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The Impact of CSR Ratings on Stock Prices

An event study on the impact of the publication of the Folksam Index of Corporate Social Responsibility on the share value of Swedish listed companies

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Abstract

It has become increasingly common for Swedish listed companies to invest in CSR (Corporate Social Responsibility) to gain a competitive advantage. However, there are conflicting views as to how a company's corporate social responsibility affects its short-term stock value. This thesis aims to investigate how the announcement of a CSR rating affects stock prices of companies listed on the Stockholm Stock Exchange (Nasdaq OMX Stockholm), and whether any potential impact differs across industries. An event study was performed to measure the impact of the publication of the *Folksam Index of Corporate Social Responsibility* on stock prices. The twenty companies with the highest ratings, the twenty companies with the lowest ratings and the companies without a rating were selected each of the five years that the index has been released. Additionally, top-ranked and bottom-ranked firms for nine industries were analyzed. Cumulative abnormal returns were calculated after the publication to determine whether stock prices were affected by the release of the rating. The results conclude that, overall, a bottom ranking has a negative impact on a company's share price, whereas a top ranking has no effect. This impact, however, varies across industries.

Tutor: Katerina Hellström
Keywords: Corporate Social Responsibility, Rating Announcement, Event Study, Abnormal Returns

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1. Introduction

Although a challenge to measure its impact, it has become increasingly common for Swedish listed companies to invest in CSR (Corporate Social Responsibility) as a business strategy to create value. Going beyond just complying with laws and regulations, many Swedish companies incorporate CSR as a systematic way to take responsibility of economic, environmental and social impacts. Not only are Swedish companies investing in CSR - the Swedish government has appointed a CSR ambassador to take on a leadership role in debates and discussions. Sweden's CSR ambassador claims that Swedish companies are at the forefront of CSR issues, and are consequently sought after by the market. (Utrikesdepartementet 2011). Therefore, it is of relevance to examine the impact of Swedish listed companies' CSR initiatives on their stock values.

Studies suggest that CSR rating agencies have a global impact on the behavior of large corporations and their stakeholders (Cellier, Chollet 2010). There is extensive literature on the relationship between CSR and financial performance, but very few investigate the impact of CSR ratings on the share prices of Swedish listed companies. It is therefore of interest to determine whether the Swedish stock market reacts to the publication of a CSR rating.

The objective of this thesis is to empirically investigate and analyze the effects of CSR ratings on companies listed on the Stockholm Stock Exchange (Nasdaq OMX Stockholm). The aim is to test whether the announcement of a CSR rating has an impact on the share price of a company, and to determine whether any potential impact differs across industries.

There are conflicting theories as to how a company's corporate social responsibility affects its short-term stock value. The most prominent advocate of CSR is Freeman (1984), who states that companies have obligations to a broad group of stakeholders and that resources should be used in a manner that goes beyond maximizing the benefit of stockholders. According to Freeman's stakeholder theory, companies must act in a manner that is consistent with society's expectations in order to be successful. Friedman (1970) on the other hand, argues that, from an investor's perspective, the key to success is maximizing market capitalization and return. Accordingly, the stockholder theory brings forth the idea that a company's improvements within CSR will incur additional expenses, leading to a negative stock price

reaction.

From the defined purpose, the following questions arise:

> *What impact does the release of a CSR rating, high or low, have on the share price of a company listed on the Stockholm Stock Exchange? Furthermore, does this impact differ across industries?*

The study is limited to investigate the effects of the publication of the *Folksam Index of Corporate Social Responsibility*. Released for the first time in 2006, the *Folksam Index of Corporate Social Responsibility* is the first index to annually analyze the public reports of Swedish listed companies based on their CSR policies. The index evaluates companies' capacities to manage environmental and social concerns. Through these components, the evaluation examines to what extent the company has a management system that includes criteria that can be traced to the Ten Principles of the United Nations Global Compact. As a result, the *Folksam Index of Corporate Social Responsibility* rates all components of CSR and presents an evaluation of a company's overall CSR efforts, making it ideal for the purpose of this thesis.

An event study will be conducted to analyze the impact that the publication of the *Folksam Index of Corporate Social Responsibility* has on the stock value of firms. Companies are ranked on the basis of their combined CSR rating scores. The companies selected for study are the twenty companies with the highest ranking, the twenty companies with the lowest ranking and the companies without a rating each year. Additionally, the same method will be applied to industry classifications to evaluate how the impact may differ across industries.

In the following section, existing theories and research on the subject of CSR and its effect on the stock value of a firm are presented. Subsequently, the selection criteria and the data collection process of the samples are described. Next, the steps of how the event study is performed are outlined and thereafter, the results obtained from conducting the event study are presented. These results are then interpreted and analyzed in relation to previous research. Finally, a discussion regarding the results of the study and what they entail is given in the conclusion.

2. Theory

In this section, existing theories and previous research concerning CSR and its effect on companies' stock value is accounted for. Previous research regarding the relationship between CSR and shareholder value has produced contradicting results. Existing literature is able to support four possible outcomes in terms of the direction of any potential relationship: negative, neutral, positive or varying.

CSR is a concept in which businesses operate in a manner that accounts for the social and environmental impact that it creates. The United Nations Global Compact asks companies to take their corporate social responsibility and to "embrace, support and enact, within their sphere of influence, a set of core values in the areas of human rights, labor standards, the environment, and anti-corruption," (*Corporate Sustainability in the World Economy: United Nations Global Compact.* 2011). Companies are increasingly adopting CSR policies and stating them in sustainability reports.

In the context of this study, it is posited that investors track socially responsible companies and such indices, and that a significant deviation or announcement of changes in the index are reflected by an abnormal return of these firms in the capital market. Share prices should reflect the fundamental expected value of the stock. This relates to the concept of the signaling theory.

The signaling theory originates from the presence of asymmetric information where, "one group of participants has superior or more timely information than other groups" (Copeland, Weston et al. 2005). Signaling theory implies that less-informed parties, eg. shareholders, use signals from well-informed parties when making decisions. As a result, the market will react to various events based on the market's assumptions concerning the message such information conveys. Thereby, one may presume that the release of CSR information acts as a signal to investors and will have an immediate impact on stock prices. The effect of the publication of a CSR rating will depend on the signal that the released information gives to potential investors. If investors regard a specific rating as positive information, the market should react positively, and vice versa.

According to the theory of Efficienct Market Hypothesis, investors are both rational and fully informed (Fama 1970). As a result, any news concerning an announcement relating to an event that affects one or more factors determining the core value of the stock will result in an instantaneous reevaluation of the expected value of that stock. The Efficient Market Hypothesis states that investors continuously stay up to date on all company information regarding rational expectations of a company's future cash flows and its riskiness, and take this into account when determining the value of the company. A security's market price always fully reflects the rational and true value of the company (Fama 1970). Fama specifies three forms of the Efficient Market Hypothesis, which are dependant on how stock prices absorb information: weak, semi-strong and strong. According to the weak form, all historical price patterns are reflected in the stock prices. In the strong efficiency form, all available value-relevant information is already reflected in stock prices, eliminating any possibilities of making excess return. The semi-strong form suggests that the current stock price accurately reflects a wide amount of public information about the company, including any new value-relevant information that has just been published.

In the context of this study, the market is assumed to be semi-strong efficient, suggesting that when a company publicly engages in a socially responsible manner, current and potential investors will take those actions and consequences into consideration when deciding whether or not to buy or sell that company's stock. When unexpected value-relevant information concerning a company's CSR is released on the market, the price of a company's shares should immediately and unbiasedly be modified to reflect this information.

In accordance with this perspective, the impact of the publication of the *Folksam Index of Corporate Social Responsibility* should be predicted based on a theoretical framework that evaluates the effect that CSR may have on the elementary value of the stock. A crucial issue in this study is, therefore, determining the direction of the relationship between CSR and stock prices.

2.1 Theory supporting a negative relationship

According to the neo-classical theory, expenditures in CSR activities will put the company at a competitive disadvantage due to the added expenses incurred, and thus there is a negative correlation between the investments in CSR and market performance (Aupperle, Carroll et al.

1985). Essentially, a majority of improvements made within CSR cause costs to increase, hence investing in such CSR activities incur costs that could be avoided, or that would otherwise have been borne by others than shareholders.

Milton Friedman, a known advocate of the stockholder theory, argues that, "There is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception and fraud," (Friedman 1970). Friedman asserted that the management of public companies are agents for the shareholders of a company, and therefore, it is their sole responsibility to act in the interest of shareholders. In accordance with this theory, an investment within CSR expropriates shareholder wealth to the benefit of other parties, and should lead to a decrease in share prices. This theory is supported by Dupré et al's (1984) findings that firms considered to be 'ethical' have a lower medium return when compared to similar non-ethical companies, and thus investors pay for CSR. They explain this lower return as a potential 'financial sacrifice' accepted by investors of ethical companies in order to hold 'ethical stocks'.

There are a number of studies that support the neo-classical view of a negative link between corporate social responsibility and market performance. Jaggi and Freedman (1992) as well as Walley and Whitehead (2004) found that large environmental investments and high-ranking environmental performance only heighten costs, resulting in reduced revenues and lower market values. Consequently, it can be deduced that the relationship between environmental performance and a firm's market value is expected to be negative.

Hassel et al. (2005) conducted one of the first studies of the value relevance of environmental performance on the Swedish market. The results indicated that, "environmental performance ratings complement accounting information, and consequently, that environmental performance has value relevance in the Swedish stock market." They found a significant negative relationship between the environmental performance ratings of listed Swedish companies and their market value, indicating that in terms of environmental performance, firms with high ratings are not highly valued by investors.

2.2 Theory supporting a neutral or insignificant relationship

Several empirical studies have deduced that there are too many other crucial factors and events that affect financial and market performance, and so there is no observable relationship between the extent of a company's CSR performance and the performance of the company (Ullmann 1985).

Hart (1997) conducted an environmental event study and suggested that excess financial returns were the result of the relative environmental capacities of the companies. However, when environmental events were isolated within a narrow window, the dynamics of such events were determined to be unknown. Milne and Chane (1999) performed an experimental study of the relationship between narrative social disclosures and investment decisions, and came to the conclusion that only a small minority of respondents actually made adjustments to their investment decisions based on social disclosures. Similarly, Elsayed and Paton (2005) found that social performance, when measured by the 'Britain's most admired companies' index in terms of 'community and environmental responsibility', had a neutral impact on a firm's performance.

Alexander and Buchholz (1978) calculated differential returns and risk measurements of the securities in social responsibility surveys over a five-year sample period between 1970 and 1974. The results and analysis of their study indicated that the degree of social responsibility exhibits no significant relationship to stock market performance.

2.3 Theory supporting a positive relationship

Numerous theories and studies support a positive link between CSR and stock market performance.

The stakeholder theory of the firm states that managers have obligations to a broad group of stakeholders and that resources should be used in a manner that goes beyond maximizing the benefit of stockholders (Freeman 1984). This theory gives rise to the notion that companies should consider the impact that corporate activities and policies have on all of its constituents (Bird, Hall et al. 2007). The Enlightened Stakeholder Theory recognizes that a determined strategy to only achieve the highest possible shareholder value is unlikely to succeed (Jensen

2001). However, Jensen also maintains that, “no investment or financing should be undertaken by the firm unless the present value of the associated incremental benefits exceeds the present value of the incremental costs,” (Jensen 2001). In accordance with this framework, there are various means by which expenditures on CSR activities may lead to an improved market value. Bird et al. (2007) state that activities with the outcome of immediate cost savings will lead to increased profitability, which may result in a heightened market valuation. Moreover, activities that bring goodwill and reputational benefits, or alternatively dissuade future costly actions by regulatory bodies, will increase profitability and, by extension, market value.

Donaldson and Preston (1995) defined an instrumental aspect of the stakeholder theory and established a framework to examine the links between stakeholder management in practice and the actual achievements of various corporate social performance goals. In line with this framework, Preston and O'Bannon (1997) deduced that meeting the needs of a range of stakeholders will ultimately lead to positive financial results.

The stakeholder analysis suggests that tension exists between the firm's explicit costs (e.g. payments to bondholders) and its implicit costs (e.g. environmental costs). This theory predicts that a firm attempting to lower its implicit costs by implementing socially irresponsible actions will incur higher explicit costs and put the company at a competitive disadvantage. Waddock and Graves (1997) exemplify this and explain that an enlightened employee relations policy may, for example, have a very low cost, but can lead to substantial gains in morale and productivity. Such gains yield a competitive advantage compared to less responsible firms. By extension, such CSR activities will have a positive impact on market performance.

Renneboog et al. (2008) claim that good corporate governance, sound environmental standards and care of stakeholder reflections are associated with higher shareholder value. Hassel, Ljungdahl et al. (2008), state that a high profitability in a publicly listed company should be reflected in an increased share price. If investments within CSR have a positive impact on profitability, it should result in an increased stock market valuation of the company (Ljungdahl, Larsson 2008). A number of studies have been carried out in order to evaluate whether CSR activities act as signals to investors. Jones and Murrell (2001) argue, “a company’s public recognition for exemplary social performance can serve as a positive signal

of the firm's business performance to shareholders." A public recognition of superior social performance signals that a company is committed to the welfare of its employees, enhancing the overall image and reputation of the company. Such long-term positive expectations make the firm more desirable to shareholders and potential investors. In turn, this should, theoretically, be reflected in stock market prices.

Additional studies sustain this positive relationship and show that improvements within CSR lead to cost savings. Thus, companies engaging in CSR are more likely to be rewarded by investors with higher market performance as a result (Lo, Sheu 2007). Porter and van der Linde (1995) claim that a reduction in emissions provides cost savings by increasing efficiency. Dechant et al (1994) argue that it is favorable for a company to be proactive on environmental issues because it reduces future costs associated with having to meet environmental requirements, and presents companies with first mover advantages.

Klassen and McLauglin (1996) advocate that environmental awards can be considered as public signals of both historical and future long-term expectations of company performance. They conducted an event study on the positive impact of environmental rewards received by firms. The results of this study show that announcements of corporate environmental news will induce an increase in share price. Similarly, Wagner (2001) found that environmental event studies clearly show that financial markets react to environmental events. He asserts that positive events lead to a positive market reaction, whereas negative events lead to a negative market reaction. Semenova et al. (2010) revealed that "the community and supplier indicators are positively related to market value". Companies with higher social performance were found to overperform in the market, whereas companies with lower scores achieved lower returns.

2.4 Studies showing a varying relationship

Additional studies show that the relationship between CSR and financial performance varies depending on the magnitude of a company's CSR efforts.

Frooman (1997) concluded that companies engaged in socially irresponsible and illicit behavior suffered in terms of their market valuation. However, there was insufficient evidence to determine if companies behaving in a positive way were rewarded in terms of

their market valuation. In addition, Johnson (2003) found that that firms operating in an illegal or irresponsible manner were punished by investors whereas he could not find evidence suggesting that companies were rewarded by the market if they operated in a manner which goes beyond legal and community standards. Cellier and Chollet (2010) found that an announcement of a high CSR rating has an overall significant positive impact on the stock market. However, when analyzing differernt CSR fields discovered that when it came to environmental performance and human resources, share prices tended to decrease.

Bird et al. (2007) found that being proactive with respect to employment areas, women's rights, and minority issues were rewarded by the market, but found that being proactive in terms of environmental protection had a negative impact. Diversity, employee-related activities and the environment were identified as key concerns to the market, and the overall results suggest that firms that actively pursue CSR, with the exception of excessive expenditure in the area of environmental protection, will be rewarded with higher market returns. Bird et al. concludes that the market values firms that meet minimum requirements in the areas of diversity and environmental protection, but were very proactive in the area of employee relations. Avoiding controversies and meeting minimum legal requirements and norms within CSR areas had a positive effect on financial performance. However, allocating too many resources on CSR issues tended to have a negative effect.

Shane and Spicer (1983) investigated whether stock price changes could be associated with the publication of corporate performance of pollution control information. The study came to the conclusion that the market takes externally produced information into consideration and discriminates firms with lower control management. They proposed that changes in share prices were the result of investors' changing perceptions, in other words, varying degrees of commitment to CSR have different effects on companies' market value. If one does (not) comply with the market's expectations with regards to degree of commitment, it should result in a positive (negative) reaction on stock prices.

2.5 Hypotheses

The weight of these arguments regarding the relationship between CSR and stock market performance suggest that the sign of any relationship between the market value of a firm, measured by stock prices, and its social performance could be in any direction. As a result, a

hypothesis regarding the direction of a relationship between a CSR rating of Swedish listed companies and their stock prices cannot be specified; negative, neutral, positive and varying relationships are all plausible.

To test the impact of the release of a CSR rating, an event study will be conducted, the process of which is further described in the methodology section. Before the event of interest can be investigated, it is crucial to determine the selection criteria for the inclusion of a given firm in the study.

3. Data Collection

In this section the selection criteria and data collection process of the samples are described. First, an account of the chosen samples is provided, and thereafter, an explanation as to how the rankings are obtained and measured follows.

3.1 Samples

Since 2006, Folksam's Department for Responsible Ownership has annually (2010 excluded) compiled and ranked companies on the Stockholm Stock Exchange based on how they account for their sustainability performance. All listed companies' efforts within CSR have been examined, rated and ranked according to the information that the companies themselves chose to present to the public in their annual reports along with published information about these topics in the media.

Companies included in this study are those that have been listed on the Stockholm Stock Exchange on May 31st of each year. As Folksam's *environment* and *human rights* criteria combined give an evaluation of a company's overall CSR efforts, the ratings of these two lists have been summed and companies have been ranked accordingly. The combined rating represents a company's total CSR score. It is posited that investors interested in CSR will look at both the environment and the human rights ratings, and hence it is appropriate to analyze the compounded CSR ratings. As the publication of the two ratings are simultaneous, it is better to look at them together rather than isolating each rating and testing separately. This is to ensure that the results of the event study are as reliable as possible.

The companies selected for this study are the twenty companies with the highest combined rating score and the twenty companies with the lowest combined rating score each year[1]. The study is conducted over five time series: 2006, 2007, 2008, 2009, and 2011[2]. This gives a total of 100 observations of top-ranked firms and 124 observations of bottom-ranked firms. Companies are given ratings based on the information available to the public. However, all Swedish listed companies do not report their CSR activities, as releasing such information is optional. Companies that do not report their CSR practices are referred to as "zero"

[1] If several firms have the same rating, all firms are included in the sample.
[2] These time series were selected because it is during these time periods that CSR data from the *Folksam Index of Corporate Social Responsibility* is available. An Index for 2010 was not compiled.

companies. To evaluate the market's reaction to firms that do not provide information concerning their CSR policies, the "zero" companies will be investigated as a separate sample, with a total number of 56 observations.

Additionally, to investigate whether the trend between CSR and market returns varies across industries, the firms listed on the Stockholm Stock Exchange have been categorized. The industry classification used in this study is the same as that used in the *Folksam Index of Corporate Social Responsibility* and is based on the MSCI / Standard & Poor's Global Industry Classification Standard (GICS). The index is comprised of 16 industries, out of which nine were found to have enough observations to provide a sample for the study. For each of these industries, the six firms with highest combined scores and the six firms with the lowest combined scores are selected each year. This gives a total of 18 samples for the industry analysis (two per industry), with a minimum sample size of 30 observations.

A complete list of all industries is found in Appendix 1.
The industries selected for the study are:

1. Materials
2. Capital goods
3. Commercial & Professional Services
4. Consumer Durables, consisting of:
    - Automobiles & Components
    - Consumer Durables & Apparel
    - Consumer Services
5. Health Care, consisting of:
    - Health Care Equipment & Services
    - Pharmaceuticals, Biotechnology & Life Sciences
6. Financials, consisting of:
    - Banks
    - Diversified Financials
    - Insurance
7. Real Estate
8. Software & Services
9. Technology Hardware & Equipment

Financial data, in the form of historical share prices, are taken from the international database, *Thomson Financial Datastream*.

A more detailed account of the rating criteria is given in the following section.

3.2 Measuring CSR- The Folksam Index of Corporate Social Responsibility

The *Folksam Index of Corporate Social Responsibility* index evaluates companies' capacities to manage environmental and social concerns. More specifically, the index aims to examine to what extent the company has a management system that includes criteria that can be traced to the UN Global Compact.

Five essential components of a management system are examined for each of the criteria:

1. *Policy*: Does the company have a relevant policy, e.g. to promote health and safety?
2. *Management System*: Are there procedures and an organization that can ensure compliance with the policy?
3. *Plans / Programs*: Is the policy broken down into relevant targets where there are concrete plans of action?
4. *Accounting*: Does the entity report information that makes it possible to assess the extent of improvement achieved?
5. *Verification*: Does a third party verify the management system?

For the purpose of this study, the companies have been ranked according to the sum of the *environmental* and the *human rights* ratings. A description of each separate analysis and corresponding rating criteria is provided below.

3.2.1 Environment

The environmental analysis provides an indication of an individual company's readiness to handle the environmental risks that fall within the business, and is divided into two main areas:

1. General assessment of environmental management systems
2. Control of significant direct or indirect environmental impact

Figure 1: Components of the Environmental Analysis

Area	Criteria
Environmental Management Systems	Environmental policy & plans
	Management & organization
	External certification
	Environmental accounting
	Supply chain management
Environmental Performance	Emission of greenhouse gases
	Energy consumption
	Industry specific criteria

Source: own illustration, based on Folksam 2011

The analysis of the reported information regarding the company's *environmental management system* includes five criteria. The first, environment policy & plans, is an assessment of the company's overall ambition of the environmental work in which explicit proactive ambition is rewarded. The next two criteria, management & organization and external certification, assess the degree to which a management system is implemented in the organization and whether these are certified with a relevant standard. Finally, the overall quality of the environmental statement and the extent to which suppliers are incorporated into the management system are evaluated.

Environmental performance analyzes a company's ability to manage its significant environmental impact. This is achieved by a customized assessment on a number of key parameters. Energy consumption and greenhouse gas emissions are criteria evaluated for all companies, regardless of industry. Examples of industry-specific criteria are the emission of environmental and hazardous substances to air, land and water, the use of hazardous substances, product development, and transport usage.

3.2.2 Human Rights

The human rights rating aims to assess a firm’s preparedness to manage business risks, and is divided into three main areas:

1. Employee rights
2. Community
3. Human rights in the supply chain

Through these areas, this rating covers the components of CSR not already covered in the environmental index.

Figure 2: Components of the Human Rights Analysis

Area	Criteria
Employees	Health & safety
	Discrimination
	Freedom of association
	Work & wages
	Child labor
	Force labor
Community	Business-related responsibility
	Corruption
Supply chain	Codes of conduct
	Verification systems
	Accounting and Reporting

Source: own illustration, based on Folksam 2011

Put simply, the three main areas represent the three major stakeholders of CSR. The first area, employees, includes the criteria: health and safety, discrimination, freedom of association, work & wages, child labor, and forced labor.

The second part of the human rights analysis evaluates a company's impact on the surrounding community. An essential criterion for this area concerns a company's preparedness to prevent the occurrence of corruption. In addition, there are business-related criteria such as the anchoring of a company's activities in local communities. The last criterion deals with business-related responsibilities, including aspects such as consultations on significant operational changes, knowledge transfers and more. Some industries are also assessed on how the company designs security arrangements that affect neighboring communities, and its preparedness to deal with social issues directly.

The third and final part of the analysis evaluates companies' accounts of how they act to promote human rights in the supply chain. Companies are assessed on their codes of conduct, along with their implementation and verification systems for these policies. For industries where it may be difficult to discern any clear set of core suppliers, the main group of suppliers is excluded from the evaluation.

3.2.3 Rating Assessment

Companies are awarded points for each criterion under investigation. Full points are awarded if all five sought after components have been identified in the company's reporting, or if there are any other clear indications that the company is well prepared in the given areas. For each subject area, the number of points awarded for each criterion is summed and an average value is calculated. Thereafter, the companies are assigned ratings based on the average value intervals. The companies are given separate ratings for environment and for human rights. As previously mentioned, for the purpose of this study, these scores are summed to obtain a total CSR rating and ranked accordingly.

After the chosen data samples have been selected according to the defined selection criteria, the effect of the CSR rating publication on the market value of the firms in each respective sample will be investigated by an event study.

4. Methodology

In this section, a description of how the study has been conducted is given. The steps of the event study performed and corresponding event definition, estimation window and calculations of normal and abnormal returns are presented. The section ends with an account of the testing procedures of the study.

An event study uses financial market data to measure the impact of a particular economic event on the market value of a company by evaluating the extent to which stock prices react to a particular piece of news (Henderson Jr. 1990). Price reactions are represented by abnormal returns i.e. stock returns adjusted for normal daily stock prices and market index movements. Test statistics are investigated to conclude if observed abnormal returns can be attributed to the event being examined. The usefulness of such a study results from the idea that, given rationality in the market, the effect of an event will immediately be reflected in share prices (MacKinlay 1997). Thereby, the economic impact of an event can be measured by observing changes in share prices over a relatively short period of time.

The concept of abnormal returns, or more specifically, cumulative abnormal returns, is central to the event study methodology (Serra 2002). The overall strategy is to measure the abnormal return of a security as a result of a specific event. The abnormal return is a direct measure of unexpected changes in the security in connection with the event (Kothari, Warner 2006). An event study methodology is used in this study as a way of quantifying the immediate short-run effect the release of a CSR rating, determined by the publication *Folksam Index of Corporate Social Responsibility*, has on companies' stock prices.

The outline of the event study is comprised of an event definition, assessment of the estimation window and event window, a model for calculating normal and abnormal returns, and a testing procedure. The event study will be performed on the previously described samples.

4.1 Event definition and Event Window

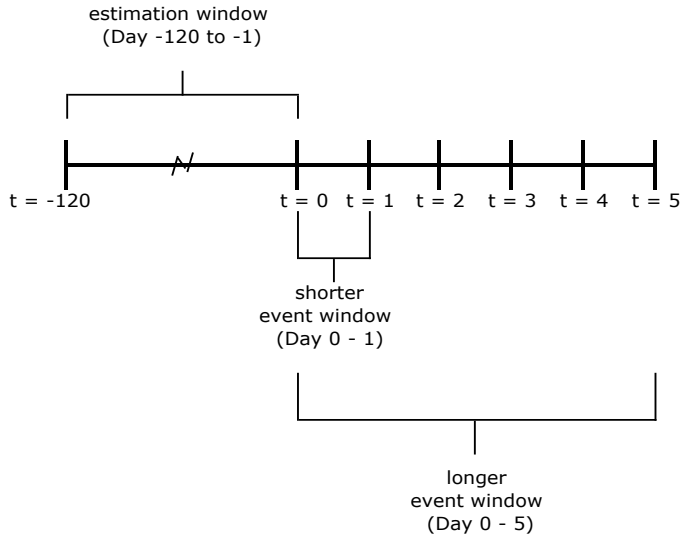
The initial task when carrying out an event study is to define the event of interest and identify the period over which security prices will be investigated, i.e. defining the event window

(Campbell, Lo et al. 1997). In this study, the event is the publication of the *Folksam Index of Corporate Social Responsibility*. The choice of event date is essential for estimating the event window (MacKinlay 1997). The most relevant date regarding the event is the day of the press release of the index each year, as this is the first time the market is exposed to each year's ratings of the Swedish listed companies. The press release takes place between November and December every year. This date is hereafter referred to as Day 0.

It is common practice to define the event window to be greater than the specific area of interest, as this permits the periods surrounding the event to be examined. According to Lorraine, Collison et al. (2004), it typically takes up to one week for the stock market to respond to news regarding a company's environmental performance. As the environmental ratings of the companies are key components of the study, this implies that the event window should be expanded by five trading days in order to capture the full effect. However, event studies are most accurate immediately after an event. The longer the period of time, the greater the uncertainty regarding the reason for potential share price changes. In accordance with this viewpoint, the event window should be tight around the event, minimizing the impact of other noise. In practice, the event window is often expanded to two days, the day of the announcement, Day 0, and the day after the announcement, Day 1, (MacKinlay 1997). This is done to capture the price effects of the announcements that occur after the stock market closes on the event date.

To ensure that the effect of the event is not missed, while still preventing noise from affecting the results, the event study will be performed using two different event windows. Average cumulative abnormal returns will first be calculated over a shorter event window (Day 0-1) and thereafter, a longer event window is applied (Day 0-5). An illustration of the event study timeline is given in Figure 3 on the following page.

Figure 3: Event Study Timeline



* t represents the day in the event study, where t = 0 is the event date

4.2 Normal returns, abnormal returns and the estimation window

In order to assess the event's impact on stock prices, a measure of abnormal returns must be obtained. The abnormal returns are the ex post returns less the normal returns of the firms over the event window (Campbell, Lo et al. 1997). These are the returns "that would be expected if the event did not take place," (MacKinlay 1997).

For firm i and event date t the abnormal return is:

$$AR_{it} = R_{it} - E(R_{it}|X_{\tau}),$$

where AR_{it}, R_{it} and $E(R_{it}|X_t)$ are the abnormal, actual and expected normal returns respectively for the time period t, and X_t is the conditioning information regarding the normal return model.

To calculate actual returns, daily stock prices are retrieved from *Thomson Financial Datastream*. These prices have been adjusted to the effect that capital actions have on share prices.

Actual daily stock returns are calculated as follows:

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}}$$

$$where,$$
$$P_{it} = closing\ price\ for\ security\ i\ at\ day\ t$$
$$P_{it-1} = closing\ price\ for\ security\ i\ at\ day\ t-1$$

Before abnormal returns can be calculated, a model of normal returns must be defined. There are several approaches to calculating normal returns in an event study, the most common of which is a one-factor model, known as the market model. Generally, "the gains from employing multifactor models for event studies are limited," (MacKinlay 1997), and therefore, the one-factor market model will be used in this study.

The one-factor market model is a statistical model that assumes a stable linear relation between the market return and the security return (Campbell, Lo et al. 1997). This model relates the return of a given security to the market portfolio return. A linear regression based on ordinary least squares (OLS) is used to estimate a normal return.

For any security i we have:

$$R_{it} = a_i + \beta_i R_{mt} + \varepsilon_{it}$$
$$E(\varepsilon_{it} = 0) \qquad var(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$$

$$where,$$
$$R_{it} = the\ rate\ of\ return\ of\ firm\ i\ on\ day\ t$$
$$a_i \text{ and } \beta_i = intercept\ and\ slope\ estimators$$
$$R_{mt} = return\ of the\ market\ index\ on\ day\ t$$
$$\varepsilon_{it} = zero\ mean\ disturbance\ term$$

R_{it} and R_{mt} represent the period-t returns on security i and the market portfolio, respectively, where ε_{it} is the zero mean disturbance term. Alpha and beta are predicted by ordinary least squares (OLS) regression on the estimation period.

The market return is calculated as:

$$R_{mt} = \frac{P_{mt} - P_{mt-1}}{P_{mt-1}}$$

$$where,$$
$$P_{mt} = closing\ price\ of\ the\ Stockholm\ Stock\ Exchange\ on\ day\ t$$
$$P_{mt-1} = closing\ price\ of\ the\ Stockholm\ Stock\ Exchange\ on\ day\ t-1$$

After the normal performance model has been selected, the parameters of the model must be estimated using a data subset known as the estimation window. It is through this estimation window that normal returns are approximated. The estimation window in this study is chosen to be the 120 trading days prior to the event window, as is proposed by MacKinlay (1997) when dealing with daily data and using the market model. To ensure that the event itself does not influence the estimates of the normal performance parameters, the event window is not included in the estimation window.

When estimating normal performance, it is necessary to appreciate a_i (the intercept) and β_i (the coefficient of the independent variable). A separate regression for each company of the day-to-day differences in stock returns as well as the differences in day-to-day market returns over the estimation window is performed. These regression equations are then used to predict normal returns during the event window. The independent term in the equation used to predict normal performance is the value-weighted return of the index of all companies listed on the Stockholm Stock Exchange.

Once the parameters for the normal performance model are estimated, the abnormal returns are calculated. As previously defined, the abnormal return amounts to the difference between the actual return on a certain day and the normal return of the stock.

Using the market model as the normal performance model, the abnormal returns are calcuated as follows:

$$AR_{i\tau} = R_{i\tau} + \widehat{a_i} - \hat{\hat{\beta}}_i R_{mt}$$

$$where,$$
$$AR_{it} = the\ abnormal\ rate\ of\ return\ of\ firm\ i\ on\ day\ t$$
$$R_{it} = the\ rate\ of\ return\ of\ firm\ i\ on\ day\ t$$
$$a_i\ and\ \beta_i = intercept\ and\ slope\ estimators$$
$$R_{mt} = return\ of\ the\ Stockholm\ Stock\ Exchange\ on\ day\ t$$

The cumulative abnormal returns over the event period are then calculated by aggregating the abnormal returns across stocks.

$$CAR_{i(t,t+k)} = \sum_{t=day-1}^{t+k} AR_{it}$$

$$where,$$
$$CAR = cumulative\ abnormal\ returns$$
$$t = first\ day\ in\ event\ window$$
$$k = number\ of\ days\ in\ event\ window$$

Next, the average abnormal returns and the average cumulative abnormal returns are calculated as:

$$\overline{AR}_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it}$$
$$where,$$
$$\overline{AR}_t = average\ abnormal\ returns\ on\ day\ t$$

and

$$\overline{CAR}_{(t,t+k)} = \sum_{t=day-1}^{t+k} \overline{AR}_t$$
$$where,$$
$$\overline{CAR}_{(t,t+k)} = cumulative\ average\ abnormal\ returns$$

Thereafter, statistical t-tests and non-parametric tests are used to test whether the average cumulative abnormal returns are significantly different from zero or not. This testing procedure is outlined in the following section. All calculations are performed in Stata and Excel.

4.3 Testing Procedure

According to Keller (2005), hypothesis testing is a process of making inferences to decide whether there is enough statistical proof to draw a conclusion as to whether a hypothesis on a parameter is supported by data. In this study, the method of hypothesis testing will be applied to investigate the significance of average cumulative abnormal returns. As a hypothesis regarding the direction of any potential relationship was not established, the view of a neutral relationship will be substituted as a null hypothesis and will be tested against the double-sided alternative that the relationship is either positive or negative. More specifically, in order to perform the testing procedure, the null hypothesis is that the average cumulative abnormal return during the event window is zero, i.e. there is no market reaction to the publication of the CSR ranking.

There are two types of statistical hypothesis tests that can be applied to event studies, namely parametric tests and non-parametric tests. As concluded by MacKinlay (1997), and in accordance with most research literature, a test of abnormal returns induced by an event should comprise of both types of tests. Brown and Warner (1985) suggest that although each test has its own good traits, they should not be used in isolation, but rather in conjunction with the other.

As the most common parametric test for an event study is a simple t-test (Serra 2002), a t-test will be used in the study. As a theoretical direction between a CSR rating and share prices could not be established through previous research, a double-sided test will be performed. Both whether the average cumulative abnormal return is greater than zero and whether it is less than zero will be tested against the possibility that the average cumulative abnormal return is equal to zero. The results from the t-test will be tested at a significance level of 5%, corresponding to a critical t-value of 1.96. If the absolute value of the calculated t-value is greater than 1.96, there is evidence supporting that the average cumulative abnormal return is different from zero. If this is the case, it can be inferred that the abnormal returns are due to

the publication of the CSR rating. Equivalently, if the t-value is less than the critical value of 1.96, there is evidence that the market is not affected by the publication of a CSR rating.

A parametric t-test is simple and easy to use, but it is subject to the five Gauss-Markov assumptions[3] (Thatcher, North et al. 2005). If these assumptions hold true, the power of a parametric test is larger than that of a non-parametric test. Nevertheless, when such assumptions do not hold, a non-parametric test is superior. The principal advantage of non-parametric tests is that the distribution of the return need not be normal. When dealing with the potential problem of violated assumptions, the use of both parametric and non-parametric tests allows the researcher to check the robustness of the the parametric test (MacKinlay 1997).

The most common types of non-parametric tests used in event studies are sign tests and rank tests (MacKinlay 1997). In this study, the sign test and the Wilcoxon signed-rank test are both conducted. In regards to this study, both of these tests examine whether or not the median of the average cumulative abnormal returns differ from zero. As with the parametric t-test, the Wilcoxon signed-rank test is a double-sided test. The sign test, on the other hand, tests three different alternatives: the double-sided alternative that the average cumulative abnormal return does not equal zero, and the one-sided alternatives that the average cumulative abnormal return is greater than zero and that the average cumulative abnormal return is less than zero. These non-parametric tests will also be tested at a 5% significance level, meaning that the idea that the cumulative abnormal return is zero can be rejected if the p-value is less than or equal to 0.05.

[3] First, expected value of the error term, or the abnormal return in this case, is zero. Second, there is no correlation between the abnormal returns. Third, all the abnormal returns are homoscedastic, i.e. have the same variance. Fourth, the abnormal returns and the actual returns are independent. Fifth, the abnormal returns follow a normal distribution.

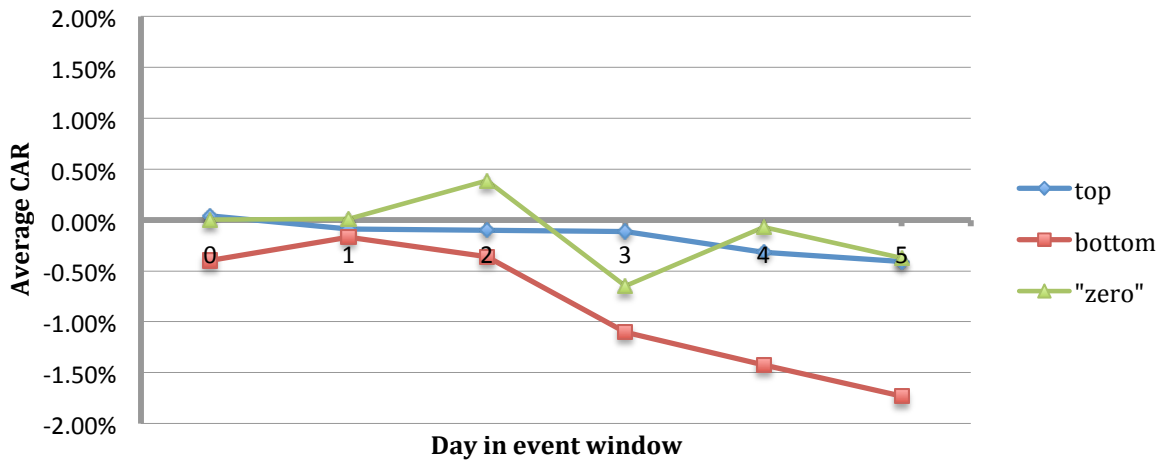
5. Results

The following section presents the results obtained from conducting the event study. The aim is to clarify whether significant evidence can be found to determine whether or not abnormal returns surrounding the event window is present or not. The average cumulative abnormal returns for the top, bottom and "zero" samples of the general samples are graphed first and the results of both the parametric and non-parametric tests conducted on each respective sample over the two event windows are presented. Next, the results for top and bottom samples of each industry ranking respectively are accounted for.

5.1 General

The average cumulative abnormal returns for the general samples are graphed in Figure 4 below.

Figure 4: Average CAR for top, bottom and "zero" rankings in the general sample



The average cumulative abnormal returns for the "zero" companies sample fluctuates greatly on a daily basis, from which no obvious conclusions regarding a trend can be drawn. The top-ranked sample is initially slightly positive at Day 0 before falling at Day 1 and remaining negative over the remainder of the event window. The bottom-ranked sample exhibits negative average cumulative abnormal returns over the event window, rising slightly between Day 0 and Day 1 before falling over the event window, indicating a negative relationship.

The results of the tests for significance are presented in Table 1.

Table 1: Tests for significance of average CAR for top, bottom and "zero" samples in the general ranking

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	100	-0.0871%	-0.32	0.7596	0.3822	0.6914	0.7644
	Bottom	124	-0.17033%	-0.44	0.7562	0.7646	0.2943	0.5587
	"Zero"	56	0.01065%	0.03	0.568	0.8252	0.2522	0.5044
Day 0-5	Top	100	-0.4076%	-0.89	0.4895	0.6914	0.3822	0.7596
	Bottom	124	-1.7298%	-2.74*	0.0022*	0.9995	0.001*	0.002*
	"Zero"	56	-0.37501%	-0.38	0.922	0.4469	0.6556	0.8939

* significant at 5% significance level

The parametric and non-parametric tests conclude that none of the samples have statistically significant average cumulative abnormal returns over the 'Day 0-1'-window. When analyzing the 'Day 0-5'-window, the results of the bottom-ranked sample indicate that there is a negative average cumulative abnormal return. The t-value of -2.74 indicates that the average cumulative abnormal return of -1.73% is significant according to the t-test. This is reinforced by p-values in both of the parametric tests. The Wilcoxon signed-rank test shows that the average cumulative abnormal return is significantly different from zero, and the sign test indicates that the average cumulative abnormal return is significantly negative.

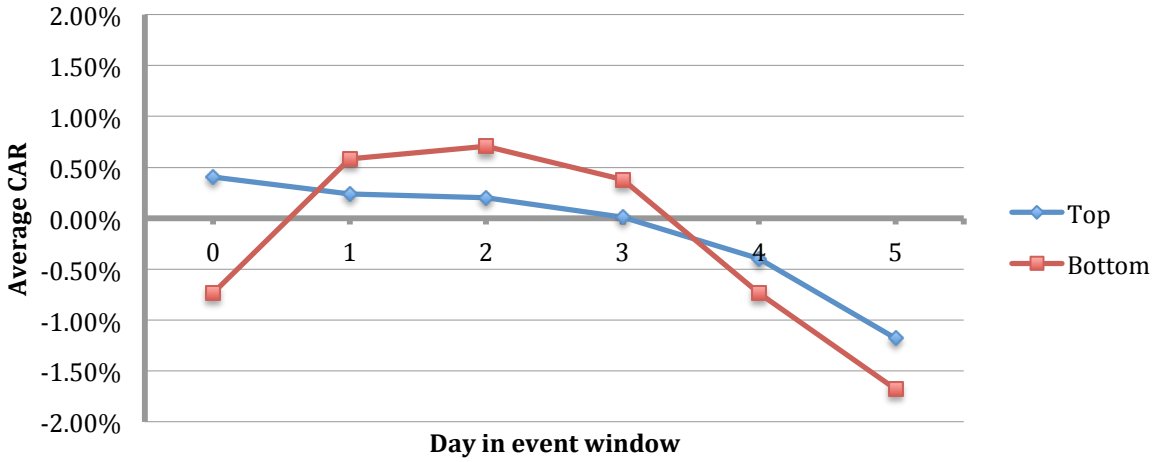
None of the tests have indicated that the publication of a top CSR ranking has any significant effect. Although a slight negative trend is observed, this is proven to be statistically insignificant. Similarly, the "zero"-ranked sample does not result in any significant test statistics.

Overall, the results from the event study conducted on the general samples indicate that there is a negative relationship between a bottom CSR ranking and stock prices, whereas an insignificant correlation exists between stock prices and a top or "zero" ranking. In other words, if a company works with CSR issues but does so inadequately, the market reacts negatively. However, the market does not seem to respond to a high CSR rating.

5.2 Industry: Materials

The average cumulative abnormal returns for the top-ranked and bottom-ranked samples in the materials industry are graphed in Figure 5.

Figure 5: Average CAR for top and bottom rankings in the materials industry



The top-ranked sample initially exhibits a positive average cumulative abnormal return and then displays a negative trend, where the average cumulative abnormal return continuously falls over the event window. The average cumulative abnormal return for the bottom-ranked sample is negative at the outset, increases to become positive up to Day 2 at which it starts to decrease and becomes negative again at Day 4. Hence, no obvious relationship can be observed from the average cumulative abnormal return over the two event windows for the bottom-ranked sample.

The results of the tests for significance of the event study performed on the materials industry are presented below in Table 2.

Table 2: Tests for significance of average CAR for top and bottom ranking in the materials industry sample

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	0.2363%	0.44	0.9099	0.5722	0.5722	1.0000
	Bottom	30	0.5845%	0.56	0.7499	0.7077	0.4278	0.8555
Day 0-5	Top	30	-1.1786%	-1.22	0.3086	0.8998	0.1808	0.3616
	Bottom	30	-1.6773%	-1.08	0.2059	0.8192	0.2923	0.5847

Over the narrow event window, both samples experience a positive average cumulative abnormal return: 0.24% for the top-ranked sample and 0.58% for the bottom-ranked sample. Over the longer event window, however, both samples exhibit negative average cumulative abnormal returns, -1.18% and -1.68% for the top-ranked and bottom-ranked samples respectively. However, neither of these results are statistically significant.

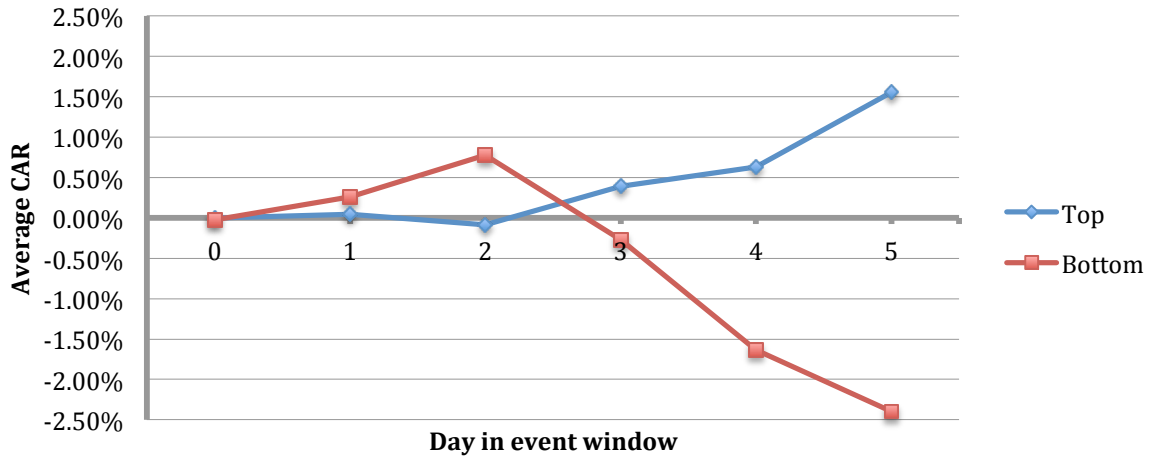
Both the Wilcoxon signed-rank test and the sign test exhibit p-values for each sample that are noticeably higher than the critical value of 0.05. The t-test presents t-values of both top and bottom rankings over both event windows that are less than the critical t-value of 1.96. Hence, both the parametric and non-parametric tests provide evidence that none of the samples have statistically significant average cumulative abnormal returns over either event windows.

Overall, the results from the event study show no clear relationship between a top or a bottom ranking for firms in the materials industry and average cumulative abnormal returns. Thus, it can be concluded that a CSR rating does not have any effect on the share prices of Swedish listed firms in the materials industry.

5.3 Industry: Capital Goods

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the capital goods industry are graphed below in Figure 6.

Figure 6: Average CAR for top and bottom rankings in the capital goods industry



Regarding the capital goods industry, the average cumulative abnormal returns for the top-ranked and bottom-ranked samples have opposite trends. The top-ranked sample initially displays a slightly decreasing average cumulative abnormal return, whereas the bottom-ranked sample shows increasing returns. After Day 2 in the event window, the average cumulative abnormal return noticeably increases for the top-ranked sample and decreases for the bottom-ranked sample. On the first day in the event window, there is a negligible

difference in average cumulative abnormal returns between the two samples. This difference increases greatly over the longer event window (to almost four percent on Day 5).

The results of the tests for significance of the event study performed on the capital goods industry are presented below in Table 3.

Table 3: Tests for significance of average CAR for top and bottom rankings in the capital goods industry

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	0.0428%	0.15	0.7499	0.2923	0.8192	0.5847
	Bottom	30	0.2606%	0.55	0.8290	0.4278	0.7077	0.8555
Day 0-5	Top	30	1.5567%	2.18*	0.0571	0.0214*	0.9919	0.0428*
	Bottom	30	-2.3968%	-2.26*	0.0387*	0.9786	0.0494*	0.0987

* significant at 5% significance level

Over the shorter event window, neither of the samples' average cumulative abnormal returns are significant according to the parametric nor the non-parametric tests. The calculated t-values are less than the critical value of 1.96, and all p-values of the Wilcoxon signed-rank test and the sign test are consistently greater than 0.05.

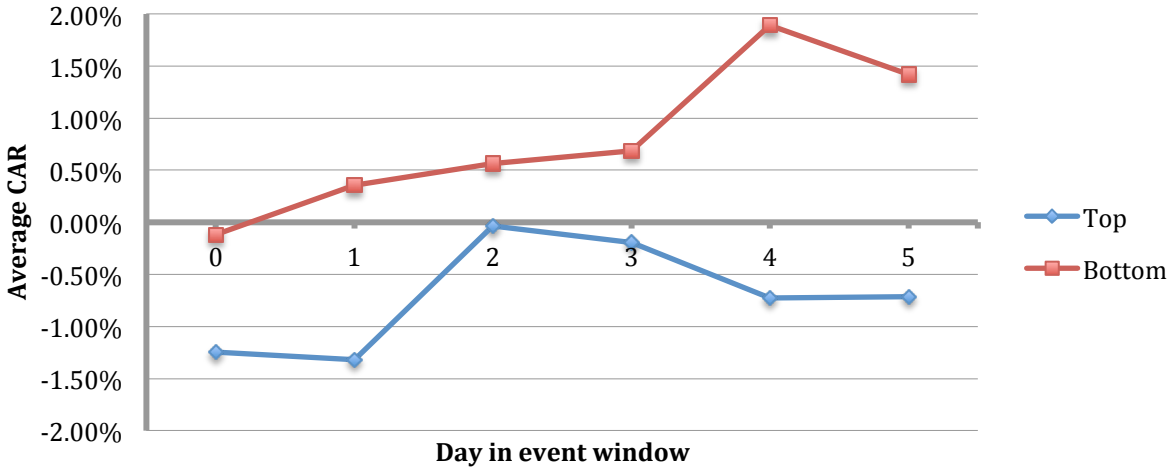
Over the longer event window, the top-ranked sample shows a positive average cumulative abnormal return of 1.56%, which is statistically significant according to both the t-test and the sign test. This result, however, is insignificant according to the Wilcoxon signed-rank test. The bottom-ranked sample shows a negative average cumulative abnormal return of -2.40%, which is statistically significant according to all three tests.

Overall, the results from the event study conducted on the capital goods industry indicates that there is a positive correlation between stock prices and a top CSR ranking and presents evidence for a negative relationship between a bottom CSR ranking and stock prices.

5.4 Industry: Commercial & Professional Services

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the commercial and professional services industry are graphed in Figure 7.

Figure 7: Average CAR for top and bottom rankings in the commercial and professional services industry



Both samples exhibit negative cumulative abnormal returns on Day 0. On Day 1, the average cumulative abnormal return is positive for the bottom-ranked sample and negative for the top-ranked sample. While both samples exhibit fluctuating averages cumulative abnormal returns, a general trend is observed. The bottom-ranked sample indicates positive cumulative abnormal returns over the event window, whereas the top-ranked sample exhibits negative average cumulative abnormal returns.

The results of the tests for significance of the event study performed on the commercial and professional services industry are presented below in Table 4.

Table 4: Tests for significance of average CAR for top and bottom rankings in the commercial and professional services industry

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	-1.3190%	-2.03*	0.0978	0.8998	0.1808	0.3616
	Bottom	30	0.3571%	0.83	0.4048	0.2923	0.8192	0.5847
Day 0-5	Top	30	-0.7162%	-0.72	0.3185	0.8192	0.2923	0.5847
	Bottom	30	1.4220%	1.76	0.1414	0.1002	0.9506	0.2005

* significant at 5% significance level

The results for top-ranked sample in the commercial and professional services industry indicates a negative average cumulative abnormal return over both event windows, -1.32% over the 'Day 0-1'-window and -0.72% over the 'Day 0-5'-window. The result from the longer event window is statistically insignificant according to all three tests. Over the shorter

event window, the t-test shows significant results for the top-ranked sample. However, these are insignificant according to the non-parametric tests.

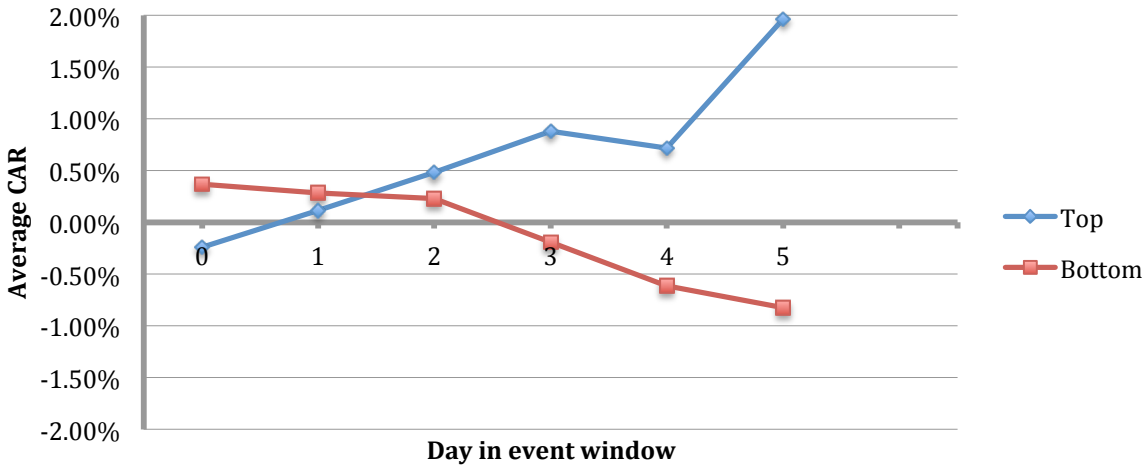
For the bottom-ranked sample, the positive average cumulative abnormal return is 0.38% over the 'Day 0-1'-window, and 1.42% over the 'Day 0-5'-window, both of which are statistically insignificant at a 5% significance level.

Overall, the results from the event study show no significant relationship between a top or a bottom ranking for firms in the commercial and professional services industry and average cumulative abnormal returns. This indicates that a CSR rating does not have any effect on the share prices of Swedish listed firms in the commercial and professional services industry.

5.5 Industry: Consumer Durables

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the consumer durables industry are graphed below in Figure 8.

Figure 8: Average CAR for top and bottom rankings in the consumer durables industry



The average cumulative abnormal return for the sample of top-ranked firms in the consumer durables industry is initially negative on Day 0, and thereafter increases over the event window, with a slight dip between Day 3 and Day 4. The average cumulative abnormal return of the bottom sample is initially positive but decreases consistently over the event window, and becomes negative at Day 3.

The results of tests for significance of the event study performed on the consumer durables industry is presented below in Table 5.

Table 5: Tests for significance of average CAR for top and bottom ranking in the consumer durables industry sample

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	0.1150%	0.15	0.9263	0.8192	0.2923	0.5847
	Bottom	30	0.2852%	0.41	0.9426	0.5722	0.5722	1.0000
Day 0-5	Top	30	1.9638%	1.64	0.5857	0.5722	0.5722	1.0000
	Bottom	30	-0.8265%	-0.90	0.3993	0.7077	0.4278	0.8555

* significant at 5% significance level

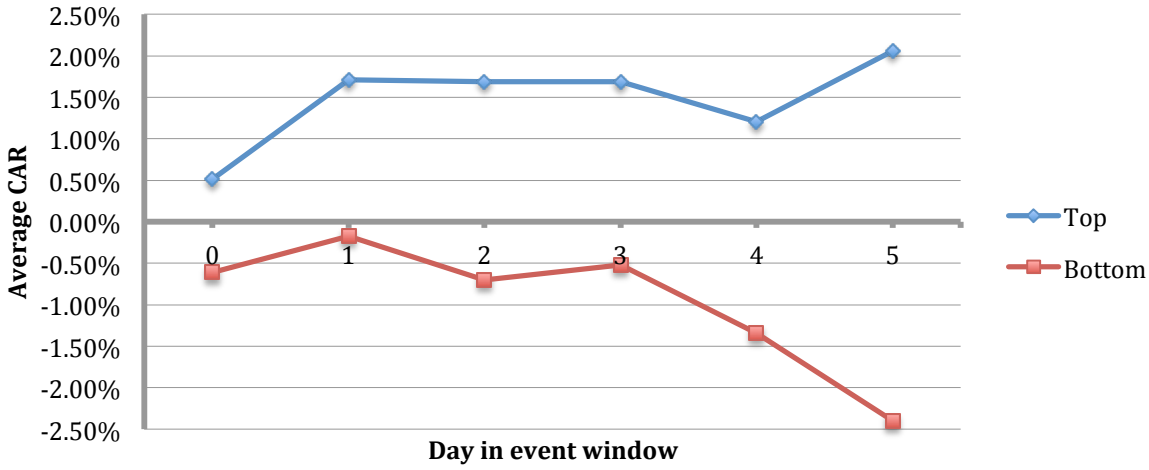
During the 'Day 0-1'-window, the top-ranked sample showed an average cumulative abnormal return of 0.12% and the bottom-ranked sample showed an average cumulative abnormal return of 0.29%. The results of the parametric t-test and the non-parametric tests indicate that these returns are statistically insignificant. Similarly, no statistically significant average cumulative abnormal returns were generated during the 'Day 0-5'-window in either sample. There is an average cumulative abnormal return of 1.96% in the top-ranked sample and -0.83% in the bottom-ranked sample, but these were not found to be statistically significant at a 5% significance level in any of the tests.

Overall, the results from the event study show no significant relationship between either a top or a bottom ranking and average cumulative abnormal returns for firms in the consumer durables industry. This indicates that a CSR rating does not have any effect on the share prices of Swedish listed firms in the consumer durables industry.

5.6 Industry: Health Care

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the health care industry are graphed in Figure 9.

Figure 9: Average CAR for top and bottom samples in the health care industry ranking



Opposite trends exist for the average abnormal cumulative returns of the two samples. The top-ranked sample shows a noticeably positive trend. The average cumulative abnormal return starts out positive and, although not steadily, increases throughout the days of the event window. The bottom-ranked sample, on the other hand, shows a negative trend, initially fluctuating slightly before decreasing sharply at Day 3.

The results of the tests for significance of the event study performed on the health care industry are presented below in Table 6.

Table 6: Tests for significance of average CAR for top and bottom ranking in the health care industry sample

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	1.7125%	1.26	0.4908	0.7077	0.4278	0.8555
	Bottom	30	-0.1739%	-0.24	0.9263	0.1808	0.8998	0.3616
Day 0-5	Top	30	2.0583%	1.33	0.1846	0.0494*	0.9786	0.0987
	Bottom	30	-2.3986%	-2.29*	0.0407*	0.9786	0.0494*	0.0987

* significant at 5% significance level

The top-ranked sample has an average cumulative abnormal return of 1.71% over the 'Day 0-1'-window, but this is statistically insignificant according to both the parametric test and the non-parametric tests. Over the longer event window, the top-ranked sample has a statistically significant positive average cumulative abnormal return. However, there is stronger evidence that no such impact exists, as both the t-test and the Wilcoxon signed-rank test conclude that the result is not statistically significant.

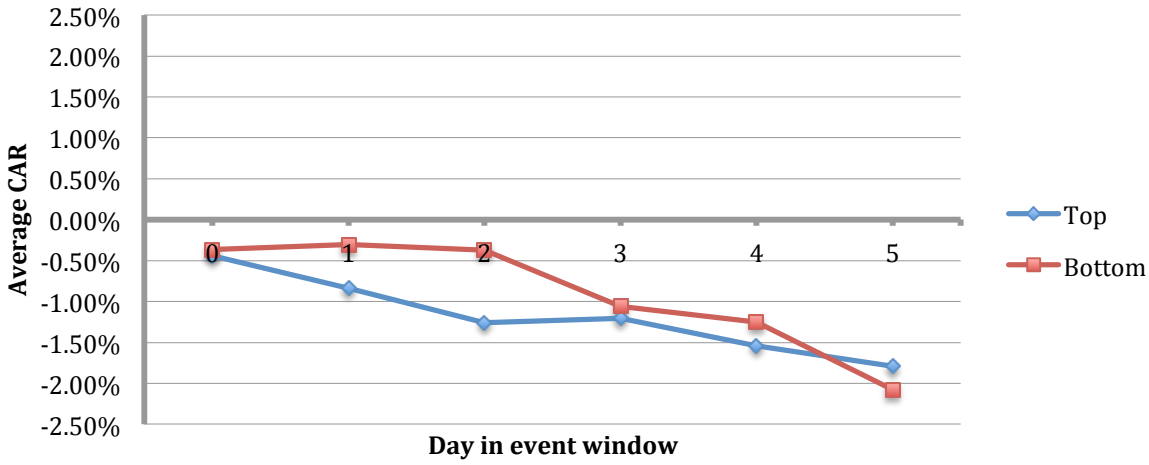
A bottom ranking generates a statistically significant average cumulative abnormal return of -2.40% over the longer event window according to all three tests. The average cumulative abnormal is also negative over the shorter event window, but this is not statistically significant.

Overall, the results from the event study conducted on the health care industry indicates that there is a negative relationship between a bottom CSR ranking and stock prices, whereas there is strong evidence for an insignificant correlation between stock prices and a top rating.

5.7 Industry: Financials

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the financials industry are graphed below in Figure 10.

Figure 10: Average CAR for top and bottom rankings in the financials industry



Regarding the financials industry, it is clearly seen that similar negative trends exist for the two samples. Initially slightly negative, the average cumulative abnormal returns for both the top-ranked and bottom-ranked samples decrease over the days in the event window, and hence the two samples both exhibit a negative trend.

Whether or not this negative trend is statistically significant is evaluated according to the parametric and non-parametric tests, and the results are summarized in Table 7.

Table 7: Tests for significance of average CAR for top and bottom ranking in the financials industry

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	-0.8415%	-1.52	0.3165	0.5722	0.5722	1.0000
	Bottom	38	-0.3052%	-0.53	0.6688	0.9283	0.1279	0.2559
Day 0-5	Top	30	-1.7914%	-1.45	0.3185	0.8988	0.1808	0.3616
	Bottom	38	-2.0777%	-1.96	0.0580	0.9283	0.1279	0.2559

* significant at 5% significance level

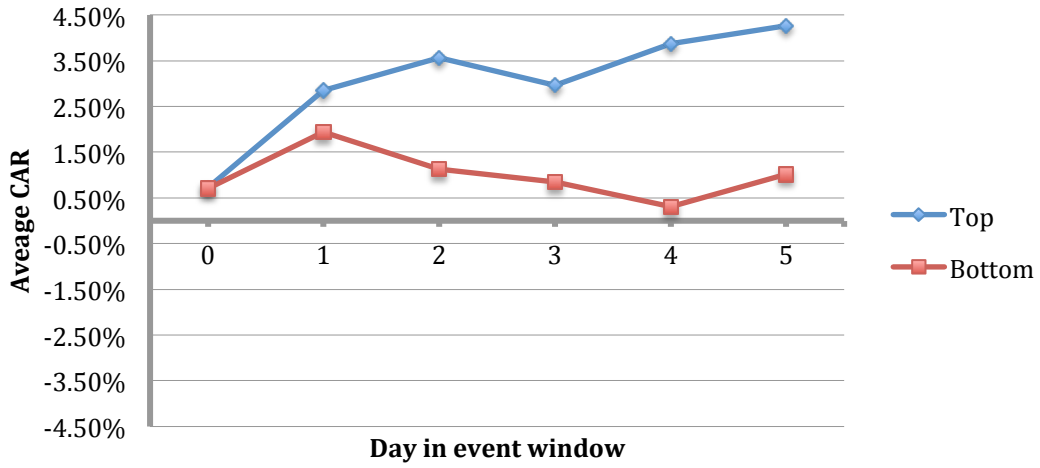
The top-ranked sample indicated an average cumulative abnormal return of -0.84% during the shorter event window and -1.79% during the longer window. The bottom-ranked sample indicated an average cumulative abnormal return of -0.1% and -2.08% over the shorter and longer event windows respectively. However, none of the tests establish any statistically significant average cumulative abnormal returns for the samples over either of the event windows.

Overall, the results from the event study provide no evidence for a significant relationship between a top or a bottom ranking for firms in the financials industry and average cumulative abnormal returns. This indicates that the publication of a CSR rating does not have any effect on the share prices of Swedish listed firms in the financials industry.

5.8 Industry: Real Estate

The average cumulative abnormal returns for top-ranked and bottom-ranked samples of the real estate industry are graphed below in Figure 11.

Figure 11: Average CAR for top and bottom rankings in the real estate industry



For the real estate industry, both samples are positive throughout all days in both event windows, fluctuating slightly between the days. Initially starting off at roughly the same point, the top-ranked sample increases to a much greater extent than the bottom-ranked sample.

The results of the tests for significance of the event study performed on the real estate industry are presented below in Table 8.

Table 8: Tests for significance of average CAR for top and bottom ranking in the real estate industry

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	2.8560%	2.99*	0.0111*	0.0494*	0.9786	0.0987
	Bottom	30	0.1941%	2.31*	0.0687	0.1808	0.8998	0.3616
Day 0-5	Top	30	4.2591%	3.34*	0.0028*	0.0026*	0.9993	0.0052*
	Bottom	30	1.0118%	0.98	0.6143	0.7077	0.4278	0.8555

Having a top ranking in the real estate industry generates a positive average cumulative abnormal return over both of the event windows. There is an average cumulative abnormal return of 2.86% and 4.26% over the shorter and longer event windows, respectively. Both of these returns are statistically significant at a 5% significance level according to both the parametric t-test and the non-parametric tests.

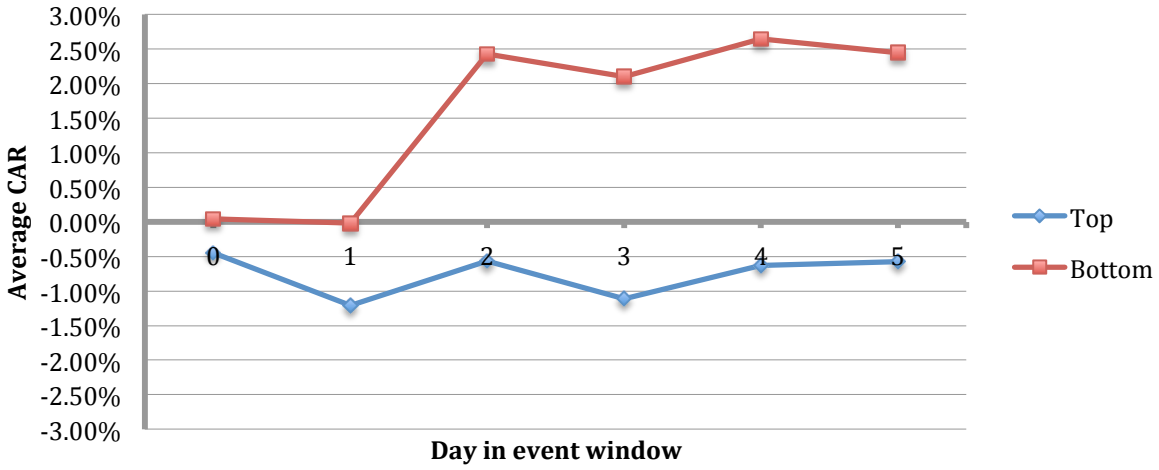
Having a bottom ranking in the real estate industry, however, does not generate any significant results. There is an average cumulative abnormal return of 0.19% and 1.01% over the shorter and longer event windows respectively, but these are not statistically significant according to any of the tests.

Overall, the results from the event study conducted on the real estate industry indicate that there is a positive relationship between top CSR rankings and stock prices, whereas there is an insignificant correlation between stock prices and a bottom ranking.

5.9 Industry: Software & Services

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the software and services industry are graphed below in Figure 12.

Figure 12: Average CAR for top and bottom rankings in the software and services industry ranking



The average cumulative abnormal return for the top-ranked sample fluctuates over the event window, but is consistently negative. The bottom-ranked sample exhibits virtually no average cumulative abnormal return between Day 0 and Day 1, after which it increases sharply at Day 2. Over the remaining days in the event window, the average cumulative abnormal return for the bottom ranked sample fluctuates, but remains positive.

The results of the tests for significance for the average cumulative abnormal returns over the two defined event windows are summarized below in table 9.

Table 9: Tests for significance of average CAR for top and bottom ranking in the software and services industry sample

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	-1.2089%	-2.44*	0.0132*	0.9993	0.0026*	0.0052*
	Bottom	30	-0.0178%	-0.05	0.9263	0.5722	0.5722	1.0000
Day 0-5	Top	30	-0.5724%	0.78	0.5716	0.7077	0.4278	0.8555
	Bottom	30	2.4439%	1.40	0.3286	0.4278	0.7077	0.8555

* significant at 5% significance level

A top CSR ranking for companies in the software and services industry generates a statistically significant average cumulative abnormal return over the 'Day 0-1'-window, but not over the 'Day 0-5'-window. A negative average cumulative abnormal return of -1.21% is generated over the shorter event window. This is statistically significant according to all three of the tests conducted. The indicated average cumulative abnormal return of -0.57% over the longer event window, however, is not found to be significant at a 5% significance level.

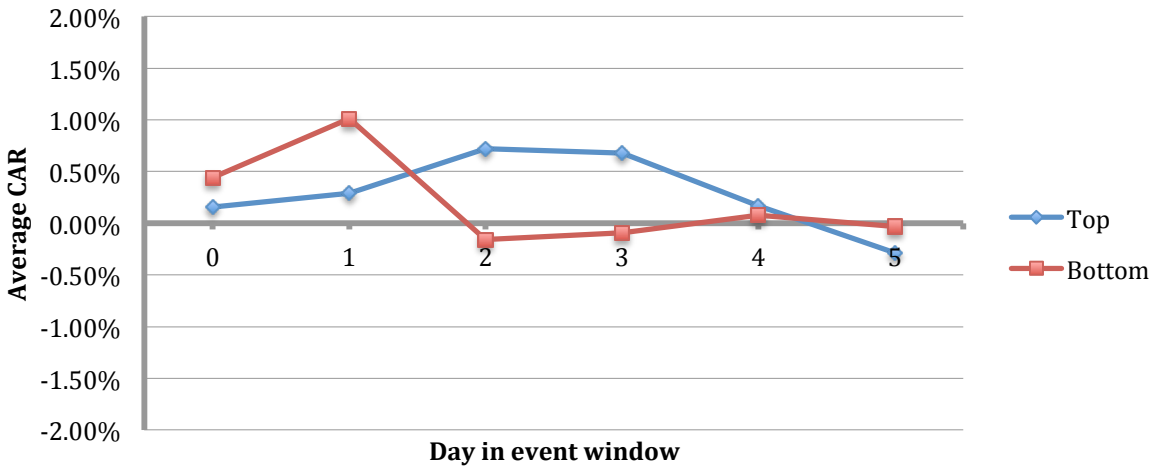
The bottom-ranked sample exhibits no statistically significant average cumulative abnormal return over either of the defined event windows. The negative average cumulative abnormal return of -0.02% over the shorter event window and the positive cumulative abnormal return of 2.44% over the longer event window are not found to be statistically significant by any of the three tests.

Overall, the results from the event study show no lasting significant relationship between a top or a bottom ranking for firms in the software industry and average cumulative abnormal returns. This indicates that a CSR rating does not have any effect on the share prices of Swedish firms in the financials industry.

5.10 Industry: Technology Hardware & Equipment

The average cumulative abnormal returns for top-ranked and bottom-ranked samples in the technology hardware and equipment industry are graphed below in Figure 13.

Figure 13: Average CAR for top and bottom rankings in the technology hardware and equipment industry ranking



The average cumulative abnormal return of the top-ranked sample, initially slightly positive, increases up to Day 2, at which it begins to decrease and eventually becomes negative on Day 5. The average cumulative abnormal return for the bottom-ranked sample fluctuates greatly between being positive and negative between Day 0 and Day 5 in the event window. No clear trend exists in either the top-ranked or the bottom-ranked samples in the technology hardware and equipment industry.

The results of the tests for significance of the event study performed on the technology hardware and equipment industry are presented below in Table 10.

Table 10: Tests for significance of average CAR for top and bottom ranking in the technology hardware and equipment industry sample

	Sample	no. of obs.	Average CAR	t-test	Wilcoxon SR	Sign Test		
				t-value	p-value	p-value (+)	p-value (-)	p-value (±)
Day 0-1	Top	30	0.2873%	0.55	0.9426	0.2923	0.8192	0.5847
	Bottom	30	1.0090%	0.79	0.2289	0.2923	0.8192	0.5847
Day 0-5	Top	30	-0.2874%	-0.26	0.6435	0.7077	0.4278	0.8555
	Bottom	30	-0.0298%	-0.02	0.4048	0.9919	0.0214*	0.0428*

* significant at 5% significance level

The top-ranked sample has an average cumulative abnormal return of 0.29% over the short event window and of -0.29% over the longer event window, both of which are statistically insignificant. Thus, there is evidence that no average cumulative abnormal return is generated as a result of having a top CSR ranking in the technology hardware and equipment industry.

Over the short event window, a bottom ranking does not generate a statistically significant average cumulative abnormal return. A return of 1.01% exists, but the tests do not find this to be significant at a 5% significance level. Over the longer event window, the tests for significance provide contradicting results for the bottom-ranked sample. According to the sign test, the negative average cumulative abnormal return of -0.03% is statistically significant and thus, there is evidence that having a bottom CSR ranking in the technology hardware and equipment industry has a negative effect on stock prices. However, there is stronger evidence that no such impact exists, as both the t-test and the Wilcoxon signed-rank test conclude that the result is not statistically significant.

Overall, the results from our event study show no significant relationship between a top or a bottom ranking for firms in the technology hardware and equipment industry and average cumulative abnormal returns. This indicates that a CSR rating does not have any impact on the share prices of Swedish listed firms in the technology hardware and equipment industry.

5.11 Summary of Results

Overall, there are few significant results over the shorter window. There are only two samples that resulted in significant average cumulative abnormal returns: the top-ranked sample for real estate industry and the top-ranked sample for the software industry. Over the longer event window, there are five samples with results that are significant at a 5% significance level according to both parametric and non-parametric testing. These are discussed in more detail below.

The general top-ranked sample, signals that no average cumulative abnormal return exists after the publication of a CSR rating. When categorizing the top-ranked Swedish listed companies by industry and performing separate, industry-specific event studies, only two of the nine industries studied were found to have significant results. These industries are the capital goods industry and the real estate industry. Both of these industries found that the publication of a top CSR-ranking generates positive effects on the stock value of those firms. With an average cumulative abnormal return of 1.56% and 4.26% for the capital goods industry and real estate industry respectively, both effects are statistically significant.

The general bottom-ranked sample with an average cumulative abnormal return of -1.73%, signals that statistically significant abnormal returns exist after a publication of a bottom CSR ranking. Hence there is evidence to support that a bottom ranking has a negative effect on share prices. However, these empirical findings are not valid over all industries when examining them separately. Out of the nine industries studied, only two were found to be significant at a 5% significance level according to both parametric and non-parametric tests. The findings of the event study for the capital goods industry and the health care industry, both with an average cumulative abnormal return of -2.40%, correspond with the result of the general bottom sample and sustain a negative relationship. The results of the remaining seven industries[4] demonstrate that no average cumulative abnormal return exists as a result of a bottom ranking, and hence shows no evidence of any relationship between a CSR bottom ranking and share value.

[4] These seven industries are: Materials, Commercial & Professional Services, Consumer Durables, Health Care, Financials, Software & Services and Technology, Hardware & Equipment.

The results indicate that no relationship exists between a “zero” CSR ranking and stock prices. The event study shows that no average cumulative abnormal return exists after the publication of a CSR rating for a company that does not publish any information regarding their CSR activities.

6. Analysis

In this section, the empirical findings of the event study presented in the previous section are analyzed, starting with the shorter event window, and subsequently analyzing the longer event window. First, the general rating and its samples are examined and thereafter, the findings related to the industry samples are discussed and analyzed.

6.1 The short event window (Day 0-1)

Overall, the majority of the samples tested over the shorter event window conveyed that the release of a CSR rating has no effect on the market value of Swedish listed companies. The only two industries that were affected by the publication were the real estate industry and the software and services industry. It is worth noting that only companies receiving a top ranking in these industries were affected; the market did not react to companies receiving a bottom CSR ranking. Within the real estate industry, the data reveals that a top CSR ranking increases the share prices. Obtaining a top ranking within the software and services industry has the opposite effect, i.e. it has a negative impact on share prices. However, caution should be taken regarding the results of the software and services industry, as it is not maintained over the longer event window.

Nevertheless, just because the findings regarding the remaining industries demonstrate that the market does not react to a CSR rating over the shorter event window, it does not necessarily mean that there is no effect. It is possible that it takes time for the market to incorporate new information and react to the publication of the *Folksam Index of Corporate Social Responsibility*. It is therefore more relevant to discuss any potential relationship on the basis of the findings over the longer event window, which is done in the following section.

6.2 The longer event window (Day 0-5)

6.2.1 The General Ranking

Swedish listed firms receiving a bottom CSR ranking experience, on average, a negative impact on their market value upon the publication of this rating. The results of the general sample correspond with the stakeholder theory, which predicts that a firm attempting to lower its implicit costs by implementing socially irresponsible actions will incur higher explicit costs and put the company at a competitive disadvantage. It is possible that the market and its investors interpret a bottom CSR ranking as not meeting legal requirements and community norms, thus having a negative effect on the share value. This also relates to Bird et al's (2007) findings that firms that do not meet minimum requirements are punished in the market, as well as Johnson's (2003) conclusions that investors tend to punish firms that operate in a irresponsible manner. In addition, these results are supported by Frooman's (1997) findings that companies engaged in socially irresponsible and illicit behavior suffered in terms of their market valuation.

The general sample shows that, for the majority of the firms, there is no impact after a top CSR ranking is announced. Receiving a top CSR ranking does not have an effect on the stock prices. These results correspond with Ullmann's (1985) findings that there is no observable relationship between the extent of a company's CSR performance and the performance of the company. There are too many other, more critical, factors that affect a company's market value. Additionally, this is consistent with Alexander and Buchholz's (1978) conclusions that the degree of social responsibility exhibits no significant relationship to stock market performance. Put simply, the market does not seem to value a top CSR ranking.

According to Efficient Market Hypothesis, as previously mentioned, the release of new information should result in an instantaneous reevaluation of the expected value of stocks. However, as the *Folksam Index of Corporate Social Responsibility* analyzes CSR according to public reports of Swedish listed companies, the release of this index may not give current investors and potential investors any new or additional information. Instead, the index may be seen as merely having a confirmative function. While the CSR ratings of the companies are new, the information on which they are based upon is not. The information used as a basis for the rating is possibly already known to investors and therefore not considered news to which

the investors react upon. The market may already be aware of which firms are top performers within CSR, thereby rendering the ratings and corresponding rankings unnecessary.

Additionally, the different components of CSR may affect the market value of firms differently. For the purpose of this study, the two ratings in the *Folksam Index of Corporate Social Responsibility* were summed and ranked thereafter. However, investors may not always may not always react similarly to all components of CSR. Hence, the effect of one component of the rating may be neutralized by another component.

Similarly to the results of the top ranking, the findings of the event study indicate that no relationship exists between a "zero" ranking and stock prices. The event study shows that the market does not react upon the publication of a CSR rating for a company that chooses not to publish any information regarding their CSR activities. One can infer that either the market does not care that a company does not report any information regarding their CSR activities, or that the market is already aware of this information, and that it is already accounted for in current share prices.

One can note that that the market does not make any inferences when a company does not report its CSR activities. Receiving a "zero" ranking does not necessarily entail that a company would have received a low ranking; it merely reflects the fact that this company has not released any specific information regarding its CSR policy. It can be inferred that a company with a poor CSR policy may in fact be better off not releasing any information concerning its CSR rather than reporting any deficiencies.

The findings support neither the neo-classical theory nor the stockholder theory, which both state that expenditures on CSR activities will put the company at a competitive disadvantage regarding short-term stock prices. Additionally, the findings of the event study reveal that the market seems to punish those firms that produce comparatively inferior CSR work reflected in their lower rating. Also, the results show a company is not rewarded for a top performance within CSR.

6.2.2 Industry Analysis

Over the longer event window, the results of the event study per industry are summarized in Table 11 below:

Table 11: Summary of Industry Results

Industry	Top Ranking	Bottom Ranking
Materials	No effect	No effect
Capital Goods	**Positive**	**Negative**
Commercial & Professional Services	No effect	No effect
Consumer Durables	No effect	No effect
Health Care	No effect	**Negative**
Financials	No effect	No effect
Real Estate	**Positive**	No effect
Software & Services	No effect	No effect
Technology Hardware & Equipment	No effect	No effect

Six of the nine industries show no impact on their market values upon receiving either a top CSR ranking or a bottom CSR ranking. The industries in which a CSR ranking has an effect are the capital goods industry, the health care industry and the real estate industry. These are discussed in further detail below.

For the real estate industry, receiving a top CSR ranking has a positive impact on share prices. The market, however, neither punishes nor rewards firms that receive a bottom CSR ranking. One reason for these results may be that investors are aware that companies in the real estate industry tend to use low quality and non-environmentally friendly raw materials and suppliers in order to quickly build at a low cost to earn high profits. These results correspond with Shane and Spicer's (1983) findings that changes in share prices result from investors' perceptions and expectations. Within the real estate industry, working with CSR questions is not expected and, thus, the announcement of a high rating signals positive information, whereas a lower rating is not unforeseen, and is therefore not important to investors. As a result, only a top-ranked company is affected by the publication of a CSR rating.

For the health care industry, the market reacts negatively to a company receiving a bottom CSR ranking. However, there is no impact following a top CSR ranking in this industry. The

health care industry is related to the well-being of human lives, an area of concern for many, where it is expected for firms to take their social responsibility. This agrees with both Frooman (1997) and Johnson's (2003) conclusions that socially irresponsible companies will suffer in terms of market valuation while companies that operate in a manner which goes beyond legal and social norms are not rewarded by the market. Therefore, it is plausible that companies that receive a high rating do not notice a positive stock value reaction for CSR policies that society already expects from them. However, if a firm signals via a low rating that it does not take its social responsibility, one may draw the conclusion that it is not trustworthy in other areas of the business. This explains the negative stock price reaction to the publication of a low CSR rating.

Both a top and a bottom CSR ranking affect the capital goods industry. A top CSR ranking has a positive impact whereas a bottom ranking has a negative impact on share prices. The companies represented in the capital goods industry are often large and transparent corporations, subject to both praise and scrutiny by the public. This corresponds with Freeman's (1984) stakeholder theory that companies have obligations to a broad group of stakeholders and must act in a manner that is consistent with society's expectations. Companies within the capital goods industry tend to use CSR questions as a way of achieving a competitive advantage. A high rating confirms its position and value, while a low rating can be interpreted as a signal that the company does not match shareholder expectations, possibly being evaluated as a potential risk and susceptible to future competition. The firms in this industry need to show that they are acting in a responsible manner in terms of environmental and social concerns. A top ranking will confirm that the company is taking care of its responsibilities, and a bottom ranking will echo distrust. When the rating is communicating that the company is doing what it promises, the stocks respond positively. Alternatively, when the rating is low it communicates that the company is being irresponsible, reflected in a negative effect on share prices. This is also compatible with Semenova et al.'s (2010) findings that companies with higher social performance were found to overperform in the market, whereas companies with lower scores achieved lower returns.

7. Conclusion

The objective of this thesis was to empirically investigate and analyze the effects of a CSR rating on companies listed on the Stockholm Stock Exchange. The study aimed to examine whether the release of a CSR rating has an impact on the share price of a company, and to determine whether any potential impact differs across industries.

Swedish listed companies were analyzed through the use of an event study, based on the publication of the *Folksam Index of Corporate Social Responsibility*. Top-ranked, bottom-ranked and "zero"-ranked companies for each of the five years the index has been published were studied. Furthermore, nine industries were individually examined.

Both existing theories and previous research provided contradicting views surrounding the relationship between CSR and short-term market value. Therefore, no specific direction could be determined for the hypotheses; positive, negative and neutral relationships were all plausible.

The investigation regarding the effect on the market value of the firms in each respective sample upon the publication of the CSR rating was conducted through an event study. Normal returns were estimated over 120 trading days and, thereafter, average cumulative abnormal returns were calculated over two event windows, one shorter (between Day 0 and Day 1) and one longer (between Day 0 and Day 5). The results of the event study showed that, if there was an effect, it took the market a few days to react to the information.

The results from the event study provide evidence that, in general and over most industries, the share price of a company was neither positively rewarded nor punished for having one of the highest CSR ratings on the Stockholm Stock Exchange. The release of a high CSR rating did not have any impact on the share prices of firms with that rating. Two industries, the real estate and the capital goods industry, differed from these findings, where a top CSR ranking was found to have a positive effect on stock prices.

Overall, the announcement of a bottom ranking, on the other hand, was found to have a negative effect on stock prices. A low CSR rating had a negative impact on the stock value of

companies listed on the Stockholm Stock Exchange. By extension, one can then draw the conclusion that while it isn't beneficial in the short-term, in terms of share prices, for Swedish listed companies to receive a high rating within CSR, it is disadvantageous to be among the lowest-ranked ones. This result, however, is not consistent across all industries. Two industries were negatively affected after the announcement of a low CSR rating. Share prices of bottom-ranked companies in both the capital goods industry and the health care industry displayed a negative reaction after the release of a low CSR rating. For the remaining seven of the nine industries examined, the results indicate that the release of a low CSR rating has no immediate impact on a company's market value.

If a company has a "zero"-ranking, i.e. the company does not report any information regarding their CSR, the publication of the CSR rating has no effect on the stock value of that firm. However, it is important to note that a "zero"-ranking does not mean that the company has no CSR activities, it merely states that the company has chosen to not report them. It can, therefore, be inferred that if a company ranks poorly within CSR activities, they may have been better off had they not reported anything at all.

In conclusion, evidence suggests that, overall, the publication of a CSR rating affects the share price of a low-rated company listed on the Stockholm Stock Exchange, but not a high-rated company. This impact, however, varies when analyzing specific industries. The release of a CSR rating affects the stock values of companies within three of the nine industries analyzed. For companies within the real estate industry, a high CSR rating led to an increase in stock prices. The health care industry showed that a low CSR rating affected stock prices negatively. For companies within the capital goods industry, both a high and a low CSR rating had an impact, where a high rating led to an increased share price, and a low rating led to a decreased share price. For the remaining six industries, no impact on share prices after the release of a CSR rating was found.

While it has not been possible to determine a consistent relationship between CSR and stock value over all industries, the study does indicate one constant result. Regardless of industry, there have been no results indicating that a high CSR rating leads to a decreased market value, or that a low CSR rating leads to increased market value. For companies investing in CSR, these results can be viewed as good indicators. No evidence was found to support the

neo-classical theory or the stockholder theory that CSR expenditures have a negative effect on stock prices.

This study is a starting point, which confirms that one can impact share value with CSR activities, although at the moment and in the short term, it does not show across all industries. The challenge for companies is how to identify which CSR activities are of value and determine how to allocate resources so that investments within CSR can result in a higher stock value.

Limitations of the Study

It is recognized that this study has its limitations and there are some valid points regarding the *Folksam Index of Corporate Social Responsibility* that may present a bias in the study. These are briefly outlined below.

Firstly, it is assumed that investors are aware of the publication of this index and that they take note of the rating when it is released. In reality, the market may not be semi-strong efficient and it may take time for the market to respond to the release of the ratings, if at all.

Additionally, the ratings are based on already published information regarding the companies' CSR policies, and therefore the index may only have a confirmative function. Although, the ratings are released on the event date, investors may already know the information that the ratings are based on. Furthermore, the basis for the ratings may be somewhat biased as companies can manipulate what is included in the report. Investors may be aware of the possibility that the companies can affect the outcome of ratings by choosing what to publish, and might be cautious to act upon the rating.

Finally, the *Folksam Index of Corporate Social Responsibility* rates and ranks all companies listed on the Stockholm Stock Exchange annually. Several companies may have similar ratings every year and investors may therefore expect certain rankings from certain companies. It is plausible that only unexpected CSR ratings affect share prices after the release of a CSR rating. This possibility, however, falls outside the scope of this study.

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9. Appendices

Appendix 1: List of Industries

List of Industries
Energy
Materials*
Capital Goods*
Commercial & Professional Services*
Transportation
Consumer Durables*
Retailing
Media
Consumer Staples
Health Care*
Financials*
Real Estate*
Software & Services*
Technology Hardware & Equipment*
Telekom
Utilities

* included in the study

Appendix 2: average AR and average CAR for all days in the event window

General Ranking, top - *100 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.0413%	0.22	0.830	0.0413%	0.22	0.830
1	-0.1285%	-0.70	0.483	-0.0871%	-0.32	0.752
2	-0.0155%	-0.10	0.919	-0.1026%	-0.30	0.765
3	-0.0097%	-0.05	0.964	-0.1123%	-0.31	0.760
4	-0.2068%	-1.02	0.310	-0.3191%	-0.78	0.438
5	-0.0886%	-0.44	0.661	-0.4076%	-0.89	0.378

General Ranking, bottom - *124 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.3727%	-1.65	0.102	-0.39770%	-1.77	0.079
1	0.2296%	0.77	0.444	-0.17033%	-0.44	0.658
2	-0.1942%	-0.70	0.486	-0.36296%	-0.79	0.429
3	-0.7426%	-2.36	0.020	-1.10241%	-2.10	0.038
4	-0.3353%	-1.11	-0.270	-1.42484%	-2.50	0.014
5	-0.3003%	-1.15	0.253	-1.72977%	-2.74	0.007

General Ranking, "zero" - *56 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.0000267	0.01	0.993	0.00267%	0.01	0.993
1	0.0000798	0.03	0.976	0.01065%	0.03	0.976
2	0.003798	1.38	0.172	0.39045%	0.87	0.387
3	-0.010384	-2.31	0.025	-0.64795%	-0.97	0.339
4	0.0057999	1.03	0.309	-0.06796%	-0.07	0.945
5	-0.0030705	-1.04	0.304	-0.37501%	-0.38	0.708

Materials Industry, top - 30 *obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.4068%	1.09	0.285	0.4068%	1.09	0.285
1	-0.1705%	-0.58	0.569	0.2363%	0.44	0.755
2	-0.0333%	-0.12	0.909	0.2030%	0.31	0.985
3	-0.1905%	-0.41	0.684	0.0126%	0.02	0.639
4	-0.4092%	-0.89	0.381	-0.3966%	-0.47	0.639
5	-0.7820%	-1.77	0.088	-1.1786%	-1.22	0.233

Materials Industry, bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.7345%	-2.02	0.053	-0.7345%	-2.02	0.053
1	1.3190%	1.30	0.202	0.5845%	0.56	0.579
2	0.1240%	0.18	0.855	0.7085%	0.69	0.496
3	-0.3295%	-0.56	0.577	0.3790%	0.32	0.751
4	-1.1107%	-2.07	0.048	-0.7318%	-0.51	0.615
5	-0.9455%	-1.29	0.206	-1.6773%	-1.08	0.289

Capital Goods Industry, top - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.0002%	0.00	0.999	0.0002%	0.00	0.999
1	0.0427%	0.15	0.878	0.0428%	0.11	0.916
2	-0.1333%	-0.76	0.452	-0.0905%	-0.21	0.833
3	0.4839%	1.48	0.150	0.3934%	0.71	0.482
4	0.2344%	0.90	0.376	0.6278%	1.11	0.278
5	0.9289%	2.53	0.017	1.5567%	2.18	0.037

Capital Goods Industry, Bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.0218%	-0.07	0.948	-0.0218%	-0.07	0.948
1	0.2824%	0.89	0.383	0.2606%	0.55	0.586
2	0.5168%	1.36	0.185	0.7774%	1.32	0.197
3	-1.0479%	-1.82	0.079	-0.2706%	-0.37	0.717
4	-1.3653%	-2.85	0.008	-1.6358%	-1.90	0.068
5	-0.7610%	-1.44	0.159	-2.3968%	-2.26	0.031

Commercial & Professional Services, top - *30 obs*

day	average AR	t-value	p-value	Average CAR	t-value	p-value
0	-1.2443%	-2.24	0.033	-1.2443%	-2.24	0.033
1	-0.0747%	-0.17	0.867	-1.3190%	-2.03	0.051
2	1.2831%	1.44	0.162	-0.0359%	-0.04	0.996
3	-0.1597%	-0.32	0.775	-0.1956%	-0.25	0.807
4	-0.5320%	-1.10	0.279	-0.7276%	-0.77	0.449
5	0.0113%	0.03	0.979	-0.7163%	-0.72	0.476

Commercial & Professional Services, bottom - *30 obs*

day	average AR	t-value	p-value	Average CAR	t-value	p-value
0	-0.1182%	-0.38	0.708	-0.1182%	-0.38	0.708
1	0.4753%	1.33	0.194	0.3571%	0.83	0.414
2	0.2057%	0.66	0.511	0.5628%	1.08	0.288
3	0.1260%	0.28	0.782	0.6888%	1.41	0.170
4	1.2038%	1.99	0.056	1.8926%	2.69	0.012
5	-0.4706%	-1.48	0.150	1.4220%	1.76	0.089

Consumer Durables Industry, top - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.2423%	-0.63	0.533	-0.2423%	-0.63	0.533
1	0.3573%	0.68	0.501	0.1150%	0.15	0.879
2	0.3667%	0.99	0.329	0.4817%	0.58	0.569
3	0.4020%	1.25	0.221	0.8837%	1.09	0.283
4	-0.1627%	-0.30	0.769	0.7210%	0.81	0.425
5	1.2428%	2.42	0.022	1.9638%	1.64	0.112

Consumer Durables Industry, bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.3674%	0.87	0.392	0.3674%	0.87	0.392
1	-0.0822%	-0.18	0.861	0.2852%	0.41	0.684
2	-0.0525%	-0.10	0.924	0.2327%	0.25	0.806
3	-0.4207%	-0.56	0.580	-0.1880%	-0.25	0.806
4	-0.4241%	-1.15	0.261	-0.6121%	0.70	0.492
5	-0.2144%	-0.35	0.726	-0.8265%	0.90	0.377

Health Care Industry, top - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.5093%	0.92	0.363	0.5093%	0.92	0.363
1	1.2033%	1.30	0.202	1.7125%	1.26	0.216
2	-0.0220%	-0.05	0.963	1.6906%	1.33	0.193
3	-0.0068%	-0.01	0.990	1.6837%	1.15	0.261
4	-0.4796%	-1.20	0.242	1.2041%	0.80	0.430
5	0.8542%	1.53	0.137	2.0583%	1.33	1.940

Health Care Industry, bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.6086%	-1.64	0.112	-0.6086%	-1.64	0.112
1	0.4348%	0.68	0.501	-0.1739%	-0.24	0.812
2	-0.5315%	-0.85	0.400	-0.7053%	-0.75	0.461
3	0.1806%	0.23	0.819	-0.5248%	-0.57	0.571
4	-0.8210%	-0.97	0.340	-1.3458%	-1.30	0.202
5	-1.0528%	-1.74	0.093	-2.3986%	-2.29	0.030

Financials Industry, top - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.4450%	-1.68	0.104	-0.4450%	-1.68	0.104
1	-0.3965%	-1.10	0.281	-0.8415%	-1.52	0.139
2	-0.4169%	-0.86	0.396	-1.2584%	-1.35	0.188
3	0.0493%	0.15	0.880	-1.2092%	-1.26	0.219
4	-0.3311%	-0.87	0.389	-1.5402%	-1.25	0.220
5	-0.2512%	-0.96	0.346	-1.7914%	-1.45	0.151

Financials Industry, bottom - *38 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.3660%	-0.92	0.366	-0.3660%	-0.92	0.366
1	0.0608%	0.17	0.886	-0.3052%	-0.53	0.602
2	-0.0661%	-0.22	0.828	-0.3713%	-0.58	0.563
3	-0.6887%	-1.45	0.156	-1.0600%	-1.16	0.255
4	-0.1923%	-0.38	0.704	-1.2523%	-1.18	0.244
5	-0.8253%	-2.09	0.044	-2.0777%	-1.96	0.058

Real Estate Industry, top - *30 obs*

day	average AR	t-value	p-value	Average CAR	t-value	p-value
0	0.7268%	1.44	0.159	0.7268%	1.44	0.159
1	2.1292%	2.24	0.033	2.8560%	2.99	0.006
2	0.7080%	2.56	0.016	3.5640%	3.21	0.003
3	-0.6065%	-1.55	0.131	2.9576%	2.88	0.007
4	0.9141%	1.52	0.139	3.8717%	3.02	0.005
5	0.3875%	1.00	0.324	4.2591%	3.34	0.002

Real Estate Industry, bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.7075%	1.26	0.218	0.7075%	1.26	0.218
1	1.2334%	1.44	0.161	1.9409%	2.31	0.028
2	-0.8119%	-1.22	0.232	1.1291%	1.10	0.279
3	-0.2754%	-0.50	0.618	0.8537%	0.91	0.370
4	-0.5454%	-1.53	0.137	0.3083%	0.32	0.749
5	0.7035%	2.04	0.051	1.0118%	0.98	0.337

Software & Services Industry, top - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	-0.4493%	-1.2	0.241	-0.4493%	-1.2	0.241
1	-0.7596%	-1.71	0.098	-1.2089%	-2.44	0.021
2	0.6467%	1.7	0.1	-0.5621%	-1.04	0.306
3	-0.5517%	-1.08	0.29	-1.1139%	-1.50	0.144
4	0.4833%	0.91	0.369	-0.6306%	-0.89	0.380
5	0.0582%	0.14	0.887	-0.5724%	0.78	0.441

Software & Services Industry, bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.0471%	0.15	0.884	0.0471%	0.15	0.884
1	-0.0648%	-0.2	0.843	-0.0177%	-0.05	0.962
2	2.4482%	1.5	1.44	2.4305%	1.45	0.158
3	-0.3306%	-0.65	0.519	2.1000%	1.42	0.165
4	0.5477%	0.97	0.342	2.6477%	1.53	0.138
5	-0.2038%	-0.36	0.718	2.4439%	1.40	0.171

Technology Hardware & Equipment Industry, top - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.1536%	0.42	0.675	0.1536%	0.42	0.675
1	0.1337%	0.36	0.724	0.2873%	0.55	0.583
2	0.4357%	1.18	0.247	0.7230%	1.30	0.205
3	-0.0465%	-0.08	0.939	0.6765%	0.85	0.401
4	-0.5063%	-0.90	0.374	0.1702%	0.17	0.868
5	-0.4576%	-1.05	-0.304	-0.2874%	-0.26	0.799

Technology Hardware & Equipment Industry, bottom - *30 obs*

day	average AR	t-value	p-value	average CAR	t-value	p-value
0	0.4440%	0.62	0.541	0.4440%	0.62	0.541
1	0.5651%	0.62	0.537	1.0090%	0.79	0.433
2	-1.1667%	-1.85	0.075	-0.1577%	-0.11	0.913
3	0.0670%	0.15	0.880	-0.0907%	-0.06	0.953
4	0.1689%	0.32	0.754	0.0781%	0.05	0.961
5	-0.1079%	-0.19	0.852	-0.0298%	-0.02	0.987