.

Some of the tables' columns are named according to the applied benchmark, i.e. CAPM, Fama-French and Carhart, respectively. In most of the analyses, the results show the same direction for the three different benchmarks, but are in tendency slightly smaller and less statistically significant when based on the Fama-French and Carhart multi-factor model benchmarks than when based on CAPM. This is in line with theory, since strategies based on the factors additional to the CAPM are expected to yield higher returns, implicating that less of the funds' returns are considered abnormal. This is supported by the higher AR for CAPM than the multi-factor models (see Appendix, Table 4.3A). Thus, it seems reasonable that larger nominal effects of explanatory variables are detected on CAPM abnormal returns than on others.

In order to provide a better overview, only results under the CAPM benchmark are presented in most of the tables, since its larger effects and significance facilitate a quick analysis. However, note that the magnitude and significance of effects is possibly overstated by this benchmark, since they are lower when based on multi-factor models.

In one case, namely the cross-sectional analyses for hypothesis 2 and 3 on the matched sample, the direction of the effect differs between the benchmarks, i.e. it changes sign, or the coefficients are more significant when based on the Carhart four factor model than when based on CAPM. For these equations, the results from all benchmarks are presented. For all tables showing not the complete results, the estimates for all three benchmarks can be found in the Appendix, respective Tables indicated as below.

5.1. Hypothesis 1 - The correlation between SRI and horizon

Table 5.1 shows the cross-sectional estimates for both the matched and randomized sample, with as well as without control variables for the latter. The findings support our hypothesis that SRI and horizon are positively correlated, since a lower $\overline{CR}$ stands for a longer horizon: The highly statistically significant coefficients of $\overline{CR}$ regressed on SRI are between -0.27 (matched) and -0.44 (randomized).

The effect is weaker (-0.37) in the randomized sample when control variables are included, suggesting a negative bias imposed by size, age and/or objective when omitted. We expect this to be due to the size negatively affecting the churn ratio, while being positively correlated with SRI. This is supported by the negative and statistically significant coefficient of the average TNA, and the higher mean TNA for SRI than non-SRI funds as presented in Table 5.1. Similarly, we expect many of the different objectives to have opposite correlations with SRI and churn ratio respectively.

The stronger effect in the randomized sample may be explained by the higher average $\overline{CR}$ over all (non-SRI) funds in the randomized control group compared to the matched control group (see Data, Table 3.2), possibly explaining the stronger distinction to SRI funds.

There is no obvious way to translate the effect of SRI on $\overline{CR}$ into its effect on the horizon in terms of months or years, but the earlier shown Table 3.2 implicates that the effect bears some economic relevance: The average $\overline{CR}$ over all funds is 0.8 and 1.0 in the matched and randomized sample, respectively. Therefore, the effect would decrease the average CR over all funds by more than a third in each sample.

Table 5.1. Hypothesis 1 Cross-Sectional Analysis - Matched and Randomized Sample
The relation of SRI and horizon

The table shows the estimated effects of social responsibility (SRI) on horizon, proxied by each fund's average Churn Ratio ($\overline{CR}$) for a matched, respectively randomized, sample of US domestic equity mutual funds from 1999 to 2014. Both samples consist largely of the same SRI funds, but have different control groups. The matched control group consists of two non-SRI funds per SRI fund, matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes). The randomized control group comprises half of CRSP's universe of US domestic equity mutual funds, chosen randomly but excluding the funds in the SRI sample. After $\overline{CR}$ is calculated on all observations per fund, the dataset is reduced to one observation per fund.

$\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of SRI indicate positive effects on horizon. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0), according to their own admissions of social screening. The regression with control variables uses fewer observations due to missing data in the control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) with robust standard errors. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$\overline{CR}_j = \beta_0 + \beta_1 SRI_j + \varepsilon$ [Eq. 1]

	$\overline{CR}$		
Variables	*Matched*	*Randomized*	*Randomized* [a]
SRI	-0.273***	-0.438***	-0.369***
(Standard Errors)	(0.0613)	(0.0436)	(0.0439)
Avg TNA			-3.38E-05***
(Standard Errors)			(7.87E-06)
First offer date			-2.02E-05***
(Standard Errors)			(4.49E-06)
Control for objective			Yes
Constant	0.889***	1.050***	0.699***
(Standard Errors)	(0.0486)	(0.0243)	(0.115)
Observations	438	8329	8326
Adjusted R-squared	0.031	0.001	0.079

[a] Regression with control variables

5.2. Hypothesis 2 - The effect of horizon on gross and net returns

The results for hypothesis 2 are presented under a cross-sectional data analysis section and a panel data analysis section, respectively. We find some support for horizon having a positive effect on the net abnormal returns, but no evidence for the effect being negative for gross abnormal returns. Withal, we do not find any clear evidence that the effect differs between gross and net returns.

5.2.1. Cross-sectional data analysis

To begin with, Table 5.2 shows the cross-sectional effect of SRI on gross and net abnormal returns. The results show an ambiguous effect of SRI on AR, negative in the matched sample, but positive in the randomized sample. In both cases, the effect is close to zero, and the estimates are similar under all benchmarks as well as when adding other variables to the regression (see Table 5.3 & 5.4).

The statistical significance is slightly higher in the randomized than in the matched sample, especially under the Carhart four-factor model. Also the adjusted R^2 are somewhat higher for the randomized sample. We believe this may be due to the low number of observations in the matched sample, in combination with a relatively low homogeneity in spite of the matching.

Table 5.2. Hypothesis 2 Cross-Sectional Analysis - Matched and Randomized Sample
Effects of SRI on average Abnormal Returns under the different benchmarks

The table shows the estimated effects of social responsibility (SRI) on horizon, proxied by each fund's average Abnormal Return ($\overline{AR}$) for a matched, respectively randomized, sample of US domestic equity mutual funds from 1999 to 2014. Both samples consist largely of the same SRI funds, but have different control groups. The matched control group consists of two non-SRI funds per SRI fund, matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes). The randomized control group comprises half of CRSP's universe of US domestic equity mutual funds, chosen randomly but excluding the funds in the SRI sample.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions on gross returns and/or with control variables use fewer observations due to missing data in the expense ratio, respectively control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) with robust standard errors. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$\overline{AR}_j = \beta_0 + \beta_1 SRI_j + \varepsilon$ [Eq. 2.1]

	Eq. 2.1 CAPM		Eq. 2.1 Fama-French		Eq. 2.1 Carhart	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
Matched Sample						
SRI	-0.000153	-0.000223	-9.12E-05	-0.000157	-4.02E-05	-0.000107
(Standard Errors)	(0.00031)	(0.00032)	(0.00023)	(0.00023)	(0.00022)	(0.00022)
Constant	-0.000559***	0.000542***	-0.000822***	0.000274**	-0.000880***	0.000218
(Standard Errors)	(0.00018)	(0.00019)	(0.00013)	(0.00014)	(0.00013)	(0.00014)
Observations	444	441	444	441	444	441
Adj. R-squared	-0.002	-0.001	-0.002	-0.001	-0.002	-0.002
Randomized Sample						
SRI	0.000276	0.000162	0.000353*	0.000287	0.000396**	0.000328*
(Standard Errors)	(0.00025)	(0.00025)	(0.00018)	(0.00018)	(0.00018)	(0.00018)
Constant	-0.000921***	-0.000806***	-0.00124***	-0.00117***	-0.00128***	-0.00121***
(Standard Errors)	(4.89E-05)	(5.11E-05)	(4.49E-05)	(4.62E-05)	(4.21E-05)	(4.33E-05)
Observations	9628	8419	9628	8419	9628	8419
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000

In the analysis of the effect of $\overline{CR}$ on average abnormal returns, the results from the matched sample (Table 5.3) provide a vague indication that a longer horizon has a negative effect on returns, which is stronger for gross than net returns. However, the estimates are not robust across the benchmarks, and they are close to zero. Hence, little weight is accredited to this analysis.

Contrary to the results from the matched sample, the randomized sample implies that a longer horizon is beneficial for abnormal returns, and that effect does not differ to the 6^{th} decimal between net and gross estimates (Table 5.4). The annualized $\overline{CR}$ coefficients in the randomized sample vary between -0.15 basis points (bps) when including control variables and -0.22 bps when no control variables are included for equation 2.1 and 2.2. The results are virtually identical for gross and for net returns. These estimates imply that a longer horizon would be beneficial for abnormal returns, though on a very low scale, rendering the economic significance limited. The results contradict our hypothesis that horizon has an opposite effect on gross vs. net abnormal returns; the estimates show no difference at all in this respect.

As regards statistical significance, the estimates are significant at the 1% level under the randomized sample, but not under matched. Additionally, adjusted R^2 are higher under the randomized sample. We believe the statistical weakness is based on the highly decreased size of the matched sample in the cross-sectional dimension, as briefly mentioned in the analysis concerning Table 5.2 earlier in this cross-sectional analysis. As our R^2 indicate, the applied explanatory variables predict the abnormal returns poorly; since the matched sample is compiled on the basis of those variables, the decreased sample size may not come with the benefit of homogeneity in the influential factors, which is otherwise usually an advantage of matching. Thus, the matched sample might possess less explanatory power than the randomized sample. Therefore, we give the randomized sample somewhat more weight for the cross-sectional analysis. For the complete estimates of the randomized sample, see Appendix, Table 5.4A.

Table 5.3. Hypothesis 2 Cross-Sectional Analysis - Matched Sample

Effects of horizon and SRI on average Abnormal Returns under the different benchmarks

The table shows the estimated effects of horizon, proxied by each fund's average Churn Ratio ($\overline{CR}$), and social responsibility (SRI) on the average Abnormal Returns ($\overline{AR}$) for each fund in a matched sample of US domestic equity mutual funds, SRI and non-SRI respectively, from 1999 to 2014. For each SRI fund, two non-SRI funds are matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes). After $\overline{CR}$ and $\overline{AR}$ are calculated on all observations per fund, the dataset is reduced to one observation per fund.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results under the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of SRI indicate positive effects on horizon. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions on gross returns and/or with control variables use fewer observations due to missing data in the expense ratio, resp. control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) with robust standard errors and with as well as without control variables. Asterisks indicate statistical significance:
*** p<0.01, ** p<0.05, * p<0.1.

$\overline{AR}_j = \beta_0 + \beta_1 \overline{CR}_j + \varepsilon$ [Eq. 2.2]

$\overline{AR}_j = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 SRI_j + \varepsilon$ [Eq. 2.3]

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 2.2						
$\overline{CR}$	0.000169	3.61E-05	-3.74E-05	0.000344*	0.000211	0.000138
(Standard Errors)	(0.00018)	(0.00016)	(0.00016)	(0.00019)	(0.00017)	(0.00017)
Constant	-0.000728***	-0.000867***	-0.000849***	0.0002	6.01E-05	7.83E-05
(Standard Errors)	(0.00019)	(0.00014)	(0.00015)	(0.00019)	(0.00015)	(0.00015)
Observations	438	438	438	438	438	438
Adj. R-squared	-0.001	-0.002	-0.002	0.004	0.002	0.000
Eq. 2.3						
$\overline{CR}$	0.000153	2.40E-05	-4.60E-05	0.000328*	0.000198	0.000129
(Standard Errors)	(0.00019)	(0.00016)	(0.00016)	(0.00019)	(0.00017)	(0.00017)
SRI	-0.000139	-0.000106	-7.51E-05	-0.000145	-0.000113	-8.17E-05
(Standard Errors)	(0.00032)	(0.00023)	(0.00022)	(0.00032)	(0.00023)	(0.00023)
Constant	-0.000668***	-0.000822***	-0.000817***	0.000262	0.000109	0.000113
(Standard Errors)	(0.00023)	(0.00017)	(0.00017)	(0.00024)	(0.00018)	(0.00018)
Observations	438	438	438	438	438	438
Adj. R-squared	-0.003	-0.004	-0.004	0.002	0.001	-0.002

Table 5.4. Hypothesis 2 Cross-Sectional Analysis - Randomized Sample
Effects of horizon and SRI on average Abnormal Returns under the CAPM benchmark

The table shows the estimated effects of horizon, proxied by each fund's average Churn Ratio ($\overline{CR}$), and social responsibility (SRI) on the average Abnormal Returns ($\overline{AR}$) for each fund in a sample of SRI funds and a randomized control group of US domestic equity mutual funds, from 1999 to 2014. The randomized control group comprises half of CRSP's universe of US domestic equity mutual funds, chosen randomly but excluding the funds in the SRI sample. After $\overline{CR}$ and $\overline{AR}$ are calculated on all observations per fund, the dataset is reduced to one observation per fund.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results under the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of SRI indicate positive effects on horizon. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions on gross returns and/or with control variables use fewer observations due to missing data in the expense ratio, resp. control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) with robust standard errors and with as well as without control variables. Asterisks indicate statistical significance:
*** p<0.01, ** p<0.05, * p<0.1.

$\overline{AR}_j = \beta_0 + \beta_1 \overline{CR}_j + \varepsilon$ [Eq. 2.2]
$\overline{AR}_j = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 SRI_j + \varepsilon$ [Eq. 2.3]

	Eq. 2.2 Randomized		Eq. 2.3 Randomized		Eq. 2.3[a] Randomized	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
$\overline{CR}$	-0.000186***	-0.000186***	-0.000186***	-0.000186***	-0.000126***	-0.000126***
(Standard Errors)	(5.06E-05)	(5.06E-05)	(5.06E-05)	(5.06E-5)	(4.76E-05)	(4.76E-05)
SRI			2.29e-05	2.12e-05	0.000263	0.000262
(Standard Errors)			(0.000251)	(0.000251)	(0.000249)	(0.000249)
TNA					4.49E-08**	4.50E-08**
(Standard Errors)					(2.06E-08)	(2.06E-08)
First offer date					-1.80E-07***	-1.80E-07***
(Standard Errors)					(2.12E-08)	(2.13E-08)
Control for objective					Yes	Yes
Constant	-0.000553***	-0.000551***	-0.000553***	-0.000551***	-0.00909***	-0.00909***
(Standard Errors)	(6.60E-05)	(6.61E-05)	(6.68E-05)	(6.68E-05)	(0.00246)	(0.00246)
Observations	8329	8322	8329	8322	8326	8319
Adj. R-squared	0.008	0.008	0.008	0.008	0.163	0.163

[a] Regression with control variables

5.2.2 Panel data analysis

The panel data analysis is performed on time-variant monthly AR and includes the variable CR_t, monthly churn ratio, in addition to the explanatory variables of the cross-sectional analysis. Table 5.5 shows the results for the matched sample and Table 5.6 presents the randomized sample. The regressions are performed with as well as without control variables for OLS and FE. The results are robust across different models and specifications. Thus, in the interest of overview, only a selection is shown in the tables. For complete results, see Appendix, Table 5.5A and 5.6A for matched and randomized sample, respectively.

We find that over both control groups the coefficient for $\overline{CR}$ is negative, indicating that a longer horizon is positive for abnormal returns. The effect of $\overline{CR}$ is stronger in the matched sample, ranging from -0.54 to -0.82 bps in annualized AR, but it lacks statistical significance. The estimates in the randomized sample are smaller, ranging from -0.25 to -0.42 bps annualized, but are on the other hand significant at the 1% level. While the matched sample implies that the effect is stronger on net than gross returns, the randomized sample shows no difference to the 5th decimal in the estimates. A possible explanation for the disparity could be a selection bias in the matched sample, which favors fund styles with higher expense ratios via investment objective, as well as larger TNAs, as our SRI funds are on average larger in size (see Data, Table 3.4).

Interestingly enough, the coefficients for CR_t, proxy for activity, are positive over both control groups, indicating that increased time-variant activity is beneficial for abnormal returns. The estimates show a slightly smaller effect for net returns in the matched sample and no difference between net and gross returns in the randomized sample.

Time fixed effects regressions decrease the magnitude of all coefficients for both the matched and randomized sample. This decrease may indicate serial correlation or the presence of time-specific factors with an impact on AR that are not captured by the different asset pricing models.

Although the economic significance is limited, partly due to contradictory results, the results are indeed interesting. The opposite effects of the different churn ratio measures, $\overline{CR}$ and CR_t respectively, suggest that they proxy different occurrences, providing support that long horizons as well as active management is positive for abnormal returns. Also, the estimates support the view that average churn ratio and monthly churn ratio are two distinct measures.

In the Theoretical Application section we discussed Grossman and Stiglitz's (1980) rational expectations model and expected that it implies a negative impact of a longer horizon. However, our results show that the rational expectations model, supported by the positive effect found of monthly churn ratio, can coexist with positive returns to horizon. Similarly, Pastor et al. (2015) find that active management is positive for abnormal returns, more so for gross than net returns.

Table 5.5. Hypothesis 2 Panel Data Analysis - Matched Sample

Effects of horizon and SRI on Abnormal Returns under the CAPM benchmark

The table shows the estimated effects of horizon, proxied by each fund's average Churn Ratio ($\overline{CR}$), and social responsibility (SRI) on the monthly Abnormal Returns (AR) for each fund in a matched sample of US domestic equity mutual funds, SRI and non-SRI respectively, from 1999 to 2014. For each SRI fund, two non-SRI funds are matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes. In order to isolate the horizon effect of $\overline{CR}$, the time-variant CR_t is included as a control variable, displaying a proxy for activity.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results under the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of CR indicate positive effects of horizon. CR_t is also based on CRSP's annualized "Fund Turnover Ratio", but instead of averaged per fund, it is given monthly. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. Since the funds are matched by average size, but may grow at different speeds, monthly TNA is included as a control variable. The regressions with control variables use fewer observations due to missing data in the control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) as well as Time Fixed Effects (FE) as indicated in the table, with standard errors clustered by fund. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$AR_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CRt_{j,t} + \varepsilon$ [Eq. 2.4]

$AR_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CRt_{j,t} + \beta_3 SRI_j + \varepsilon$ [Eq. 2.5]

	Eq. 2.4 OLS		Eq. 2.5 OLS		Eq. 2.5[a] OLS		Eq. 2.5[a] FE	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
$\overline{CR}$	-0.000611*	-0.000451	-0.000632*	-0.000473	-0.000680*	-0.000513	-0.000484	-0.000312
(Standard Errors)	(0.000362)	(0.000361)	(0.000366)	(0.000365)	(0.000364)	(0.000361)	(0.000310)	(0.000307)
CRt	0.000649**	0.000680**	0.000649**	0.000680**	0.000653*	0.000669**	0.00043	0.000442
(Standard Errors)	(0.000321)	(0.000326)	(0.000321)	(0.000326)	(0.000336)	(0.000337)	(0.000274)	(0.000274)
SRI			-0.000152	-0.000151	-0.000177	-0.000184	-0.000131	-0.000134
(Standard Errors)			(0.000244)	(0.000246)	(0.000244)	(0.000248)	(0.000237)	(0.000238)
TNA					2.78E-07	8.80E-08	2.40E-07	4.80E-08
(Standard Errors)					(1.85E-07)	(2.09E-07)	(2.26E-07)	(2.47E-07)
Constant	-0.000697***	0.000237	-0.000632***	0.000303	-0.000645***	0.000329	-0.000632***	0.000340*
(Standard Errors)	(0.000160)	(0.000164)	(0.000182)	(0.000188)	(0.000193)	(0.000201)	(0.000188)	(0.000193)
Observations	49240	49240	49240	49240	48936	48936	48936	48936
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Nr. of months							192	192

[a] Regression with control variables

Table 5.6. Hypothesis 2 Panel Data Analysis - Randomized Sample

Effects of horizon and SRI on Abnormal Returns under the CAPM benchmark

The table shows the estimated effects of horizon, proxied by each fund's average Churn Ratio ($\overline{CR}$), and social responsibility (SRI) on the monthly Abnormal Returns (AR) for each fund in a sample of SRI funds and a randomized control group of US domestic equity mutual funds, from 1999 to 2014. The randomized control group comprises half of CRSP's universe of US domestic equity mutual funds, chosen randomly but excluding the funds in the SRI sample. In order to isolate the horizon effect of $\overline{CR}$, the time-variant CR_t is included as a control variable, displaying a proxy for activity.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus $1/12^{th}$ of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results under the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of CR indicate positive effects of horizon. CR_t is also based on CRSP's annualized "Fund Turnover Ratio", but instead of averaged per fund, it is given monthly. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions with control variables use fewer observations due to missing data in the control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) as well as Time Fixed Effects (FE) as indicated in the table, with standard errors clustered by fund. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$AR_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CRt_{j,t} + \varepsilon$ [Eq. 2.4]

$AR_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CRt_{j,t} + \beta_3 SRI_j + \varepsilon$ [Eq. 2.5]

	Eq. 2.4 OLS		Eq. 2.5 OLS		Eq. 2.5[a] OLS		Eq. 2.5[a] FE	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
$\overline{CR}$	-0.000351***	-0.000352***	-0.000352***	-0.000354***	-0.000248***	-0.000249***	-0.000208***	-0.000208***
(Standard Errors)	(7.05E-05)	(7.06E-05)	(7.06E-05)	(7.07E-05)	(6.38E-05)	(6.37E-05)	(5.36E-05)	(5.35E-05)
CRt	0.000143***	0.000144***	0.000143***	0.000144***	0.000123***	0.000123***	6.17E-05**	6.10E-05**
(Standard Errors)	(4.96E-05)	(4.96E-05)	(4.96E-05)	(4.96E-05)	(4.51E-05)	(4.50E-05)	(3.04E-05)	(3.01E-05)
SRI			-0.000426**	-0.000428**	-0.00011	-0.000113	0.000206	0.000207
(Standard Errors)			(0.000207)	(0.000207)	(0.00022)	(0.00022)	(0.000219)	(0.000219)
TNA					-2.34E-09	-2.66E-09	3.82E-08***	3.83E-08***
(Standard Errors)					(8.47E-09)	(8.46E-09)	(1.15E-08)	(1.15E-08)
First offer date					-1.78E-07***	-1.76E-07***	1.62E-09	3.73E-09
(Standard Errors)					(1.94E-08)	(1.98E-08)	(1.69E-08)	(1.72E-08)
Control for objective					Yes	Yes	Yes	Yes
Constant	-1.00E-04**	-0.000100**	-8.92E-05*	-8.95E-05*	-0.00828***	-0.00831***	-0.00998***	-0.0100***
(Standard Errors)	(4.99E-05)	(4.99E-05)	(5.07E-05)	(5.07E-05)	(0.00206)	(0.00206)	(0.00201)	(0.00201)
Observations	768238	767950	768238	767950	761945	761747	761945	761747
Adj. R-squared	0.000	0.000	0.000	0.000	0.004	0.004	0.004	0.004
Nr. of months							192	192

[a] Regression with control variables

5.3 Hypothesis 3 - The effects of horizon and activity on SRI vs. non-SRI funds

We test hypothesis 3 first on the cross-sectional data in Table 5.7 and 5.8 and then on panel data in Table 5.9 and 5.10. While the analysis of hypothesis 2 indicated a positive effect of horizon on AR in general, the analysis of hypothesis 3 shows that the effect differs between SRI and non-SRI funds. Contrary to our expectations, we find evidence that the effect of a longer horizon is robustly negative for SRI funds, but positive for non-SRI funds. Nevertheless, the results support hypothesis 3 with a horizon effect of bigger magnitude for SRI funds. The effects are stronger when controlling for activity, proxied by time-variant churn ratio.

For the same reasons as in hypothesis 2, most results are only shown under the CAPM. The directions of the estimates are consistent across the different benchmarks and the magnitudes of effects only differ slightly, with the exception of the $\overline{CR}$ estimate in the cross-sectional analysis made on the matched sample. Thus, for this analysis the results for all benchmarks are presented (Table 5.7). Note that the direction of the interaction effect does not differ across the benchmarks, whereas the $\overline{CR}$ effect changes sign and lacks statistical significance (comp. cross-sectional data analysis for hypothesis 2). Complete results for the randomized sample are disclosed in the Appendix, Table 5.8A.

5.3.1 Cross-sectional data analysis

Table 5.7 and Table 5.8 show the estimated effects of $\overline{CR}$ (horizon), SRI and SRI*$\overline{CR}$ on abnormal returns in a cross-sectional dataset. We find a continuously positive interaction variable for CAPM in both the matched and the randomized sample, which indicates that for SRI funds, a lower $\overline{CR}$, i.e. a longer horizon, decreases abnormal returns. This holds for gross as well as net returns, for all different benchmarks and with as well as without control variables.

As in the earlier cross-sectional analysis of hypothesis 2, the coefficient for $\overline{CR}$ is negative and significant at the 1% level for the randomized sample, but positive and not significant for the matched sample under CAPM. Under Fama-French and Carhart multi-factor models the effect is negative on net AR also for the matched sample (see Table 5.7). By adding the interaction variable $\overline{CR}$*SRI, we only find a difference between net and gross returns in the matched sample, while coefficients for net and gross, respectively, mirror each other to the 6^{th} decimal in the randomized sample (see Table 5.8).

Similar to the cross-sectional analysis of hypothesis 2, which also yielded some ambiguous estimates, we cautiously conclude that the statistically significant estimates under the randomized sample imply that a longer horizon is generally positive for funds' abnormal returns. However, since the estimated effect of $\overline{CR}$*SRI outweighs the one of $\overline{CR}$ by a factor of more than 5, we also conclude that a longer horizon has a negative impact on SRI funds' abnormal returns.

Table 5.7. Hypothesis 3 Cross-Sectional Analysis - Matched Sample
Effects of horizon on Abnormal Returns conditional on the SRI status

The table shows the estimated effects of horizon, social responsibility (SRI) and their interaction on the average Abnormal Returns ($\overline{AR}$) for a matched sample of US domestic equity mutual funds from 1999 to 2014. The matched control group consists of two non-SRI funds per SRI fund, matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes). Horizon is proxied by each fund's average Churn Ratio ($\overline{CR}$). After $\overline{CR}$ and $\overline{AR}$ are calculated on all observations per fund, the dataset is reduced to one observation per fund.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of CR indicate positive effects of horizon. Likewise, a negative coefficient of the interaction term indicates more positive effects of horizon for SRI funds than for non-SRI. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions on gross returns and/or with control variables use fewer observations due to missing data in the expense ratio, resp. control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) with robust standard errors. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$$\overline{AR}_j = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 SRI_j + \beta_3 (\overline{CR}_j * SRI_j) + \varepsilon \qquad \text{[Eq. 3.1]}$$

	Eq. 3.1 Net AR			Eq. 3.1 Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
$\overline{CR}$	2.95E-05	-8.04E-05	-1.34E-04	1.76E-04	6.55E-05	1.16E-05
(Standard Errors)	(0.00018)	(0.00017)	(0.00017)	(0.00019)	(0.00017)	(0.00017)
SRI	-0.000741*	-0.000615*	-5.06E-04	-0.000886**	-0.000761**	-0.000652**
(Standard Errors)	(0.00042)	(0.00032)	(0.00033)	(0.00042)	(0.00032)	(0.00033)
$\overline{CR}$*SRI	0.000922*	0.000780*	6.60E-04	0.00114**	0.000993**	0.000873**
(Standard Errors)	(0.00055)	(0.00043)	(0.00043)	(0.00054)	(0.00041)	(0.00041)
Constant	-0.000558**	-0.000729***	-0.000738***	0.000397*	0.000227	0.000217
(Standard Errors)	(0.00023)	(0.00017)	(0.00017)	(0.00024)	(0.00018)	(0.00018)
Observations	438	438	438	438	438	438
Adj. R-squared	0.000	0.001	-0.001	0.008	0.01	0.004

Table 5.8. Hypothesis 3 Cross-Sectional Analysis - Randomized Sample
Effects of horizon on Abnormal Returns under the CAPM benchmark conditional on the SRI status

The table shows the estimated effects of horizon, social responsibility (SRI) and their interaction on the average Abnormal Returns ($\overline{AR}$) for a matched, respectively randomized, sample of US domestic equity mutual funds from 1999 to 2014. Both samples consist largely of the same SRI funds, but have different control groups. The matched control group consists of two non-SRI funds per SRI fund, matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes). The randomized control group comprises half of CRSP's universe of US domestic equity mutual funds, chosen randomly but excluding the funds in the SRI sample. Horizon is proxied by each fund's average Churn Ratio ($\overline{CR}$). After $\overline{CR}$ and $\overline{AR}$ are calculated on all observations per fund, the dataset is reduced to one observation per fund.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results under the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of CR indicate positive effects of horizon. Likewise, a negative coefficient of the interaction term indicates more positive effects of horizon for SRI funds than for non-SRI. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions on gross returns and/or with control variables use fewer observations due to missing data in the expense ratio, resp. control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) with robust standard errors. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$$\overline{AR}_j = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 SRI_j + \beta_3 (\overline{CR}_j * SRI_j) + \varepsilon \qquad \text{[Eq. 3.1]}$$

	Eq. 3.1 Randomized		Eq. 3.1[a] Randomized	
Variables	*Net*	*Gross*	*Net*	*Gross*
$\overline{CR}$	-0.000187***	-0.000187***	-0.000127***	-0.000127***
(Standard Errors)	(5.07E-05)	(5.07E-05)	(4.77E-05)	(4.77E-05)
SRI	-0.000564	-0.000566	-0.000363	-0.000364
(Standard Errors)	(0.00035)	(0.00035)	(0.00037)	(0.00037)
$\overline{CR}$*SRI	0.000959*	0.000959*	0.00102*	0.00102*
(Standard Errors)	(0.00053)	(0.00053)	(0.00056)	(0.00056)
TNA			4.58e-08**	4.59e-08**
(Standard Errors)			(2.06E-08)	(2.06E-08)
First offer date			-1.80e-07***	-1.80e-07***
(Standard Errors)			(2.13E-08)	(2.13E-08)
Control for objective			Yes	Yes
Constant	-0.000552***	-0.000550***	-0.00909***	-0.00909***
(Standard Errors)	(6.69E-05)	(6.69E-05)	(0.00246)	(0.00246)
Observations	8329	8322	8326	8319
Adj. R-squared	0.008	0.008	0.163	0.163

[a] Regression with control variables

5.3.2. Panel data analysis

We add a time dimension to the previous analysis by using panel data and the time-variant variable CR_t as a proxy for activity. Furthermore, we include CR_t in interaction with SRI, creating the time-variant interaction variable CR_t*SRI. Table 5.9 shows the estimated effects for the matched sample, while Table 5.10 illustrates for the randomized sample. The complete results are shown in the Appendix, Table 5.9A & 5.9B for the matched, and Table 5.10A & 5.10B for the randomized sample, respectively.

We find complete robustness over all coefficients' directions and economic implications under both control groups and for every type of regression.

To begin with, $\overline{CR}$*SRI is continuously positive with an annualized effect of 3.3 to 3.8 bps in the matched, and 0.9 to 2.1 bps in the randomized sample. The estimates are statistically significant throughout the whole matched sample at 1% or 5% significance levels, but lack statistical significance in the randomized sample except under time FE without control variables. In the matched sample, effects are slightly stronger for gross than net returns, whereas the randomized sample finds the opposite. We conclude that there is no reliable and significant difference between gross and net returns. With $\overline{CR}$*SRI outweighing the negative effect of $\overline{CR}$ throughout the panel analysis, the results support our hypothesis. Surprisingly, though, we find that a longer horizon is beneficial for non-SRI funds' abnormal returns, but negative for those of SRI funds.

Similar to the panel results for hypothesis 2 (Table 5.5 and 5.6), the proxy for activity shows the opposite effects of horizon. Moreover, the interaction effects of SRI with horizon and SRI with activity, respectively, are opposite. In analogy to the cross-sectional analysis, the negative effect of CR_t*SRI outweighs the positive CR_t effects, implying that increased activity is beneficial for non-SRI funds' abnormal returns, but negative for those of SRI.

In summary, the estimates continuously indicate two main effects. First, a longer investment horizon is positive for the abnormal returns of non-SRI funds, but negative for those of SRI funds. Second, higher activity is positive for returns of non-SRI funds, but negative for SRI funds. The estimates are robust across OLS and FE, with or without control variables, as well as between gross and net returns, for the matched as well as the randomized sample.

Table 5.9. Hypothesis 3 Panel Data Analysis - Matched Sample

Effects of horizon and activity on monthly Abnormal Returns under the CAPM benchmark conditional on the SRI status

The table shows the estimated effects of horizon, social responsibility (SRI) and their interaction on the monthly Abnormal Returns (AR) for each fund in a matched sample of US domestic equity mutual funds, SRI and non-SRI respectively, from 1999 to 2014. Horizon is proxied by each fund's average Churn Ratio ($\overline{CR}$). For each SRI fund, two non-SRI funds are matched by size (average TNA +/- 20%), age (first and last offered date +/- 2 years) and objective (CRSP objective codes). In order to isolate the horizon effect of $\overline{CR}$, the time-variant CR_t is included as a control variable, displaying a proxy for activity.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results from the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of CR indicate positive effects of horizon. Likewise, a negative coefficient of the interaction term indicates more positive effects of horizon for SRI funds than for non-SRI. CR_t is also based on CRSP's annualized "Fund Turnover Ratio", but instead of averaged per fund, it is given monthly. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. Since the funds are matched by average size, but may grow at different speeds, monthly TNA is included as a control variable. The regressions with control variables use fewer observations due to missing data in the control variable.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) as well as Time Fixed Effects (FE), as indicated in the table, with standard errors clustered by fund. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$AR_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CR_{j,t} + \beta_3 SRI_j + \beta_4 (\overline{CR}_j * SRI_j) + \beta_5 (CR_{j,t} * SRI_j) + \varepsilon$ [Eq. 3.2]

	Eq. 3.2 OLS		Eq. 3.2[a] OLS		Eq. 3.2 FE		Eq. 3.2[a] FE	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
$\overline{CR}$	-0.00101**	-0.000865**	-0.00106**	-0.000912**	-0.000845**	-0.000695*	-0.000894**	-0.000744**
(Standard Errors)	(0.00044)	(0.00044)	(0.00044)	(0.00043)	(0.00037)	(0.00036)	(0.00037)	(0.00036)
SRI	-0.000862**	-0.00101***	-0.000918**	-0.00105***	-0.000807**	-0.000950***	-0.000855**	-0.000987***
(Standard Errors)	(0.00036)	(0.00036)	(0.00036)	(0.00036)	(0.00035)	(0.00035)	(0.00035)	(0.00035)
$\overline{CR}$*SRI	0.00272**	0.00287**	0.00276**	0.00294***	0.00284***	0.00300***	0.00293***	0.00313***
(Standard Errors)	(0.00110)	(0.00112)	(0.00111)	(0.00112)	(0.00101)	(0.00102)	(0.00101)	(0.00102)
CRt	0.000903**	0.000918**	0.000900**	0.000912**	0.000714**	0.000728**	0.000710**	0.000721**
(Standard Errors)	(0.00041)	(0.00041)	(0.00042)	(0.00042)	(0.00034)	(0.00034)	(0.00035)	(0.00035)
CRt*SRI	-0.00156*	-0.00146	-0.00154*	-0.00151	-0.00171**	-0.00164**	-0.00174**	-0.00173**
(Standard Errors)	(0.00089)	(0.00091)	(0.00091)	(0.00092)	(0.00078)	(0.00080)	(0.00080)	(0.00080)
TNA			2.54E-07	6.28E-08			2.11E-07	1.78E-08
(Standard Errors)			(1.83E-07)	(2.07E-07)			(2.22E-07)	(2.43E-07)
Constant	-0.000520***	0.000438**	-0.000524***	0.000471**	-0.000514***	0.000442**	-0.000512***	0.000480**
(Standard Errors)	(0.00019)	(1.90E-04)	(0.00020)	(0.00020)	(0.00018)	(1.79E-04)	(0.00019)	(0.00019)
Observations	49240	49240	48936	48936	49240	49240	48936	48936
Adj. R-squared	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.001
Nr. of months					192	192	192	192

[a] Regression with control variables

Table 5.10. Hypothesis 3 Panel Data Analysis – Randomized Sample

Effects of horizon and activity on monthly Abnormal Returns under the CAPM benchmark conditional on the SRI status

The table shows the estimated effects of horizon, social responsibility (SRI) and their interaction on the monthly Abnormal Returns (AR) for each fund in a randomized sample of US domestic equity mutual funds, SRI and non-SRI respectively, from 1999 to 2014. Horizon is proxied by each fund's average Churn Ratio ($\overline{CR}$). The randomized control group comprises half of CRSP's universe of US domestic equity mutual funds, chosen randomly but excluding the funds in the SRI sample. In order to isolate the horizon effect of $\overline{CR}$, the time-variant CR_t is included as a control variable, displaying a proxy for activity.

Gross and net AR are calculated monthly as the difference between the actual gross/net returns for each fund and the predicted gross/net return based on CAPM, the Fama-French three factor and the Carhart four factor model, respectively. Gross returns are net plus 1/12th of expense ratio, as reported by CRSP. In the interest of overview, this table presents only the results from the CAPM benchmark. The coefficients under the other benchmarks show the same direction. $\overline{CR}$ is calculated as each funds' average of CRSP's annualized "Fund Turnover Ratio", which is the minimum of aggregated sales or purchases of securities divided by the average 12-month Total Net Assets. A low $\overline{CR}$ is associated with a long horizon. Thus, negative coefficients of CR indicate positive effects of horizon. Likewise, a negative coefficient of the interaction term indicates more positive effects of horizon for SRI funds than for non-SRI. CR_t is also based on CRSP's annualized "Fund Turnover Ratio", but instead of averaged per fund, it is given monthly. Funds are categorized as either socially responsible (SRI=1) or not (SRI=0) according to their own admissions of social screening. The regressions on gross returns and/or with control variables use fewer observations due to missing data in the expense ratio, resp. control variables.

The results in the table are estimates obtained by the equations listed below, regressed using Ordinary Least Squares (OLS) as well as Time Fixed Effects (FE), as indicated in the table, with standard errors clustered by fund. Asterisks indicate statistical significance: *** p<0.01, ** p<0.05, * p<0.1.

$AR_{j,t} = \beta_0 + \beta_1 \overline{CR}_j + \beta_2 CR_{j,t} + \beta_3 SRI_j + \beta_4(\overline{CR}_j * SRI_j) + \beta_5(CR_{j,t} * SRI_j) + \varepsilon$ [Eq. 3.2]

	Eq. 3.2 OLS		Eq. 3.2[a] OLS		Eq. 3.2 FE		Eq. 3.2[a] FE	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
$\overline{CR}$	-0.000354***	-0.000355***	-0.000249***	-0.000250***	-0.000275***	-0.000275***	-0.000210***	-0.000210***
(Standard Errors)	(7.09E-05)	(7.10E-05)	(6.40E-05)	(6.39E-05)	(5.86E-05)	(5.87E-05)	(5.39E-05)	(5.38E-05)
SRI	-0.000958***	-0.000958***	-0.000483	-0.000474	-0.000628*	-0.000624*	-0.000102	-0.0000908
(Standard Errors)	(0.00033)	(0.00033)	(0.00035)	(0.00035)	(0.00032)	(0.00032)	(0.00035)	(0.00036)
$\overline{CR}$*SRI	0.00112	0.00104	0.000827	0.000755	0.00171**	0.00163**	0.00137	0.0013
(Standard Errors)	(0.00093)	(0.00094)	(0.00104)	(0.00104)	(0.00081)	(0.00082)	(0.00089)	(0.00090)
CRt	0.000144***	0.000144***	0.000124***	0.000123***	7.74e-05**	7.70e-05**	6.30e-05**	6.22e-05**
(Standard Errors)	(4.97E-05)	(4.97E-05)	(4.53E-05)	(4.51E-05)	(3.29E-05)	(3.27E-05)	(3.07E-05)	(3.03E-05)
CRt*SRI	-0.000187	-0.000111	-0.000168	-0.000116	-0.000832	-0.000757	-0.000827	-0.000776
(Standard Errors)	(0.00074)	(0.00073)	(0.00075)	(0.00074)	(0.00059)	(0.00059)	(0.00060)	(0.00060)
TNA			-1.98E-09	-2.31E-09			3.85e-08***	3.86e-08***
(Standard Errors)			(8.47E-09)	(8.45E-09)			(1.15E-08)	(1.15E-08)
First offer date			-1.78e-07***	-1.76e-07***			1.61E-09	3.71E-09
(Standard Errors)			(1.94E-08)	(1.98E-08)			(1.69E-08)	(1.72E-08)
Control for objective			Yes	Yes			Yes	Yes
Constant	-8.82e-05*	-8.85e-05*	-0.00828***	-0.00831***	-0.000107**	-0.000108**	-0.00998***	-0.0100***
(Standard Errors)	(5.08E-05)	(5.08E-05)	(0.00206)	(0.00206)	(5.14E-05)	(5.14E-05)	(0.00201)	(0.00201)
Observations	768238	767950	761945	761747	768238	767950	761945	761747
Adj. R-squared	0.000	0.000	0.004	0.004	0.000	0.000	0.004	0.004
Nr. of months					192	192	192	192

[a] Regression with control variables

6. Discussion

To begin with, it has to be considered that most of the results showed estimates under the CAPM benchmark. The degree of economic implication, especially regarding magnitude of the coefficients for abnormal returns, is considerably constrained under the multi-factor models. Nevertheless, consistent results over the benchmarks and different analyses indicate high robustness for such effects, also when put into economic context. Therefore, although many effects found in this study are too small to establish guidelines or a model for fund managers or investors, the findings contribute to an understanding of the relation and reciprocity of SRI, investment horizons, and differences between net and gross returns.

Since the analysis is conducted on cross-sectional as well as panel data, two different control groups and categorize for further factors, some readers point out a difficulty to decide on the main finding of this thesis. Therefore, we want to refer to the results for hypothesis 3, especially Table 5.9. As indicated earlier, the hypotheses build up in complexity, so hypothesis 3 is the most sophisticated as well as content-loaded analysis. Also, the hypothesis 3 results are the most robust in this study, so the findings can be understood on a broader scale.

6.1 Conclusions and economic implications

As regards gross and net returns, our findings imply that fund fees do not distort the performance estimates and the effect of investment horizon is not reflected in the fees. However, since these findings were not completely robust, we want to point out the possibility of a selection bias in the matched sample. However, we find robust results showing no significant difference in the effects on net and gross ARs in hypothesis 3. That is, when a fund generates higher gross returns by a lower investment horizon or higher activity, that surplus is passed to the fund investor via net returns. In conclusion, these findings imply that factors such as investment horizon, SRI and activity impact gross and net returns equally in terms of economic significance. Thereby, this implication also supports the robustness of studies which only use net returns to estimate effects.

For investment horizons, assessing the economic significance is nothing straight forward. As mentioned in the results for the first hypothesis, there is no clear translation from churn ratio to horizon in terms of months or years. With an average churn ratio of 0.8 and a standard deviation of 0.7 in the matched sample, a fund with a $\overline{CR}$ one standard deviation lower than its peer is expected to create higher abnormal returns, but only up to 0.6 bps annually, according to our matched sample results for hypothesis 2, net AR (see Table 5.5). The bigger sample with a randomly selected control group has a higher average churn ratio and a higher standard deviation (average 1.0 and standard deviation 1.8, see Data, Table 3.2). Although the estimated coefficients of $\overline{CR}$ are smaller (see Table

5.6), a difference of one standard deviation has an AR impact of up to 0.8 basis points annually in this case.

Under hypothesis 3, an SRI fund with a $\overline{CR}$ one standard deviation smaller than its SRI peer (i.e. 1 St.Dev. longer horizon), has up to 1.0 bps *lower* abnormal net returns annually, while a non-SRI fund with a $\overline{CR}$ one standard deviation smaller than its non-SRI peer has up to 0.9 bps *higher* abnormal net returns annually. Thus, the difference of the effect on SRI and non-SRI is up to 1.9 bps annually. The calculations are based on the matched sample and take into account that the standard deviations as well as coefficients for SRI and non-SRI fund differ.

It seems like the effect of horizon indeed differs between SRI funds and non-SRI funds, but not only with higher magnitude for SRI, as expected, but negative impact on SRIs' AR. We find empirical support for horizons having opposite effects on abnormal returns for SRI and non-SRI, being negative and of higher magnitude for SRI funds. The results are robust and statistically significant, particularly in hypothesis 3, indicating properties of SRI that have not been encountered before, to the best of our knowledge.

The economic significance of the horizon on abnormal returns is small, but the difference of the effect on SRI and non-SRI funds, respectively, has some economic relevance. However, the adjusted R^2 are low in general, below 1% in most of our regressions. This means that our variables, although statistically significant in many cases, are weak at explaining or predicting the abnormal returns. Nevertheless, this is a common problem when modeling long-run abnormal returns; the predictability is very low since the part of the returns that is modeled by the established asset pricing models, our benchmarks, by definition is not included in abnormal returns (comp. Sanchez 2007). Thus, the direction of the found effects of horizon and SRI on AR remain relevant.

Although we expected a positive effect of long horizons on SRI funds, the results are graspable. One of the possible reasons for SRI funds benefitting from a shorter horizon could be their "stickiness" and loyalty to investments, as described in Literature Review. Loyalty motivated by social rather than financial values is likely to lead to lower abnormal returns. In such cases, less loyal SRI funds constitute better investments, financially speaking. When the investments are held longer in a downturn but do not recover fully, there is no upside to the longer horizon. Similarly, stickiness impeding the divestment of holdings that are continuously underperforming is naturally negative for the funds' returns. Additionally, SRI funds have to screen for non-financial information. Hence, some activity might be motivated by changes regarding social factors rather than profitability, rendering trades less correlated with returns.

In contrast to the negative effect of long horizons on AR for SRI funds, the effect for non-SRI funds is as expected. Cella et al. (2013) show that some firms have more short horizon investors while others have more long horizon investors. In light of our findings, we believe there is a clustering effect among the type of investors, such that they pick the same type of stocks. Hence, when short horizon funds pick a rather homogenous group of stock, they become more likely to experience negative abnormal returns in conjunction with liquidity shocks. A longer horizon would therefore diversify the stock holdings in a way that decreases the impact of market shocks on the holdings' value.

The opposite effects of horizon for SRI and non-SRI funds could possibly be explained by a non-linear, bell-shaped relationship between horizon and abnormal returns, rather than the SRI status per se. This would imply that SRI funds on average have a sub-optimally long horizon (their mean churn ratio is 0.6, see Data, Table 3.2), while non-SRI funds have a sub-optimally short horizon (their mean churn ratio is 1.0 in the randomized sample, see Data, Table 3.2). Hence, SRI and non-SRI funds could both benefit when their investment horizons converge in terms of length. The relationship between horizon and abnormal returns could constitute an interesting topic for future research.

As regards activity, the estimated effects are as expected for non-SRI funds, but less intuitive when noting the different effects for SRI funds. For the former, the effect of activity can be understood in a similar way to the outcome of Pastor et al. (2015): if a manager has sufficient skills to create abnormal returns, more activity will increase the returns. Concerning SRI funds, the negative effect of activity may be attributable to a worse stock picking skill compared to non-SRI fund managers.

Under this assumption, it seems plausible that even though SRI funds with shorter horizons do better, temporary increases in trade activity are not always beneficial, for trade is only associated with increased abnormal returns for funds managed by skilled managers. It is conceivable that SRI funds with less skilled managers also show more detrimental stickiness than others. This could explain why SRI funds perform better with shorter than longer horizons, but perform worse when they trade more.

This is opposed to the findings of Pastor et al. (2015); however, they do not study the effects on SRI funds - and our findings for non-SRI funds are in line with those of Pastor et al. (2015). The opposite effects we find for horizon and activity on AR of SRI versus non-SRI funds suggest that SRI funds indeed have different properties compared to non-SRI funds, an insight that could be valuable for an investor to be aware of.

As regards an economic application of our findings, we see a potential application rather on investor than on fund level. That is, we would not expect nor advise a fund to increase or decrease its horizon, because the changes would have to be dramatic in order to have a significant effect on returns: as seen earlier, a movement of one standard deviation of $\overline{CR}$ could change a fund's classification from short to long horizon in our tertiles, but only affect abnormal returns by up to 1 bps annually. However, when picking funds in which to invest in, all else equal, comparing $\overline{CR}$ could provide some guidance for the respective choice.

6.2 Limitations and suggestions for future research

This study displays a few limitations, naturally, many of which could constitute a subject for future research. First of all, the data quality regarding SRI classification of funds is unsatisfactory, as there is no regulation or control regarding their screenings and associated degrees of effort. The current lack of classification aggravates studies on SRI, since no comprehensive lists of SRI are available, nor is it possible to find details on the SRI characteristics in the established databases. Furthermore, SRI as a group is highly heterogeneous, as described in more detail in Introduction and Literature Review. It is thus difficult to detect definite and explicit properties of social responsibility.

As a result of this heterogeneity, we believe it would be possible to find clearer effects of SRI as status and in interaction with horizon by analyses performed on specific types of SRI. This additional filtering may provide a challenge in terms of required information as well as gathering a sufficient sample size. While this filtering would have put too much constraints on this study, it could be of interest for further research if data availability on SRI improves.

Furthermore, stronger effects of SRI and horizon could possibly also be found by isolating eventful time periods such as booms, recessions, and large social or environmental events such as transformative scandals or regulations, which we thus suggest for further research.

Another potential limitation we recognize in this study is the isolation of the effect of SRI on abnormal returns. As discussed in the previous section, the different effects of horizon on SRI and non-SRI funds may in practice be credited to non-linearity between horizon and abnormal returns, rather than the social responsibility focus per se. We would therefore encourage further research on the relation between horizon and abnormal returns. The issue of isolating an SRI effect is further aggravated by the heterogeneity and data quality inherent to SRI samples, as described above. As this problem has been encountered in previous studies, we emphasize the awareness for data quality when it comes to studies of SRI.

Additionally, the measure used for horizon is a proxy, which may indicate effects other than horizon. We try to mitigate the activity component of churn ratio by differentiating between fund average churn ratio and time-variant churn ratio, including the latter as a control variable. However, the measure may still not constitute a valid measure of horizon. Future research using different ways of indicating the investment horizon, for instance by classifying the investor type, could add further insight to the topic.

Finally, we found the horizon and activity, or average and time-variant churn ratio, to have opposite effects on abnormal returns. Since the relation between these two factors is out of scope for this thesis, we did not investigate it further. However, the results are noteworthy and apply to SRI and non-SRI funds. Future research delving the relation between the two, using the average and time-variant churn ratios as constructed in these thesis, could provide insights on the trading frequency of fund managers, thereby contributing to an understanding of the ability of fund managers to create alpha consistently vs. intermittently.

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Appendix

Table 3.1A. Descriptive statistics of funds in the Matched Sample

Descriptive statistics on the fund distribution over time

	Nr of active funds		Nr of new funds*		Avg. age in years		Size**	
Year	SRI	non-SRI	SRI	non-SRI	SRI	non-SRI	SRI	non-SRI
1999	41	84	12	30	3.49	3.31	122	162
2000	53	104	11	22	3.49	3.48	147	156
2001	64	122	11	17	3.72	3.83	180	159
2002	66	132	1	12	4.56	4.30	152	113
2003	68	143	4	13	5.29	4.87	120	95
2004	70	154	3	16	6.04	5.29	173	150
2005	80	186	15	37	5.84	5.09	177	147
2006	92	218	12	35	5.98	5.10	183	159
2007	106	233	14	18	6.14	5.61	187	187
2008	116	258	10	28	6.41	5.84	192	170
2009	119	263	4	3	7.17	6.77	116	97
2010	132	268	13	8	7.36	7.58	143	121
2011	133	270	3	1	8.13	8.49	175	149
2012	130	268	3	0	9.09	9.48	182	160
2013	126	263	-	-	10.10	10.52	214	174
2014	125	243	-	-	11.10	11.31	269	206
Total	1521	3209	116	240	7.11	6.92	176	152

*First offer date the corresponding year, as of January

**TNA in millions of US dollars

Table 3.2A. Comparison of the two samples - number of funds over time
Descriptive statistics on the fund distribution over time

	First offer date				Active Funds*			
	Matched		Randomized		Matched		Randomized	
Year	*Non-SRI*	*SRI*	*Non-SRI*	*SRI*	*Non-SRI*	*SRI*	*Non-SRI*	*SRI*
<1990	6	3	358	9	-	-	-	-
1990-1998	50	29	1995	30	-	-	-	-
1999	30	12	537	12	84	41	2580	47
2000	22	11	724	11	104	53	3220	59
2001	17	11	621	11	122	64	3724	70
2002	12	1	559	1	132	66	4162	72
2003	13	4	449	4	143	68	4376	74
2004	16	3	487	3	154	70	4539	76
2005	37	15	602	15	186	80	4837	86
2006	35	12	590	12	218	92	5170	98
2007	18	14	520	14	233	106	5392	112
2008	28	10	557	10	258	116	6448	123
2009	3	4	356	4	263	119	6400	126
2010	8	13	431	13	268	132	6419	139
2011	1	3	470	3	270	133	6651	140
2012	0	3	217	3	268	130	6495	137
2013	-	-	-	-	263	126	6154	133
2014	-	-	-	-	243	125	5854	132
Total	296	148	9473	155	3209	1521	82421	1624

*As of January

Table 3.3A. Detailed descriptive statistics of the matching variables

A. Descriptive statistics of fund age in the matched sample

		SRI				Non-SRI			
Year	Nr of funds	Avg	stdev	min	max	Avg	stdev	min	max
1999	84	3.49	4.01	0	17	3.31	3.95	0	17
2000	104	3.49	3.98	0	18	3.48	3.94	0	18
2001	122	3.72	4.00	0	19	3.83	3.96	0	19
2002	132	4.56	4.04	-1	20	4.30	3.88	0	20
2003	143	5.29	4.14	0	21	4.87	3.99	0	21
2004	154	6.04	4.27	0	22	5.29	4.24	0	22
2005	186	5.84	4.86	0	23	5.09	4.59	0	23
2006	218	5.98	5.12	0	24	5.10	4.78	0	24
2007	233	6.14	5.30	0	25	5.61	4.84	0	25
2008	258	6.41	5.41	0	26	5.84	5.00	0	26
2009	263	7.17	5.51	0	27	6.77	5.04	0	27
2010	268	7.36	5.77	0	28	7.58	5.14	0	28
2011	270	8.13	5.81	0	29	8.49	5.17	0	29
2012	268	9.09	5.99	0	30	9.48	5.18	1	30
2013	263	10.10	6.06	1	31	10.52	5.21	2	31
2014	243	11.10	6.08	2	32	11.31	4.89	3	29
Total	3209	7.11	5.71	-1	32	6.92	5.34	0	31

B. Descriptive statistics of fund size, TNA in million USD, in the matched sample

		SRI				Non-SRI			
Year	Nr of funds	Avg	stdev	min	max	Avg	stdev	min	max
1999	41	122	404	0.1	2399	162	430	0.1	2660
2000	53	147	498	0.1	3223	156	394	0.1	2302
2001	64	180	462	0.1	2840	159	386	0.1	2019
2002	66	152	357	0.1	1887	113	295	0.1	2122
2003	68	120	275	0.1	1429	95	245	0.1	1760
2004	70	173	376	0.1	2093	150	376	0.1	2687
2005	80	177	374	0.1	2214	147	393	0.1	3025
2006	92	183	376	0.1	2483	159	418	0.1	3260
2007	106	187	379	0.1	2378	187	432	0.1	3268
2008	116	192	398	0.1	2293	170	389	0.1	2821
2009	119	116	250	0.1	1416	97	212	0.1	1546
2010	132	143	320	0.1	2361	121	276	0.1	2435
2011	133	175	389	0.1	3317	149	359	0.1	4070
2012	130	182	400	0.1	3508	160	414	0.1	5014
2013	126	214	480	0.1	4355	174	430	0.1	4330
2014	125	269	642	0.7	6163	206	441	0.1	3799
Total	1521	176	411	0.1	6163	152	375	0.1	5014

Table 4.1A. Descriptive statistics of Benchmarks – Matched Sample
Average coefficients and standard deviations of the factors for the respective benchmarks, as well as expected and abnormal gross and net returns by benchmark and SRI status

	CAPM		Fama- French		Carhart	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
SRI funds						
mkt	1.00059	1.00058	0.98234	0.98226	0.97296	0.97287
(Standard Deviation)	(0.17548)	(0.17550)	(0.13347)	(0.13350)	(0.13694)	(0.13693)
smb			0.09737	0.09764	0.10094	0.10121
(Standard Deviation)			(0.27893)	(0.27893)	(0.27495)	(0.27497)
hml			-0.00165	-0.00154	-0.01098	-0.01085
(Standard Deviation)			(0.21821)	(0.21824)	(0.21044)	(0.21046)
umd					-0.02326	-0.02328
(Standard Deviation)					(0.07379)	(0.07369)
Expected Return	0.00529	0.00529	0.00545	0.00545	0.00542	0.00542
(Standard Deviation)	(0.04619)	(0.04619)	(0.04729)	(0.04729)	(0.04744)	(0.04744)
Abnormal Return	-0.00072	0.00032	-0.00087	0.00017	-0.00084	0.00020
(Standard Deviation)	(0.01864)	(0.01864)	(0.01553)	(0.01553)	(0.01506)	(0.01506)
Non-SRI funds						
mkt	1.01289	1.01255	0.99683	0.99641	1.00344	1.00316
(Standard Deviation)	(0.26361)	(0.26420)	(0.22145)	(0.22165)	(0.22183)	(0.22214)
smb			0.08411	0.08432	0.07975	0.07994
(Standard Deviation)			(0.28896)	(0.28874)	(0.28335)	(0.28311)
hml			-0.02184	-0.02151	-0.01926	-0.01874
(Standard Deviation)			(0.28626)	(0.28700)	(0.27613)	(0.27670)
umd					0.01232	0.01266
(Standard Deviation)					(0.09922)	(0.09920)
Expected Return	0.00517	0.00512	0.00541	0.00537	0.00547	0.00543
(Standard Deviation)	(0.04806)	(0.04807)	(0.04983)	(0.04984)	(0.05008)	(0.05009)
Abnormal Return	-0.00047	0.00064	-0.00072	0.00039	-0.00078	0.00033
(Standard Deviation)	(0.02213)	(0.02212)	(0.01781)	(0.01778)	(0.01712)	(0.01709)

Table 4.2A. Descriptive statistics of Benchmarks – Randomized Sample
Average coefficients and standard deviations of the factors for the respective benchmarks, as well as expected and abnormal gross and net returns by benchmark and SRI status

	CAPM		Fama- French		Carhart	
Variables	*Net*	*Gross*	*Net*	*Gross*	*Net*	*Gross*
SRI funds						
mkt	0.99189	0.99188	0.97775	0.97768	0.96737	0.96728
(Standard Deviation)	(0.17720)	(0.17722)	(0.13410)	(0.13412)	(0.13691)	(0.13690)
smb			0.09094	0.09120	0.09522	0.09547
(Standard Deviation)			(0.27646)	(0.27648)	(0.27305)	(0.27308)
hml			0.02184	0.02195	0.01221	0.01233
(Standard Deviation)			(0.24352)	(0.24355)	(0.23578)	(0.23580)
umd					-0.02497	-0.02499
(Standard Deviation)					(0.07327)	(0.07318)
Expected Return	0.00520	0.00520	0.00542	0.00542	0.00538	0.00538
(Standard Deviation)	(0.04583)	(0.04583)	(0.04707)	(0.04707)	(0.04722)	(0.04722)
Abnormal Return	-0.00059	0.00043	-0.00081	0.00022	-0.00076	0.00026
(Standard Deviation)	(0.01922)	(0.01923)	(0.01584)	(0.01584)	(0.01538)	(0.01538)
Non-SRI funds						
mkt	0.99786	1.00015	0.96370	0.96545	0.96641	0.96948
(Standard Deviation)	(0.38551)	(0.38440)	(0.34349)	(0.34009)	(0.33999)	(0.33685)
smb			0.16313	0.16501	0.16134	0.16292
(Standard Deviation)			(0.33886)	(0.33769)	(0.33470)	(0.33301)
hml			0.01152	0.01662	0.00721	0.01392
(Standard Deviation)			(0.35800)	(0.36355)	(0.34872)	(0.35385)
umd					-0.00048	0.00320
(Standard Deviation)					(0.12528)	(0.12468)
Expected Return	0.00477	0.00433	0.00522	0.00483	0.00526	0.00487
(Standard Deviation)	(0.04878)	(0.04855)	(0.05121)	(0.05113)	(0.05152)	(0.05144)
Abnormal Return	-0.00037	0.00089	-0.00082	0.00039	-0.00086	0.00035
(Standard Deviation)	(0.02754)	(0.02782)	(0.02263)	(0.02270)	(0.02190)	(0.02195)

Table 4.3A. Descriptive statistics of Abnormal Returns
Descriptive statistics on the net and gross Abnormal Returns by sample, SRI and benchmark

	SRI Matched			Non-SRI Matched			Non-SRI Randomized		
	CAPM	Fama-French	Carhart	CAPM	Fama-French	Carhart	CAPM	Fama-French	Carhart
Net Returns									
Nr of obs	17,490	17,490	17,490	36,495	36,495	36,495	913,265	913,265	913,265
mean	-0.00072	-0.00087	-0.00084	-0.00048	-0.00072	-0.00078	-0.00037	-0.00082	-0.00086
sd	0.01860	0.01550	0.01510	0.02210	0.01780	0.01710	0.02750	0.02260	0.02190
min	-0.24100	-0.13000	-0.13000	-0.26000	-0.16700	-0.18700	-1.02200	-1.00300	-1.01000
max	0.24800	0.17200	0.17000	0.50900	0.24500	0.19300	0.73900	0.71700	0.70700
Gross Returns									
Nr of obs	17,490	17,490	17,490	36,295	36,295	36,295	834,083	834,083	834,083
mean	0.00032	0.00017	0.00020	0.00064	0.00039	0.00033	-0.00025	-0.00075	-0.00079
sd	0.01860	0.01550	0.01510	0.02210	0.01780	0.01710	0.02780	0.02270	0.02200
min	-0.23900	-0.12900	-0.12900	-0.25800	-0.16500	-0.18500	-0.99400	-0.97300	-0.98000
max	0.25000	0.17300	0.17100	0.51200	0.24800	0.19400	0.73900	0.71700	0.70700

Table 5.4A. Hypothesis 2 Cross-Sectional Analysis - Randomized Sample
Effects of horizon and SRI on average Abnormal Returns

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 2.2						
$\overline{CR}$	-0.000186***	-0.000183***	-0.000182***	-0.000186***	-0.000183***	-0.000182***
(Standard Errors)	(5.06E-05)	(4.52E-05)	(4.44E-05)	(5.06E-05)	(4.52E-05)	(4.44E-05)
Constant	-0.000553***	-0.000921***	-0.000959***	-0.000551***	-0.000919***	-0.000958***
(Standard Errors)	(6.60E-05)	(5.80E-05)	(5.59E-05)	(6.61E-05)	(5.81E-05)	(5.60E-05)
Observations	8329	8329	8329	8322	8322	8322
Adj. R-squared	0.008	0.01	0.012	0.008	0.01	0.012
Eq. 2.3						
$\overline{CR}$	-0.000186***	-0.000182***	-0.000181***	-0.000186***	-0.000183***	-0.000182***
(Standard Errors)	(5.06E-05)	(4.52E-05)	(4.44E-05)	(5.06E-05)	(4.52E-05)	(4.44E-05)
SRI	0.0000229	0.000152	0.000193	0.0000212	0.00015	0.000192
(Standard Errors)	(2.51E-04)	(1.83E-04)	(1.78E-04)	(2.51E-04)	(1.83E-04)	(1.78E-04)
Constant	-0.000553***	-0.000924***	-0.000963***	-0.000551***	-0.000922***	-0.000962***
(Standard Errors)	(6.68E-05)	(5.87E-05)	(5.65E-05)	(6.68E-05)	(5.88E-05)	(5.66E-05)
Observations	8329	8329	8329	8322	8322	8322
Adj. R-squared	0.008	0.01	0.011	0.008	0.01	0.011
Eq. 2.3a						
$\overline{CR}$	-0.000126***	-0.000137***	-0.000136***	-0.000126***	-0.000137***	-0.000136***
(Standard Errors)	(4.76E-05)	(4.36E-05)	(4.26E-05)	(4.76E-05)	(4.36E-05)	(4.26E-05)
SRI	0.000263	0.000206	0.000256	0.000262	0.000205	0.000255
(Standard Errors)	(2.49E-04)	(1.88E-04)	(1.82E-04)	(2.49E-04)	(1.88E-04)	(1.82E-04)
TNA	4.49e-08**	7.68e-08***	8.29e-08***	4.50e-08**	7.69e-08***	8.29e-08***
(Standard Errors)	(2.06E-08)	(2.17E-08)	(2.25E-08)	(2.06E-08)	(2.17E-08)	(2.25E-08)
First offer date	-1.80e-07***	-6.12e-08***	-4.86e-08***	-1.80e-07***	-6.07e-08***	-4.82e-08***
(Standard Errors)	(2.12E-08)	(1.71E-08)	(1.67E-08)	(2.13E-08)	(1.71E-08)	(1.68E-08)
Control for objective	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.00909***	-0.0109***	-0.0104***	-0.00909***	-0.0109***	-0.0104***
(Standard Errors)	(0.00246)	(0.00244)	(0.00216)	(0.00246)	(0.00244)	(0.00216)
Observations	8326	8326	8326	8319	8319	8319
Adj. R-squared	0.163	0.134	0.132	0.163	0.134	0.132

Table 5.5A. Hypothesis 2 Panel Data Analysis - Matched Sample
Effects of horizon and SRI on Abnormal Returns

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 2.4 OLS						
$\overline{CR}$	-0.000611*	-0.000187	-0.000258	-0.000451	-2.77E-05	-9.84E-05
(Standard Errors)	(0.000362)	(0.000427)	(0.000434)	(0.000361)	(0.000425)	(0.000431)
CRt	0.000649**	0.000235	0.000209	0.000680**	0.000265	0.000239
(Standard Errors)	(0.000321)	(0.000322)	(0.000308)	(0.000326)	(0.000324)	(0.000310)
Constant	-0.000697***	-0.000915***	-0.000861***	0.000237	1.93E-05	7.31E-05
(Standard Errors)	(0.000160)	(0.000154)	(0.000161)	(0.000164)	(0.000156)	(0.000163)
Observations	49,240	49,240	49,240	49,240	49,240	49,240
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Eq. 2.5 OLS						
$\overline{CR}$	-0.000632*	-0.000184	-0.000249	-0.000473	-2.47E-05	-8.94E-05
(Standard Errors)	(0.000366)	(0.000430)	(0.000438)	(0.000365)	(0.000429)	(0.000435)
CRt	0.000649**	0.000235	0.000209	0.000680**	0.000265	0.000239
(Standard Errors)	(0.000321)	(0.000322)	(0.000308)	(0.000326)	(0.000324)	(0.000310)
SRI	-0.000152	0.0000209	6.27E-05	-0.000151	0.0000211	6.31E-05
(Standard Errors)	(0.000244)	(0.000216)	(0.000220)	(0.000246)	(0.000216)	(0.000220)
Constant	-0.000632***	-0.000924***	-0.000888***	0.000303	1.02E-05	4.58E-05
(Standard Errors)	(0.000182)	(0.000166)	(0.000174)	(0.000188)	(0.000170)	(0.000177)
Observations	49,240	49,240	49,240	49,240	49,240	49,240
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Eq. 2.5a OLS						
$\overline{CR}$	-0.000680*	-0.000214	-0.000276	-0.000513	-4.62E-05	-0.000108
(Standard Errors)	(0.000364)	(0.000433)	(0.000441)	(0.000361)	(0.000429)	(0.000437)
CRt	0.000653*	0.000249	0.000224	0.000669**	0.000264	0.000239
(Standard Errors)	(0.000336)	(0.000335)	(0.000322)	(0.000337)	(0.000335)	(0.000321)
SRI	-0.000177	-1.23E-05	3.51E-05	-0.000184	-1.92E-05	2.85E-05
(Standard Errors)	(0.000244)	(0.000213)	(0.000218)	(0.000248)	(0.000216)	(0.000221)
TNA	2.78E-07	3.89e-07**	4.09e-07**	8.80E-08	1.99E-07	2.19E-07
(Standard Errors)	(1.85E-07)	(1.56E-07)	(1.66E-07)	(2.09E-07)	(1.74E-07)	(1.86E-07)
Constant	-0.000645***	-0.000978***	-0.000948***	0.000329	-4.57E-06	2.59E-05
(Standard Errors)	(0.000193)	(0.000165)	(0.000172)	(0.000201)	(0.000171)	(0.000177)
Observations	48,936	48,936	48,936	48,936	48,936	48,936
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Eq. 2.5a FE						
$\overline{CR}$	-0.000484	-6.26E-05	-0.000126	-0.000312	0.000109	4.64E-05
(Standard Errors)	(0.000310)	(0.000381)	(0.000388)	(0.000307)	(0.000375)	(0.000380)
CRt	0.00043	8.70E-05	6.30E-05	0.000442	9.89E-05	7.47E-05
(Standard Errors)	(0.000274)	(0.000294)	(0.000280)	(0.000274)	(0.000291)	(0.000276)
SRI	-0.000131	2.14E-05	6.86E-05	-0.000134	1.88E-05	6.61E-05
(Standard Errors)	(0.000237)	(0.000211)	(0.000215)	(0.000238)	(0.000210)	(0.000214)
TNA	2.40E-07	2.78E-07	2.97E-07	4.80E-08	8.58E-08	1.05E-07
(Standard Errors)	(2.26E-07)	(1.92E-07)	(2.05E-07)	(2.47E-07)	(2.11E-07)	(2.26E-07)
Constant	-0.000632***	-0.000961***	-0.000930***	0.000340*	1.15E-05	4.21E-05
(Standard Errors)	(0.000188)	(0.000159)	(0.000167)	(0.000193)	(0.000163)	(0.000170)
Observations	48,936	48,936	48,936	48,936	48,936	48,936
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Nr. of months	192	192	192	192	192	192

[a] Regression with control variables

Table 5.6A. Hypothesis 2 Panel Data Analysis - Randomized Sample
Effects of horizon and SRI on average Abnormal Returns

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 2.4 OLS						
$\overline{CR}$	-0.000351***	-0.000252***	-0.000251***	-0.000352***	-0.000253***	-0.000252***
(Standard Errors)	(7.05E-05)	(5.41E-05)	(5.34E-05)	(7.06E-05)	(5.42E-05)	(5.35E-05)
CRt	0.000143***	7.29e-05**	6.15e-05*	0.000144***	7.31e-05**	6.17e-05*
(Standard Errors)	(4.96E-05)	(3.57E-05)	(3.36E-05)	(4.96E-05)	(3.57E-05)	(3.36E-05)
Constant	-1.00e-04**	-0.000632***	-0.000654***	-0.000100**	-0.000633***	-0.000655***
(Standard Errors)	(4.99E-05)	(3.96E-05)	(4.06E-05)	(4.99E-05)	(3.96E-05)	(4.06E-05)
Observations	768,238	768,238	768,238	767,950	767,950	767,950
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Eq. 2.5 OLS						
$\overline{CR}$	-0.000352***	-0.000252***	-0.000251***	-0.000354***	-0.000253***	-0.000252***
(Standard Errors)	(7.06E-05)	(5.41E-05)	(5.35E-05)	(7.07E-05)	(5.42E-05)	(5.36E-05)
CRt	0.000143***	7.29e-05**	6.15e-05*	0.000144***	7.31e-05**	6.17e-05*
(Standard Errors)	(4.96E-05)	(3.57E-05)	(3.36E-05)	(4.96E-05)	(3.57E-05)	(3.36E-05)
SRI	-0.000426**	-7.49E-05	-5.37E-06	-0.000428**	-7.71E-05	-7.26E-06
(Standard Errors)	(0.000207)	(0.000181)	(0.000184)	(0.000207)	(0.000181)	(0.000184)
Constant	-8.92e-05*	-0.000630***	-0.000654***	-8.95e-05*	-0.000631***	-0.000655***
(Standard Errors)	(5.07E-05)	(4.01E-05)	(4.11E-05)	(5.07E-05)	(4.01E-05)	(4.11E-05)
Observations	768,238	768,238	768,238	767,950	767,950	767,950
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Eq. 2.5a OLS						
$\overline{CR}$	-0.000248***	-0.000174***	-0.000176***	-0.000249***	-0.000174***	-0.000176***
(Standard Errors)	(6.38E-05)	(4.84E-05)	(4.89E-05)	(6.37E-05)	(4.84E-05)	(4.88E-05)
CRt	0.000123***	5.76e-05*	0.0000475	0.000123***	5.75e-05*	4.73E-05
(Standard Errors)	(4.51E-05)	(3.28E-05)	(3.13E-05)	(4.50E-05)	(3.26E-05)	(3.12E-05)
SRI	-0.00011	-2.07E-05	7.03E-05	-0.000113	-2.31E-05	6.82E-05
(Standard Errors)	(0.000220)	(0.000188)	(0.000189)	(0.000220)	(0.000189)	(0.000189)
TNA	-2.34E-09	2.36e-08**	2.75e-08***	-2.66E-09	2.33e-08**	2.72e-08***
(Standard Errors)	(8.47E-09)	(9.44E-09)	(9.83E-09)	(8.46E-09)	(9.36E-09)	(9.75E-09)
First offer date	-1.78e-07***	-1.01e-07***	-9.13e-08***	-1.76e-07***	-1.00e-07***	-9.01e-08***
(Standard Errors)	(1.94E-08)	(1.46E-08)	(1.44E-08)	(1.98E-08)	(1.50E-08)	(1.48E-08)
Control for objective	Yes	Yes	Yes			
Constant	-0.00828***	-0.00974***	-0.00913***	-0.00831***	-0.00977***	-0.00915***
(Standard Errors)	(0.002060)	(0.002070)	(0.001890)	(0.002060)	(0.002070)	(0.001890)
Observations	761,945	761,945	761,945	761,747	761,747	761,747
Adj. R-squared	0.004	0.003	0.003	0.004	0.003	0.003
Eq. 2.5a FE						
$\overline{CR}$	-0.000208***	-0.000168***	-0.000170***	-0.000208***	-0.000167***	-0.000170***
(Standard Errors)	(5.36E-05)	(4.50E-05)	(4.60E-05)	(5.35E-05)	(4.49E-05)	(4.60E-05)
CRt	6.17e-05**	4.44E-05	3.53E-05	6.10e-05**	4.38E-05	3.46E-05
(Standard Errors)	(3.04E-05)	(2.74E-05)	(2.63E-05)	(3.01E-05)	(2.72E-05)	(2.60E-05)
SRI	0.000206	0.000136	0.000212	0.000207	0.000136	0.000213
(Standard Errors)	(0.000219)	(0.000189)	(0.000189)	(0.000219)	(0.000190)	(0.000190)
TNA	3.82e-08***	3.79e-08***	4.02e-08***	3.83e-08***	3.80e-08***	4.03e-08***
(Standard Errors)	(1.15E-08)	(1.11E-08)	(1.13E-08)	(1.15E-08)	(1.10E-08)	(1.13E-08)
First offer date	1.62E-09	-7.31E-09	-4.65E-09	3.73E-09	-5.26E-09	-2.63E-09
(Standard Errors)	(1.69E-08)	(1.43E-08)	(1.44E-08)	(1.72E-08)	(1.46E-08)	(1.46E-08)
Control for objective	Yes	Yes				
Constant	-0.00998***	-0.0105***	-0.00986***	-0.0100***	-0.0106***	-0.00988***
(Standard Errors)	(0.002010)	(0.002060)	(0.001880)	(0.002010)	(0.002060)	(0.001880)
Observations	761,945	761,945	761,945	761,747	761,747	761,747
Adj. R-squared	0.004	0.003	0.003	0.004	0.003	0.003
Nr. of months	192	192	192	192	192	192

[a] Regression with control variables

Table 5.8A. Hypothesis 3 Cross-Sectional Data Analysis - Randomized Sample
Effects of horizon on Abnormal Returns conditional on the SRI status

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 3.1						
$\overline{CR}$	-0.000564	-0.000322	-0.000164	-0.000566	-0.000324	-0.000165
(Standard Errors)	(0.00035)	(0.00028)	(0.00029)	(0.00035)	(0.00028)	(0.00029)
SRI	-0.000187***	-0.000183***	-0.000182***	-0.000187***	-0.000183***	-0.000182***
(Standard Errors)	(5.07E-05)	(4.53E-05)	(4.45E-05)	(5.07E-05)	(4.53E-05)	(4.45E-05)
$\overline{CR}$ *SRI	0.000959*	0.000774*	0.000582	0.000959*	0.000775*	0.000583
(Standard Errors)	(0.00053)	(0.00040)	(0.00041)	(0.00053)	(0.00040)	(0.00041)
Constant	-0.000552***	-0.000923***	-0.000963***	-0.000550***	-0.000922***	-0.000962***
(Standard Errors)	(6.69E-05)	(5.88E-05)	(5.66E-05)	(6.69E-05)	(5.89E-05)	(5.67E-05)
Observations	8,329	8,329	8,329	8,322	8,322	8,322
Adj. R-squared	0.008	0.01	0.011	0.008	0.01	0.011
Eq. 3.1a						
$\overline{CR}$	-0.000363	-0.000309	-0.000141	-0.000364	-0.00031	-0.000142
(Standard Errors)	(0.00037)	(0.00028)	(0.00029)	(0.00037)	(0.00028)	(0.00029)
SRI	-0.000127***	-0.000137***	-0.000137***	-0.000127***	-0.000137***	-0.000137***
(Standard Errors)	(4.77E-05)	(4.37E-05)	(4.27E-05)	(4.77E-05)	(4.37E-05)	(4.27E-05)
$\overline{CR}$ *SRI	0.00102*	0.000841**	0.000647	0.00102*	0.000841**	0.000648
(Standard Errors)	(0.00056)	(0.00042)	(0.00042)	(0.00056)	(0.00041)	(0.00042)
TNA	4.58E-08**	7.75E-08***	8.34E-08***	4.59E-08**	7.76E-08***	8.35E-08***
(Standard Errors)	(2.06E-08)	(2.18E-08)	(2.25E-08)	(2.06E-08)	(2.18E-08)	(2.25E-08)
First offer date	-1.80E-07***	-6.13E-08***	-4.86E-08***	-1.80E-07***	-6.08E-08***	-4.82E-08***
(Standard Errors)	(2.13E-08)	(1.71E-08)	(1.68E-08)	(2.13E-08)	(1.71E-08)	(1.68E-08)
Control for objective	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.00909***	-0.0109***	-0.0104***	-0.00909***	-0.0109***	-0.0104***
(Standard Errors)	(0.00246)	(0.00244)	(0.00216)	(0.00246)	(0.00244)	(0.00216)
Observations	8,326	8,326	8,326	8,319	8,319	8,319
Adj. R-squared	0.163	0.134	0.132	0.163	0.134	0.132

[a] Regression with control variables

Table 5.9A. Hypothesis 3 Panel Data OLS Analysis - Matched Sample
Effects of horizon and activity on monthly Abnormal Returns conditional on the SRI status

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 3.2 OLS						
SRI	-0.000862**	-0.000498	-0.000367	-0.00101***	-0.000646*	-0.000515
(Standard Errors)	(0.00036)	(0.00033)	(0.00034)	(0.00036)	(0.00033)	(0.00034)
CRt	0.000903**	0.000503	0.000487	0.000918**	0.000518	0.000501
(Standard Errors)	(0.00041)	(0.00040)	(0.00039)	(0.00041)	(0.00040)	(0.00039)
$\overline{CR}$	-0.00101**	-0.000546	-0.000603	-0.000865**	-0.000397	-0.000455
(Standard Errors)	(0.00044)	(0.00052)	(0.00053)	(0.00044)	(0.00052)	(0.00053)
CRt*SRI	-0.00156*	-0.00165**	-0.00170**	-0.00146	-0.00156*	-0.00161**
(Standard Errors)	(0.00089)	(0.00082)	(0.00076)	(0.00091)	(0.00084)	(0.00078)
$\overline{CR}$ *SRI	0.00272**	0.00250**	0.00241**	0.00287**	0.00265**	0.00256**
(Standard Errors)	(0.00110)	(0.00104)	(0.00100)	(0.00112)	(0.00106)	(0.00101)
Constant	-0.000520***	-0.000843***	-0.000821***	0.000438**	0.000115	0.000137
(Standard Errors)	(0.00019)	(0.00018)	(0.00019)	(0.00019)	(0.00018)	(0.00019)
Observations	49,240	49,240	49,240	49,240	49,240	49,240
Adj. R-squared	0.001	0.000	0.000	0.001	0.001	0.000
Eq. 3.2a OLS						
SRI	-0.000918**	-0.00053	-0.000392	-0.00105***	-0.000666**	-0.000529
(Standard Errors)	(0.00036)	(0.00033)	(0.00034)	(0.00036)	(0.00033)	(0.00034)
CRt	0.000900**	0.000507	0.000492	0.000912**	0.000518	0.000503
(Standard Errors)	(0.00042)	(0.00042)	(0.00040)	(0.00042)	(0.00042)	(0.00040)
$\overline{CR}$	-0.00106**	-0.000565	-0.000622	-0.000912**	-0.000416	-0.000472
(Standard Errors)	(0.00044)	(0.00052)	(0.00054)	(0.00043)	(0.00052)	(0.00053)
CRt*SRI	-0.00154*	-0.00161*	-0.00167**	-0.00151	-0.00158*	-0.00164**
(Standard Errors)	(0.00091)	(0.00083)	(0.00078)	(0.00092)	(0.00084)	(0.00078)
$\overline{CR}$ *SRI	0.00276**	0.00246**	0.00237**	0.00294***	0.00264**	0.00256**
(Standard Errors)	(0.00111)	(0.00105)	(0.00100)	(0.00112)	(0.00106)	(0.00101)
TNA	2.54E-07	3.65E-07**	3.84E-07**	6.28E-08	1.74E-07	1.94E-07
(Standard Errors)	(1.83E-07)	(1.52E-07)	(1.63E-07)	(2.07E-07)	(1.70E-07)	(1.83E-07)
Constant	-0.000524***	-0.000892***	-0.000875***	0.000471**	0.000102	0.000119
(Standard Errors)	(0.00020)	(0.00017)	(0.00018)	(0.00020)	(0.00018)	(0.00019)
Observations	48,936	48,936	48,936	48,936	48,936	48,936
Adj. R-squared	0.001	0.000	0.001	0.001	0.001	0.001

[a] Regression with control variables

Table 5.9B. Hypothesis 3 Panel Data FE Analysis - Matched Sample
Effects of horizon and activity on monthly Abnormal Returns conditional on the SRI status

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 3.2 FE						
SRI	-0.000807**	-0.000471	-0.000339	-0.000950***	-0.000615*	-0.000484
(Standard Errors)	(0.00035)	(0.00033)	(0.00034)	(0.00035)	(0.00033)	(0.00033)
CRt	0.000714**	0.000361	0.000346	0.000728**	0.000375	0.00036
(Standard Errors)	(0.00034)	(0.00035)	(0.00034)	(0.00034)	(0.00035)	(0.00033)
$\overline{CR}$	-0.000845**	-0.000409	-0.000468	-0.000695*	-0.000259	-0.000318
(Standard Errors)	(0.00037)	(0.00046)	(0.00047)	(0.00036)	(0.00045)	(0.00046)
CRt*SRI	-0.00171**	-0.00172**	-0.00177***	-0.00164**	-0.00164**	-0.00170**
(Standard Errors)	(0.00078)	(0.00074)	(0.00068)	(0.00080)	(0.00076)	(0.00070)
$\overline{CR}$ *SRI	0.00284***	0.00256***	0.00246***	0.00300***	0.00273***	0.00263***
(Standard Errors)	(0.00101)	(0.00097)	(0.00093)	(0.00102)	(0.00098)	(0.00093)
Constant	-0.000514***	-0.000845***	-0.000823***	0.000442**	0.000111	0.000133
(Standard Errors)	(0.00018)	(0.00017)	(0.00018)	(0.00018)	(0.00017)	(0.00018)
Observations	49,240	49,240	49,240	49,240	49,240	49,240
Adj. R-squared	0	0.000	0.000	0.001	0.001	0.001
Nr. of months	192	192	192	192	192	192
Eq. 3.2a FE						
SRI	-0.000855**	-0.000494	-0.000356	-0.000987***	-0.000627*	-0.000489
(Standard Errors)	(0.00035)	(0.00033)	(0.00034)	(0.00035)	(0.00032)	(0.00033)
CRt	0.000710**	0.000362	0.000349	0.000721**	0.000373	0.000359
(Standard Errors)	(0.00035)	(0.00036)	(0.00035)	(0.00035)	(0.00036)	(0.00034)
$\overline{CR}$	-0.000894**	-0.000431	-0.000488	-0.000744**	-0.000281	-0.000338
(Standard Errors)	(0.00037)	(0.00046)	(0.00047)	(0.00036)	(0.00045)	(0.00046)
CRt*SRI	-0.00174**	-0.00171**	-0.00178**	-0.00173**	-0.00170**	-0.00177**
(Standard Errors)	(0.00080)	(0.00076)	(0.00070)	(0.00080)	(0.00076)	(0.00070)
$\overline{CR}$ *SRI	0.00293***	0.00256***	0.00247***	0.00313***	0.00276***	0.00268***
(Standard Errors)	(0.00101)	(0.00098)	(0.00094)	(0.00102)	(0.00098)	(0.00094)
TNA	2.11E-07	2.51E-07	2.70E-07	1.78E-08	5.75E-08	7.65E-08
(Standard Errors)	(2.22E-07)	(1.86E-07)	(2.00E-07)	(2.43E-07)	(2.05E-07)	(2.21E-07)
Constant	-0.000512***	-0.000874***	-0.000857***	0.000480**	0.000119	0.000135
(Standard Errors)	(0.00019)	(0.00017)	(0.00018)	(0.00019)	(0.00017)	(0.00018)
Observations	48,936	48,936	48,936	48,936	48,936	48,936
Adj. R-squared	0	0.000	0.001	0.001	0.001	0.001
Nr. of months	192	192	192	192	192	192

[a] Regression with control variables

Table 5.10A. Hypothesis 3 Panel Data OLS Analysis - Randomized Sample
Effects of horizon and activity on monthly Abnormal Returns conditional on the SRI status

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 3.2 OLS						
SRI	-0.000958***	-0.000542*	-0.000333	-0.000958***	-0.000541*	-0.000332
(Standard Errors)	(0.00033)	(0.00028)	(0.00029)	(0.00033)	(0.00028)	(0.00029)
CRt	0.000144***	7.38e-05**	6.25e-05*	0.000144***	7.39E-05**	6.26E-05*
(Standard Errors)	(4.97E-05)	(3.60E-05)	(3.39E-05)	(4.97E-05)	(3.59E-05)	(3.38E-05)
$\overline{CR}$	-0.000354***	-0.000254***	-0.000253***	-0.000355***	-0.000255***	-0.000254***
(Standard Errors)	(7.09E-05)	(5.45E-05)	(5.38E-05)	(7.10E-05)	(5.45E-05)	(5.39E-05)
CRt*SRI	-0.000187	-0.000533	-0.000627	-0.000111	-0.000457	-0.000552
(Standard Errors)	(0.00074)	(0.00074)	(0.00068)	(0.00073)	(0.00073)	(0.00067)
$\overline{CR}$ *SRI	0.00112	0.00135	0.0012	0.00104	0.00127	0.00112
(Standard Errors)	(0.00093)	(0.00088)	(0.00083)	(0.00094)	(0.00088)	(0.00083)
Constant	-8.82e-05*	-0.000629***	-0.000654***	-8.85e-05*	-0.000630***	-0.000654***
(Standard Errors)	(5.08E-05)	(4.02E-05)	(4.12E-05)	(5.08E-05)	(4.02E-05)	(4.12E-05)
Observations	768,238	768,238	768,238	767,950	767,950	767,950
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Eq. 3.2a OLS						
SRI	-0.000483	-0.000458	-0.000242	-0.000474	-0.00045	-0.000234
(Standard Errors)	(0.00035)	(0.00029)	(0.00029)	(0.00035)	(0.00029)	(0.00029)
CRt	0.000124***	5.85e-05*	0.0000485	0.000123***	5.82E-05*	4.82E-05
(Standard Errors)	(4.53E-05)	(3.30E-05)	(3.15E-05)	(4.51E-05)	(3.28E-05)	(3.14E-05)
$\overline{CR}$	-0.000249***	-0.000176***	-0.000177***	-0.000250***	-0.000176***	-0.000177***
(Standard Errors)	(6.40E-05)	(4.87E-05)	(4.92E-05)	(6.39E-05)	(4.86E-05)	(4.91E-05)
CRt*SRI	-0.00154*	-0.000499	-0.000603	-0.000116	-0.000448	-0.000552
(Standard Errors)	(0.00091)	(0.00074)	(0.00068)	(0.00074)	(0.00074)	(0.00068)
$\overline{CR}$ *SRI	-0.000168	0.00127	0.00115	0.000755	0.0012	0.00108
(Standard Errors)	(0.00075)	(0.00093)	(0.00088)	(0.00104)	(0.00093)	(0.00088)
TNA	-1.98E-09	2.40e-08**	2.78e-08***	-2.31E-09	2.37E-08**	2.75E-08***
(Standard Errors)	(8.47E-09)	(9.49E-09)	(9.87E-09)	(8.45E-09)	(9.41E-09)	(9.79E-09)
First offer date	-1.78e-07***	-1.02e-07***	-9.14e-08***	-1.76e-07***	-1.00E-07***	-9.02E-08***
(Standard Errors)	(1.94E-08)	(1.46E-08)	(1.44E-08)	(1.98E-08)	(1.50E-08)	(1.48E-08)
Control for objective	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.00828***	-0.00974***	-0.00913***	-0.00831***	-0.00977***	-0.00915***
(Standard Errors)	(0.00206)	(0.00207)	(0.00189)	(0.00206)	(0.00207)	(0.00189)
Observations	761,945	761,945	761,945	761,747	761,747	761,747
Adj. R-squared	0.004	0.003	0.003	0.004	0.003	0.003

[a] Regression with control variables

Table 5.10B. Hypothesis 3 Panel Data FE Analysis - Randomized Sample
Effects of horizon and activity on monthly Abnormal Returns conditional on the SRI status

	Net AR			Gross AR		
Variables	*CAPM*	*Fama-French*	*Carhart*	*CAPM*	*Fama-French*	*Carhart*
Eq. 3.2 FE						
SRI	-0.000628*	-0.000383	-0.000189	-0.000624*	-0.00038	-0.000186
(Standard Errors)	(0.00032)	(0.00028)	(0.00029)	(0.00032)	(0.00028)	(0.00029)
CRt	7.74E-05**	5.76E-05*	4.76E-05*	7.70E-05**	5.73E-05*	4.73E-05*
(Standard Errors)	(3.29E-05)	(2.96E-05)	(2.79E-05)	(3.27E-05)	(2.94E-05)	(2.77E-05)
$\overline{CR}$	-0.000275***	-0.000227***	-0.000228***	-0.000275***	-0.000228***	-0.000228***
(Standard Errors)	(5.86E-05)	(5.04E-05)	(5.02E-05)	(5.87E-05)	(5.04E-05)	(5.03E-05)
CRt*SRI	-0.000832	-0.00102*	-0.00109**	-0.000757	-0.000951	-0.00102*
(Standard Errors)	(0.00059)	(0.00060)	(0.00055)	(0.00059)	(0.00060)	(0.00055)
$\overline{CR}$ *SRI	0.00171**	0.00185**	0.00167**	0.00163**	0.00177**	0.00159**
(Standard Errors)	(0.00081)	(0.00078)	(0.00074)	(0.00082)	(0.00078)	(0.00075)
Constant	-0.000107**	-0.000644***	-0.000667***	-0.000108**	-0.000644***	-0.000667***
(Standard Errors)	(5.14E-05)	(4.04E-05)	(4.15E-05)	(5.14E-05)	(4.04E-05)	(4.15E-05)
Observations	768,238	768,238	768,238	767,950	767,950	767,950
Adj. R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Nr. of months	192	192	192	192	192	192
Eq. 3.2a FE						
SRI	-0.000102	-0.000277	-7.66E-05	-9.08E-05	-0.000267	-6.63E-05
(Standard Errors)	(0.00035)	(0.00029)	(0.00030)	(0.00036)	(0.00030)	(0.00030)
CRt	6.30E-05**	4.60E-05*	3.70E-05	6.22E-05**	4.53E-05*	3.62E-05
(Standard Errors)	(3.07E-05)	(2.77E-05)	(2.66E-05)	(3.03E-05)	(2.74E-05)	(2.63E-05)
$\overline{CR}$	-0.000210***	-0.000170***	-0.000172***	-0.000210***	-0.000170***	-0.000172***
(Standard Errors)	(5.39E-05)	(4.54E-05)	(4.64E-05)	(5.38E-05)	(4.53E-05)	(4.63E-05)
CRt*SRI	-0.000827	-0.000984	-0.00106*	-0.000776	-0.000935	-0.00101*
(Standard Errors)	(0.00060)	(0.00060)	(0.00056)	(0.00060)	(0.00060)	(0.00056)
$\overline{CR}$ *SRI	0.00137	0.00171**	0.00157**	0.0013	0.00165**	0.00150*
(Standard Errors)	(0.00089)	(0.00081)	(0.00077)	(0.00090)	(0.00081)	(0.00078)
TNA	3.85E-08***	3.83E-08***	4.05E-08***	3.86e-08***	3.84E-08***	4.05E-08***
(Standard Errors)	(1.15E-08)	(1.11E-08)	(1.14E-08)	(1.15E-08)	(1.11E-08)	(1.14E-08)
First offer date	1.61E-09	-7.34E-09	-4.63E-09	3.71E-09	-5.29E-09	-2.62E-09
(Standard Errors)	(1.69E-08)	(1.43E-08)	(1.44E-08)	(1.72E-08)	(1.46E-08)	(1.46E-08)
Control for objective	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.00998***	-0.0105***	-0.00985***	-0.0100***	-0.0106***	-0.00988***
(Standard Errors)	(0.00201)	(0.00206)	(0.00188)	(0.00201)	(0.00206)	(0.00188)
Observations	761,945	761,945	761,945	761,747	761,747	761,747
Adj. R-squared	0.004	0.003	0.003	0.004	0.003	0.003
Nr. of months	192	192	192	192	192	192

[a] Regression with control variables