Stock Price and Analyst Reactions to Domini 400 Social Index Additions and Deletions

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A Thesis

in

The John Molson

School of

Business

Presented in Partial Fulfillment of the Requirements

for the Degree of Master of Science (Administration) at

Concordia University

Montreal, Quebec, Canada

March 2010

Your file Votre référence
ISBN: 978-0-494-67228-0
Our file Notre référence
ISBN: 978-0-494-67228-0

ABSTRACT

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This study examines additions to and deletions from the Domini 400 Social Index, specifically looking at the reactions of the added or deleted firm's stock price and of analyst earnings forecasts to the news of the index change. It is found that additions to the Domini 400 Social Index are met with an abnormally positive stock price response and more favourable earnings forecasts than comparable firms. It is also found that deletions from the index are met with an abnormally negative stock price response, while no reaction is observed on the part of analyst earnings forecasts. This evidence indicates that the observed price response to index deletions is most likely caused by the actions of social investors, while the observed price response to index additions may be jointly attributable to the actions of social investors as well as the influence of social factors on the future earning potential of the added firm.

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1: Introduction

Over the past century the corporate form of business in America has progressed to become, unquestioningly, the dominant economic force on the planet. Concurrently during the latter half of this time period, the academic community has been engaged in much debate concerning whether or not these private corporations are wielding too much un-checked power over society, and also, whether or not corporations have a duty to assume so called 'social responsibilities.' During the most recent decade the increased threat of global warming has brought some of these issues of corporate social responsibility (CSR) to the forefront once again. Some of the major questions that academics have been grappling with include:

(1) Do corporations indeed have a moral duty to commit some of their resources to initiatives that while beneficial to society as a whole, do not necessarily impact directly on their bottom line?

(2) How does the pursuance of goals related to corporate social responsibility affect a firm's financial performance?

In the world of finance CSR has manifested itself in the form of socially responsible investors, who seek to integrate CSR concerns into their investment decisions. In this thesis the study of socially responsible investors will focus on two main questions:

(3) What influence do socially responsible investors exert on the market for financial capital? And is it significant enough that corporations should take notice?

(4) What does the phenomenon of socially responsible investing (SRI) have to say about the relationship between CSR and financial performance?

In the pages that follow questions (1) and (2) will be addressed via a review of the prevailing academic literature on the subject of CSR, and its relationship to a firm's financial performance, while questions (3) and (4) will be addressed through empirical testing of stock price and analyst forecast reactions to news concerning a firm's CSR performance.

Specifically, the empirical portion of this thesis is divided into two parts. The first part employs event study methodology to test the price reaction in the stock market to information concerning a firm's CSR performance. Additions to and deletions from the Domini 400 Social Index (DS400) are used as indicators of a firm's CSR performance. The goal of this section of the paper is to test whether or not CSR criteria have an influence on the stock market.

The second empirical portion of this paper focuses on the earnings per share (eps) forecasts of equity analysts. The eps forecasts for sample firms were analysed during time periods before and after the event of addition to or deletion from the DS400, with the goal of determining whether a company's inclusion on the DS400 or removal from the DS400 has any effect on the opinions of professional equity analysts. The goal of this section of the thesis is to attribute any observed price reaction to either (i) the influence of 'social investors' who may base their investment decisions, at least in part, on non-financial criteria, or (ii) some perceived linkage between a firm's CSR performance and its future earning potential.

The remainder of this thesis will be presented as follows. In section 2 the academic literature related to CSR will be reviewed, with a focus on theories related to the ethical and moral obligations of the modern business corporation. In this section a brief history of the evolution of the corporate form of business in America will also be presented. In Section 3 a review of the literature linking CSR and financial performance will be presented. Section 4 reviews some methodologically similar studies that were performed using the S&P 500 index. In

section 5 the formal hypotheses to be tested in the empirical portion of this thesis will be presented. Section 6 describes the data used in this study along with the procedures that were used to overcome some biases in the data. In section 7 the methodology of the empirical tests employed in this thesis is presented, while section 8 presents the results of these tests. Finally, section 9 concludes the thesis with a discussion related to the four questions posed at the onset of this paper.

2: Corporate Social Responsibility (CSR)

The concept of CSR as a field of study, which began in earnest in the 1950s, is an outgrowth of the rise to power of the corporation. The modern form of the corporation, with limited liability and legal personality, has been able to achieve wealth and size that would have been unthinkable before its creation. The incredible size that some corporations had attained by the 1950s led certain scholars, notably Edward Mason and Howard Bowen, to question whether these private entities were wielding too much power over society. As Mason stated in his 1959 book *The Corporation in Modern Society:* "In addition to market power, the large corporation exercises a considerable degree of control over nonmarket activities of various sorts. What this all seems to add up to is the existence of important centers of private power in the hands of men whose authority is real but whose responsibilities are vague" (Mason, 1959). These early concerns expressed by Mason and others spawned a series of questions concerning the interface between private corporations and the public at large, which eventually evolved into the field of study we know as CSR. That being said, it would be remiss to begin a review of the CSR literature without first briefly touching on the evolution of the modern form of the corporation and how it came to be the dominant form of business in the world.

2.1: A Historical Perspective on the Corporation

The two most important characteristics that separate the corporation from other forms of business organizations are its limited liability and its legal personality. These two features of corporations, which allow the corporation to take legal action under its own name and allow owners to limit their possible losses to the amount invested in the corporation respectively, are the two main reasons why the corporation has surpassed all other forms of business, such as sole proprietorships and partnerships, to become the most efficient and most powerful. However, a quick look back in history reveals that "the evolutionary phase of the modern corporation [...] has been accomplished not by any great change either in concept or in statutory enactment, but rather by a long process of grant of management powers piecemeal" (Berle & Means, 1932). Essentially, there was never any great paradigm shift in economic thought whereby politicians decided that legal personality and limited liability should be granted to businesses so that they will become more efficient. The reality is that in the USA near the beginning of the nineteenth century the only businesses that were granted the powers of incorporation were those that worked to improve the infrastructure of a city, such as by building roads and railways, and benevolent organizations such as religious congregations. It is clear that both of these types of organizations are connected in that they both provide clear and direct services to the general public. In fact in his historical review of the corporation in America entitled *The Origins of the American Business Corporation, 1784 – 1855* Ronald Seavoy says of this time period that "limited liability was the price the public willingly paid to get internal improvements built without the expenditure of public funds [...] Such an exception as limited liability could only be justified by the public service a business performed" (Seavoy, 1982). In fact during that time period the granting of limited liability to a business was looked upon as unfair competition. "The competitive businesses, like retail and wholesale merchants, export-

import brokers, ship builders, stage, canal, and river freight lines, and real estate developers, were seldom or never incorporated until the middle 1850s or later" (Seavoy, 1982). This explains why near the beginning of the nineteenth century the powers of incorporation were only granted to those businesses that essentially took up tasks that provided a very obvious public service. "When a state finally adopted a policy of granting charters of incorporation for any legitimate business enterprise (as Connecticut did in 1837 and New York did after 1846), the policy sprang from this earlier relationship: the close identity of interest between state governments and private organizations performing socially beneficial services" (Seavoy, 1982).

The main lesson that can be taken from this is that the reason that corporations in America were formed in the first place was because certain public services, such as major infrastructure projects, required so much capital and had such long payback periods that the public sector could not feasibly take them on, nor could the businesses of the day which were organized as sole proprietorships or partnerships (Lydenberg, 2005). In fact, in the early stages of the granting of incorporation to businesses, every single application for incorporation had to be reviewed and approved by the state because "their purposes had to be made consistent with public welfare" (Seavoy, 1982). Over time state legislature began to permit incorporation for all legitimate businesses belonging to certain industries without having to approve and negotiate each individual charter (beginning with benevolent organizations such as religious congregations, academies and libraries) until eventually, in the mid to late 1800s, most states in the USA granted articles of incorporation to any legitimate business enterprise. It should be readily apparent that, over the years, as the public became more accustomed to businesses which had been granted the privileges of incorporation performing vital public services, it also became less wary of bestowing these privileges on any business. What occurred as a result was

the granting of corporate powers to enterprises that were not necessarily set up to work for the public good.

During the period when every application for corporate status was evaluated on its individual merits, the public sector was wary about granting the powers of legal personality and limited liability to a business and each individual application for incorporation was looked at as a trade-off. In other words, the public was willing to grant special powers to the business in return for some identifiable public service. Over time the public became more and more accustomed to the fact that corporations tend to perform important public services, and eventually this fact was attributed to the corporate form itself rather than to the strict screening process from which corporations were originally spawned. Thus the criteria for incorporation became increasingly lackadaisical, until eventually any legitimate business enterprise could obtain corporate status without ever having to prove its value to society. The end result being that by the middle of the twentieth century corporations had attained large amounts of power, and had little or no accountability to the public. It is essentially this attribution error that led to the rise of the corporation in the USA and as a result to the academic study of these corporations' responsibilities towards society.

2.2: Theories of CSR

For the purposes of this thesis the term corporate social responsibility (CSR) will refer to "the firm's consideration of, and response to, issues beyond the narrow economic, technical, and legal requirements of the firm" (Davis, 1973). Hence when a firm is said to exhibit high CSR performance it will mean that the firm gives more consideration to issues not related its economic, technical and legal requirements than a typical firm. Conversely, when a firm is said to exhibit low CSR performance it will mean that the firm gives less consideration to such issues

than a typical firm. Also for the purposes of this thesis, the field of study of CSR will be defined to include all research into the question of whether or not a company should give consideration to issues not related to its economic, technical and legal requirements. In this section the prevailing academic literature in the field of CSR, as was just described, will be reviewed. More precisely, drawing on works by Domenec Mele (2008) and John Hasnas (1998), four separate theories that attempt to answer the question of whether or not companies should consider issues that reside outside their economic, technical, and legal requirements are presented.

Theory 1: Social Contract Theory (Corporate Social Performance Theory)

This theory, which Hasnas refers to as social contract theory and Mele refers to as corporate social performance theory, argues for the assumption of social responsibilities by business from a purely moral and ethical perspective. This theory states that there exists "an implicit contract between the members of society and businesses in which the members of society grant businesses the right to exist in return for certain specified benefits" (Hasnas, 1998). In this case the "specified benefits" include responsibilities to society beyond wealth creation. They also include "ethical requirements and discretionary or philanthropic actions carried out by business in favour of society" (Mele, 2008). Essentially, the argument is that businesses are granted a great deal of power and power begets responsibility. This way of thinking about the business/society interface dominated much of the corporate social responsibility literature throughout the 1960s and 1970s. One of the more influential works to expound this way of thinking was the 1973 paper by Keith Davis entitled *The Case for and against Business Assumption of Social Responsibilities*. In this paper Davis makes the case for corporate assumption of social responsibilities by reasoning that "the institution of business exists only because it performs valuable services for society. Society gave business its charter to

exist, and that charter could be amended or revoked at any time that business fails to live up to society's expectations. Therefore, if business wishes to retain its present role and social power, it must respond to society's needs and give society what it wants" (Davis, 1973).

As can be seen, Davis does not use any economic arguments to make the case for business' assumption of social responsibilities. He approaches the question from a purely ethical viewpoint employing what is known in the ethics literature as the Iron Law of Responsibility, which states that "in the long run, those who do not use power in a manner which society considers responsible will tend to lose it" (Davis & Blomstrom, 1971). Indeed it is a weakness of the social contract arguments that they do not consider the economic ramifications of the assumption of social responsibilities by businesses. Another weakness of this theory is that there are many varied opinions as to what exactly constitutes a proper definition of CSR. In other words, what exactly are these social responsibilities that corporations are meant to assume? The perspective taken in this thesis is to use the definition that was suggested by Davis in his 1973 paper, and which has already been given above. However this definition is not the only one offered up by the literature,[1] and there remains much ambiguity concerning which definition is the most appropriate. Also, it is possible to argue that even the most complete definitions of CSR remain vague and difficult to interpret, although I feel that the Davis definition is fairly intuitive and serves the purposes of this paper and indeed most other scholarly works on the topic of CSR quite nicely. This ambiguity surrounding the definition of CSR remains a weakness of the social contract theory.

One important point to take away from the Davis definition of CSR is that a firm's social responsibilities begin where the law ends. A firm that behaves in a socially responsible manner

[1] See Wood (1991) for a popular alternative definition of CSR.

considers issues of concern to society beyond those that it is bound by law to consider. This definition should be kept in mind when considering the next CSR theory, which interprets the business/society interface from a purely economic perspective.

Theory 2: Stockholder Theory (or Shareholder Value Theory)

This theory which approaches CSR from an economic perspective was made most famous by economist Milton Friedman in a 1970 article entitled *Social Responsibility of Business*. In this article Friedman sums up the premise of this theory by stating 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 or fraud" (Friedman, 1970). This perspective stems from another realm of literature, namely that of agency theory. In agency theory, corporations are viewed simply as vehicles for the transfer of capital from stockholder to manager. Managers are then given power over the allocation of said capital, but are bound by their agency relationship with the stockholders to allocate the capital in a manner consistent with the wishes of the stockholders. Agency theory tells us that "managers have a duty not to divert business resources away from the purposes expressly authorized by stockholders. This implies that a business can have no social responsibilities" (Hasnas, 1998). By coming at the question from an economic angle rather than an ethical angle the stockholder theory reaches the opposite conclusion of the social contract theory. Since both theories came to prominence around the same time, there was much debate between proponents of the two during the 1960s and 1970s. The main strength of the stockholder theory is that it brings an economic perspective to the issue of CSR. The main weakness of the theory is that it views a business as

merely an economic vehicle and not a collection of people, who as individual moral actors are bound by the laws of ethics and societal norms.

In this sense the two theories that have been discussed so far complement each other quite nicely. Social contract theory considers the ethical and sociological issues that pertain to the question of business' assumption of social responsibilities, while stockholder theory considers the economic ramifications of the question. It is no coincidence that these two perspectives were the earliest ones considered in the literature, and while still pertinent today, they must now compete with some more modern viewpoints concerning the interface between business and society.

Theory 3: Stakeholder Theory

Stakeholder theory has its roots in the field of strategic management, and was popularized by the 1984 book *Strategic Management: A Stakeholder Approach* by Edward Freeman. The basic premise of stakeholder theory is that "effective management requires the balanced consideration of and attention to the legitimate interests of all stakeholders" (Hasnas, 1998). The term stakeholders refers to "any group or individual who can affect or is affected by the achievement of the firm's objectives" (Freeman, 1984). Some common examples of stakeholder groups include governments, local community organizers, shareholders, consumer advocates, customers, competitors, media, employees, special interest groups, environmentalists, and suppliers. Essentially, stakeholder theory expands on the agency arguments of stockholder theory by claiming that managers have a fiduciary responsibility not only to stockholders, but also to all other stakeholders. Stakeholder theory views the firm as a "vehicle for coordinating stakeholder interests" (Hasnas, 1998) and claims that the most

effective way to manage a firm, for greater long term profits and survival, is to constantly strive to balance the often conflicting claims of multiple stakeholders.

It is obvious that stakeholder theory has its roots in strategic management, and it was initially presented as a theory of how to best manage a firm. However, it also suggests an answer to the question of whether businesses should assume social responsibilities. By stating that effective management involves attempting to satisfy the claims of multiple stakeholders it is implied that not all corporate actions will directly benefit stockholders, who make up but one of many stakeholder groups. This contradicts the stockholder theory of corporate social responsibility and suggests that it is in the best interests of a corporation to assume, at least some, social responsibilities. The main strength of stakeholder theory as a theory of CSR is that it does not ignore the economic implications of assuming social responsibilities, as does social contract theory. In fact, stakeholder theory suggests that assuming social responsibilities that are related to a firm's stakeholder groups will indeed increase the chances of its long term survival, and lead to greater long term economic success. A major criticism of stakeholder theory comes from Jensen (2002) who criticizes stakeholder theory for lacking an objective function to optimize. "Stakeholder theory [...] contains no conceptual specification of how to make the tradeoffs among stakeholders that must be made. This makes the theory damaging to firms and to social welfare ..." (Jensen, 2002). Jensen contends that employing stakeholder theory makes it very difficult to measure the performance of a firm and will actually increase the agency costs to the firm by providing managers with a plausible reason for diverting capital into unprofitable ventures. Nevertheless, stakeholder theory has supplanted the social contract and stockholder theories of CSR in the minds of many academics and practitioners.

Theory 4: Corporate Citizenship

The final theory of corporate social responsibility is that of corporate citizenship. This theory, which gained popularity in the 1990s, shares many similarities with social contract theory. However many scholars prefer it because it resolves one of the key weaknesses of the social contract theory. By taking the perspective that there exists an implied social contract between business and society, social contract theory implicitly views business as being separate from society. Corporate citizenship corrects this viewpoint by claiming that businesses are in fact members of society and should behave as would any good citizen.

"Corporations, like individuals, are part and parcel of the communities that created them, and the responsibilities that they bear are not the products of argument or implicit contracts but intrinsic to their very existence as social entities" (Solomon, 1992). The difficult part of this conception of CSR does not lie in recognizing that corporations are members of society, but in explaining exactly what it means to be a good citizen. Clearly being a citizen involves having certain rights and privileges within a community. However it also implies some duties and responsibilities. Among advocates of corporate citizenship a popular framework for defining the roles of a good citizen is that suggested by Aristotle that "citizens, though being dissimilar to each other, have the safety of the community as their work" (Simpson, 1997). Essentially, Aristotle viewed all individuals and businesses as citizens in the community and believed that, although they each have different means and skills to employ, they are united because they both have the same goal, the furtherance of the community. Applied to a modern context we see that all members of society should have as their goal to benefit the community, and should help this cause relative to the means at their disposal.

At its core the theory of corporate citizenship is an updated version of the social contract theory, and it shares many of the same strengths and weaknesses. For instance, like

social contract theory, corporate citizenship does not provide an economic justification for the assumption of social responsibilities by business. It argues for their assumption from an ethical and political science perspective. However, it is more intuitively appealing than the social contract theory from an ethical viewpoint, as it corrects the problem of viewing corporations as being separated from society.

Of the four major theories of CSR, three of them argue for the firm's assumption of social responsibilities. Social contract theory and the theory of corporate citizenship argue that a firm has an ethical obligation to assume social responsibilities, while stakeholder theory suggests that the assumption of social responsibilities may in fact be in a company's economic best interest. Conversely, stockholder theory hypothesizes that firms should not assume any responsibilities that aren't expressly tied to the creation of value for shareholders. The major sticking point seems to be that the field of CSR attempts to connect two very different fields of research.

On the one hand, academic works coming from the field of ethics tend to argue that companies have an ethical duty to assume certain social responsibilities. The company is viewed as either owing a social debt to society (social contract theory), as part of society in the same way as any individual person (corporate citizenship) or often as a collection of individuals who have a "responsibility to be moral actors and to perceive and exercise choice in the service of social responsibility" (Wood, 1991). On the other hand, economic and financial research tends to view a company as a vehicle for the creation of shareholder wealth. Research into whether the assumption of social responsibilities is actually beneficial to a company's ability to create wealth for its shareholders is very much divided. Not coincidentally it is this stream of literature that is examined next.

3: CSR and Financial Performance

While we have presented the arguments for and against business' assumption of social responsibilities from a moral and ethical standpoint, more pertinent to this thesis is the possibility that CSR may actually have an effect on financial performance. In this section a review of the literature investigating the link between CSR and financial performance will be presented. Currently the academic community is far from a consensus on this topic. There exist in the academic canon many studies showing evidence of a positive, a negative, and a lack of a relationship between CSR and financial performance. This section will begin by explaining some of the theories that have been used in past literature to explain the relationship, or lack thereof, between CSR and financial performance, before highlighting the results of a few pertinent studies performed in this area. Also, the concept of socially responsible investing (SRI) will be introduced along with some opinions as to its current influence on the capital markets.

3.1: Theories of CSR and Financial Performance

Unsurprisingly the hypotheses that postulate a negative correlation between CSR and financial performance most often stem from stockholder theory, which was described in section 2. The premise of hypotheses based on stockholder theory being that any time spent by management on pursuits that are not related to increasing shareholder wealth, is by definition destructive to firm value. Becchetti et al (2007) relate this hypothesis more directly to the stakeholder strategic management technique, and refer to it as the shift of focus theory. The shift of focus theory states simply that CSR activities involve a "shift of focus from the maximization of shareholders' value to the satisfaction of the interests of a broader set of stakeholders" (Becchetti et al, 2007) which will inevitably cause financial performance to suffer.

As can be seen this idea is directly opposed to stakeholder theory which posits that the best way to achieve long term financial performance is to focus on a broad set of stakeholders.

While various versions of the 'shift of focus hypothesis' are the most often cited reasons for postulating a negative relationship between CSR and financial performance, there also exist many reasons why a positive relationship between the two may be expected.[2]

There are five main arguments that are commonly used to explain a positive relationship between CSR and financial performance. The first one is that engagement in CSR activities may actually reduce costs and risks for the firm, hence leading to improved financial performance. This argument is closely tied to the stakeholder theory, which postulates that the best way to achieve strong financial performance in the long-run is to focus management strategy on satisfying the demands of all of the firm's stakeholders. "Under a cost and risk reduction perspective of the CSR business case, the primary view is that the demands of stakeholders present potential threats to the viability of the organization, and that corporate economic best interests are served by mitigating those threats through a threshold level of social or environmental performance" (Kurucz et al, 2008). For example, under this hypothesis, the act of a company like Home Depot ceasing to sell wood products harvested from endangered forests (Vogel, 2005) is a risk reducing strategy in the sense that it reduces the chance that a stakeholder group supporting endangered forests will take some future legal or civil action against them.

The second reason why a positive link between CSR and financial performance may be postulated is that CSR initiatives may provide a competitive advantage to the firm implementing them. This argument also stems from the stakeholder management theory, but rather than

[2] The postulated reasons for a positive relationship between CSR and financial performance in this section are summarized from Kurucz, Colbert and Wheeler (2008).

viewing stakeholder demands on the firm as constraints, as was done with the cost and risk reduction argument, they are now viewed as opportunities to be leveraged and made profitable. For example the act of a coffee chain such as Starbucks selling Fair Trade coffee is a CSR friendly response to stakeholder demands. However, these stakeholder demands also offer Starbucks the opportunity to make a profit off of a new line of products.

The third argument as to why a positive link between CSR and financial performance may be found is that investment in CSR initiatives may improve a firm's reputation and legitimacy. Essentially this hypothesis claims that consumers, employees, and investors consider a firm's CSR reputation when considering what product to buy, where to work, and where to invest respectively. This would lead to improved financial performance because firms exhibiting high CSR performance would experience greater sales, hire better employees, and have increased access to capital relative to their low CSR performing peers. This issue will be taken up in greater detail in the section on SRI.

The fourth reason why a positive correlation may be found is sometimes known as the slack resources theory or the available funds hypothesis (Kurucz et al, 2008). This hypothesis suggests that there is a positive correlation between CSR and financial performance, but that the chain of causation does not run from CSR to financial performance, but from financial performance to CSR. In essence it is suggested that the "profitability of the firm allows and/or encourages managers to implement programs that increase the level of corporate social responsibility" (Stanwick & Stanwick, 1998).

The fifth and final reason why a positive association between CSR and financial performance may exist is essentially a combination of the slack resources theory and the competitive advantage hypothesis. This reason, sometimes known as the "virtuous cycle"

(Orlitzky et al, 2003), suggests that "financially successful companies spend more [on CSR] because they can afford it, but [CSR] also helps them become a bit more successful" (Orlitzky et al, 2003). If the virtuous cycle is extended into the long-run, it clearly leads to firms with high CSR performance outperforming firms with low CSR performance (Pava & Krausz, 1995).

It is also quite possible for an empirical study to find no link between CSR and financial performance, and there exists many reasons to expect this result. One possible reason is that due to the vagueness surrounding the definition of CSR it is very difficult to approximate it in an empirical setting. It has even been suggested that "because of the uncertainty surrounding definitions of CSR there is no such thing as CSR, and, therefore, firms that may have been identified as socially responsible are, in fact, no different from other, non-socially responsible firms" (Pava & Krausz, 1995).

All of the theories described above have been put forward in the literature as explanations for an empirically observed result concerning the link between CSR and financial performance. The following section describes the results of some of these studies.

3.2: Empirical Evidence on the Link between CSR and Financial Performance

Over the years many researchers have empirically tested the relationship between CSR and financial performance. Many different data sets have been used to represent CSR and many different performance indicators have been used to measure financial performance. Also, different conclusions have been reached concerning the nature of the relationship.

Vance (1975) was one of the first to document a negative relationship between CSR and financial performance. He sent a survey to 86 "corporate staffers in the urban affairs and public affairs fields" (Vance, 1975) and also to 300 business graduate students, asking them to rank the

social responsibility of 45 major corporations on a scale of 1 to 5. He then examined the financial performance of these 45 firms over the year 1974, using market returns as his measure. Vance documented a negative relation between market returns in the year 1974 and social responsibility rating for both the surveys of business executives and students. In fact his results indicated that a company could be expected to lose 23% in value for each 1 point increase in social responsibility rating, as rated by the business executives, and to lose 18.03% for each 1 point increase in social responsibility rating, as rated by the graduate students. All of this led him to conclude that "corporations rated [...] as socially responsible do not seem to be good investment risks" (Vance, 1975).

More recently, Fisher-Vanden & Thorburn (2008) also documented a negative relationship between CSR and financial performance. Using event study methodology they showed evidence of significantly negative abnormal market returns for firms that announce membership in the EPA Climate Leaders program. Membership in the EPA Climate Leaders program entails that the firm "set aggressive 5-10 year goals for the reduction of greenhouse gases, and annually track and report their emissions to measure progress" (Fisher-Vanden & Thorburn, 2008). Therefore, it is reasonable to suggest that the act of voluntarily joining the EPA Climate Leaders program represents a corporate initiative that corresponds to the definition of CSR used in this thesis. They also documented that firms who join CERES, a program that is similar to EPA Climate Leaders but with less stringent requirements, experienced no abnormal returns surrounding the event of announcing membership. All of this led them to conclude that "environmentally responsible investments of [the sort described above] conflict with shareholder interests" (Fisher-Vanden & Thorburn, 2008).

There have also been many studies to document a lack of a relationship between CSR and financial performance. One of these, by Aupperle, Carroll & Hatfield (1985), measured CSR using a survey that was completed by 241 CEOs listed in the Forbes 1981 Annual Directory. The survey involved the CEOs selecting from sets of statements based on their desirability. Each set of statements was constructed to range from indicating a low orientation towards CSR to indicating a high orientation towards CSR. Financial performance was then measured for all 241 responding firms using the accounting based measure of return on assets (ROA) adjusted for risk using scores from the Value Line Safety Index. The bottom line is that Aupperle et al (1985) found no association between "a strong orientation toward social responsibility" (Aupperle et al, 1985) and financial performance.

Although the linkage between CSR and financial performance remains very much an un-resolved issue, it is a fact that most studies on the topic have favoured a positive relationship between the two. As was written in 1995, "nearly all empirical studies to date have concluded that firms that are perceived as having met social responsibility criteria have either outperformed or performed as well as other firms that are not necessarily socially responsible" (Pava & Krausz, 1995). It should be noted, however, that the number of studies alone does not constitute proof of anything, and it has been claimed by many researchers that those studies that are the most methodologically sound do not reach the conclusion that a relationship exists between CSR and financial performance (Aupperle et al, 1985).

That being said, one of the many studies to postulate a positive relationship between CSR and financial performance is by Anderson & Frankle (1980). In this study the authors examined differences between firms that chose to disclose social performance information in their 1972 annual reports and those that did not. Using two portfolios constructed to have

equal systematic risk, one consisting of the firms that chose to disclose social information and the other consisting of firms that did not. Anderson & Frankle (1980) found that the socially disclosing portfolio outperformed the other portfolio. This result led them to conclude that "social disclosure has information content and that the market values this disclosure positively" (Anderson & Frankle, 1980).

A more recent study of the linkage between CSR and financial performance, that is especially relevant to this thesis, was performed by Tsoutsoura (2004). Tsoutsoura used ratings prepared by KLD, the same company that maintains the DS400, to measure the CSR performance of the firms on the S&P 500 index. As a second measure of CSR performance Tsoutsoura used a dummy variable representing whether or not the company was included on the DS400. To measure financial performance she favoured the accounting measures of return on assets (ROA), return on equity (ROE), and return on sales (ROS). Using data from 1996 to 2000, and controlling for industry and size, Tsoutsoura documented a positive relationship between DS400 inclusion and ROA and ROS. She also documented a positive relationship between the KLD ratings and all three of the financial performance variables, leading to the conclusion that "socially responsible corporate performance can be associated with a series of bottom-line benefits" (Tsoutsoura, 2004).

There have been several attempts made to compile all of the existing literature on the relationship between CSR and financial performance, easily the most sophisticated of which was a 2003 paper by Orlitzky, Schmidt and Rynes titled *Corporate Social and Financial Performance: A Meta-Analysis*. In this study the authors compiled the results from 52 prior studies, spanning many different disciplines. Then, using statistical aggregation techniques, cumulated the correlations from all studies while simultaneously correcting for sampling and measurement

error. This meta-analysis led them to find a positive association between CSR and financial performance and to conclude that "the mainstream claim that we have little generalizable knowledge about [CSR] and [financial performance] is built on shaky grounds" (Orlitzky et al, 2003). Another important finding from this study is that the association between CSR and financial performance is very sensitive to the means of CSR and financial performance measurement. For instance the authors found that, in general, CSR is much more likely to be related to accounting measures of financial performance than to market based measures. Also, they found a very strong correlation between market based measures of financial performance and reputation index operationalizations of CSR. The reputation index method of CSR measurement is defined by the authors to include surveys of business professionals and students and any other survey or opinion based rating of CSR, such as those often found in *Fortune* magazine. By contrast, Orlitzky et al find hardly any correlation between market based measures of financial performance and social audit measures of CSR. Social audit measures of CSR "consist of a systematic third-party effort to assess a firm's objective [CSR] behaviours" (Orlitzky et al, 2003). The KLD ratings used by Tsoutsoura (2004) would fall into this category.

In a few empirical studies the link between CSR and financial performance has been examined using market returns surrounding the event of a change to the DS400, the most well known socially screened stock index. As the methodology of those studies is replicated in this paper, research of this nature merits a more in depth review in this thesis.

Becchetti, Ciciretti & Hasan (2007) documented a "significant upward trend in absolute value abnormal returns of the sample events, irrespective of changes (addition or deletion) in the index" (Becchetti et al, 2007). They also found a negative effect upon the event of DS400 deletion, but no effect upon the event of DS400 addition. Essentially they found, using a sample

of DS400 changes from 1990 to 2004, that there was a significantly negative market reaction to the event of a firm's deletion from the DS400, and no significant reaction to the event of a firm's addition to the DS400. They also found evidence that the abnormal returns tend to revert to mean between 11 and 24 days post-event, and that the market impact of the event of DS400 change (irrespective of type) has increased over time. One concern the authors had was that the negative abnormal returns evidenced around the event of deletion from the DS400 may be attributable to some concurring event of financial distress. However, when they re-examined the sample of deletion events "net of the effect of those which [were] likely to be related to financial distress" (Becchetti et al, 2007) they found that "the negative effects of exits on abnormal returns still applies" (Becchetti et al, 2007). In conclusion, the authors attribute the negative market reaction to a DS400 deletion event to "the reaction of ethically screened funds" (Becchetti et al, 2007) more so than from "an expected negative shock on shareholders' value" (Becchetti et al, 2007).

In a similar study Ramchander, Schwebach & Staking (2009) find evidence of positive abnormal returns surrounding the event of addition to the DS400 and negative abnormal returns surrounding the event of deletion. Furthermore, they separate the samples of announcements into two categories based on the reason for addition or deletion. The first sub-sample, which they name relational announcements, consists of firms that are added to, or deleted from, the DS400 due to their "primary stakeholder related activities" (Ramchander et al, 2009). The second sub-sample, which they name non-relational announcements, consists of firms that are added to, or deleted from, the DS400 due to their "broader social agenda activities" (Ramchander et al, 2009). The authors find that the positive abnormal returns surrounding the additions are attributable to the relational announcements and not the non-relational ones. In contrast, they find negative abnormal returns surrounding deletions for both

relational and non-relational announcements. The authors also examine the reactions of the added or deleted firms' competitors. They find that rival firms earn negative (positive) abnormal returns when a firm is added (deleted) for relational reasons, and positive (negative) abnormal returns when one is added (deleted) for non-relational reasons. Based on this evidence the authors conclude that "CSR has a positive impact on share price performance only if firms engage in effective stakeholder management (i.e., building long-term relationships with their primary stakeholders), as opposed to pursuing general social issues" and that "investments made in social responsibility are best focused on changes that create long-term competitive advantages, ones that are not easily replicable by competitors" (Ramchander et al, 2009).

While the form of market return event study employed by Becchetti et al (2007) and Ramchander et al (2009) potentially has some explanatory power concerning the relationship between CSR and financial performance, it also captures the behaviour of so called socially responsible investors and their influence in the financial markets. The next section considers the issue of socially responsible investing (SRI) in more detail.

3.3: Socially Responsible Investing (SRI)

So far this paper has focussed mainly on the concept of CSR. Questions have been raised concerning whether or not companies should consider "issues beyond the narrow economic, technical, and legal requirements of the firm" (Davis, 1973), and indeed whether taking initiatives in this vein may indeed pay off financially. A related, but distinctly different, concept is that of SRI. SRI is in essence the act of incorporating social and ethical concerns into the investment decision making process, in this sense it can be thought of as the application of CSR concepts in the financial markets. Through an examination of the investors who practice SRI, Lloyd Kurtz offers the simplest definition of the concept. "All social investors include in their

investment decision processes, over and above considerations of financial risk and return, some combination of ethical, religious, social, and environmental concerns" (Kurtz, 2008). Kurtz also is careful to point out that there are different SRI investors who have different motivations for investing as they do. In fact he describes three types of social investors. *Value-based investors* are investors whose "decision to include non-financial variables in their portfolio policy is driven primarily by their desire to have investments that are consistent with their moral beliefs" (Kurtz, 2008). *Value-seeking investors* are investors who "use social and environmental data to enhance portfolio performance" (Kurtz, 2008). Finally, *value-enhancing investors* are investors who use "shareholder activism techniques to enhance investment value" (Kurtz, 2008).

In his 2005 book entitled *Corporations and the Public Interest* Steven Lydenberg argues that due to worldwide decreases in government ownership and regulation there exists today a substantial disconnect between the interests of corporations and the public interest. He then goes on to propose SRI as a means for directing corporations back towards the public interest. He defines the public interest as "the creation of value that will continue to benefit members of society even if the corporation were dissolved today" (Lydenberg, 2005). Lydenberg also argues that in order to better serve the public interest, rather than focusing purely on bottom line profitability, corporations should focus on long-term wealth creation which he defines as "encompass[ing] productivity gains and technological advances, but [...] also demand[ing] that the profits generated not be made at the expense of society or the environment and that they be productively reinvested for the benefit of the corporation's stakeholders" (Lydenberg, 2005). SRI is viewed as the means for achieving the realignment between corporate and societal interests, because through the power of the financial markets investors exert influence on which corporations have access to capital. Lydenberg argues that if investors chose to reward corporations that create long-term wealth as opposed to those that do not, then all

corporations would eventually adopt long-term wealth creation as their ultimate goal, leading to a corporate world that better serves the public good.

One could argue that while theoretically appealing, Lydenberg's vision of capital markets that reward and punish corporations based on a new idea of wealth creation that includes both financial and CSR related concerns is simply impractical. In his book entitled *The Market for Virtue* David Vogel agrees that Lydenberg's vision could work in principle, but that the current state of the corporate world provides no indication that such a system is possible.

"In principle, if most individuals' decisions about what and where to buy, and where to work and to invest, were informed by how responsibly firms acted, then the market for virtue would work effectively: all companies would have a strong incentive to change their policies and practices in order to attract and retain customers, employees, and investors. Unfortunately, while many people profess to care about CSR and claim that it informs their marketplace decisions, relatively few act on these beliefs. A company's degree of social responsibility or irresponsibility has rarely affected its sales, its attractiveness to potential employees, or its access to capital" (Vogel, 2005).

However, several other scholars are more optimistic. In 1980 Anderson & Frankle claimed that "ethical investors do exist and may in fact dominate the market." (Anderson & Frankle, 1980). This notion was seconded by Garone (1999) who claimed that "[SRI] has reached the scale where it has begun to make a difference in the shareholder relations of publicly traded companies." He added that "Investor concerns about [CSR] can give a significant advantage in shareholder relations to companies that have a clear commitment to, and strategy for attaining, positive corporate social performance as part of their plan for increasing shareholder value" (Garone, 1999). Lydenberg himself feels that "although [SRI] activities have gained momentum

in recent years, they have yet to become an important part of the mainstream marketplace" (Lydenberg, 2005). However, he also believes that the potential exists for this to change. He identifies that two steps which could be taken to help drive this change would be "ensuring that consumers and investors have relevant [CSR related] data at the point of purchase, and fostering greater public debate about the nature of price and returns" (Lydenberg, 2005).

But what does the data say about the prevalence of SRI? A 2007 report shows that SRI has increased greatly over the recent years claiming that "roughly 11 percent of assets under professional management in the U.S. – nearly one out of every nine dollars – are now involved in SRI" (Social Investment Forum, 2008). This represents an 18% increase in SRI assets under professional management from 2005 to 2007. For the purposes of comparison, all assets under professional management in the USA increased by less than 3% over this same time period (Social Investment Forum, 2008). These figures come from the *2007 Report on Socially Responsible Investing Trends in the United States* and have been criticized as being somewhat exaggerated since they consider investments employing even a single social screen as being SRI investments. If this definition is altered so that SRI investments are considered to be those employing more than one social screen, then it has been calculated that SRI investments represented approximately 4% of all assets under management in the U.S. in 2006 (Kurtz, 2008).

One of the goals of this thesis is to evaluate the extent to which SRI currently influences the market, by examining the market and analyst reactions to CSR related events. Hopefully, some insight will be provided as to the extent to which the financial system is currently set up to influence corporations towards the public interest, and also as to the feasibility of Lydenberg's vision coming to fruition. The aforementioned CSR related events are additions to and deletions from the DS400, an index of US equities that is screened for criteria related to CSR. In order to

better understand how the market reacts to index changes in general, it is a good idea to look at prior works concerning the market response to the changes to a more conventional stock index that does not consider CSR criteria, namely the S&P 500.

4: S&P 500 Index Changes

Academics who have considered the market effects of S&P 500 index changes have reached a consensus that there is a definite positive market response to the event of a firm's addition to the S&P 500. However different studies have postulated many different reasons for this documented positive price increase.

One of the first works to document this positive price response upon addition to the index was Harris & Gurel (1986). Harris & Gurel (1986) find a large increase in both trading volume and price for added firms on the first trading day after the addition is announced. They attribute this market reaction to what they call the price pressure hypothesis. This hypothesis essentially states that when a stock is added to the index there is an upward shift in its demand due to the numerous investors who passively track the S&P 500. They claim that the immediate price increase "is necessary to induce passive demanders to offer their shares" (Harris & Gurel, 1986). They also document that the price tends to revert back to its normal level after two weeks allowing investors who had offered their shares to indexers at an inflated price to "re-establish their position (if desired) at a net profit" (Harris & Gurel, 1986). A key assumption in this result is that the event of addition to the S&P 500 conveys no information as to the future prospects of the added stocks, as is explicitly stated by S&P. The fact that the authors document a price reversion in the two weeks following the event seems to corroborate this assumption.

A slightly different interpretation of the price increase surrounding S&P 500 addition comes from Shleifer (1986) who claims that the positive price response to S&P 500 addition

constitutes evidence that the demand curves for stocks are downward sloping. If the demand curves for stocks are horizontal, as has been theorized, this implies that it is possible to "buy and sell any amount of the firm's equity without significantly affecting the price" (Shleifer, 1986). Shleifer claims, as do Harris & Gurel (1986), that since the event of addition to the S&P 500 conveys no information concerning the intrinsic value of the stock, any price increase surrounding addition can only be attributed to the demand shock caused by S&P 500 indexers. However, unlike Harris & Gurel (1986), Shleifer finds that the stock price for added firms does not revert for at least ten days after the addition. The price reaction to a demand shock accompanied by a lack of price reversion leads Shleifer to conclude that "demand curves for stocks slope down" (Shleifer, 1986).

The common theme between the previous two works is that both assume that the event of addition to the S&P 500 conveys no information about the intrinsic value of the stock. A study by Dhillon & Johnson (1991) challenges this assumption by claiming that, even though S&P makes claims to the contrary, addition to the S&P 500 index is not an informationless event. The authors document that "stocks, bonds, and calls for firms being listed in the S&P 500 have price increases on the announcement date" (Dhillon & Johnson, 1991). The fact that call options also increase in price refutes the price pressure hypothesis put forth by Harris & Gurel (1986). If the price pressure hypothesis was true it could be expected that call option prices would be unaffected by the event, because they are derived from "the distribution of future stock prices" (Dhillon & Johnson, 1991) which do not change under the temporary price shock predicted by the price pressure hypothesis. The fact that both bond and call option prices increase along with stock prices refutes the downward sloping demand curve theory of Shleifer (1986). If Shleifer's reasoning is correct and increased demand alone can cause a stock price increase, then given the fact that bond and call option prices also increase it must be true that all three

instruments are close substitutes for one another, which the authors argue is not likely given "tax treatment and transaction costs" (Dhillon & Johnson, 1991). This leaves Dhillon & Johnson (1991) to conclude that there is some information being conveyed by the event. They postulate that the price increase could occur because S&P 500 firms receive closer scrutiny which could reduce asymmetric information and agency costs.

Hegde & McDermott (2002) offer yet another explanation for the observed price increase surrounding S&P 500 addition. Specifically, they document a decrease in the bid-ask spreads following addition that does not revert over the following three months. This indicates that added stocks experience a sustained increase in liquidity. They also claim that this liquidity increase "stems mainly from a significant decrease in the direct cost of trading and, to a lesser extent, from a decrease in the asymmetric information cost of trading" (Hegde & McDermott, 2002). The authors claim that an increase in liquidity will lead to a decrease in the required rate of return for the stock and hence an increase in price. They name this the "liquidity-wealth-effect hypothesis" (Hegde & McDermott, 2002) and claim that it is at least partly responsible for the observed price reaction following an index addition.

A study that is very important for the purposes of this thesis is that of Denis, McConnell, Ovtchinnikov, and Yu (2003). This study uses the earnings forecasts of equity analysts to show that S&P 500 addition is not an information free event. Their methodology is applied to the DS400 in this thesis. The authors document that the change in median eps forecast from before to after the event of index addition is significantly less negative for added firms than for a benchmark of non-added firms. This result would seem to imply that the event of S&P 500 addition conveys some information to the market concerning the intrinsic value, or future earnings potential, of the added firm. Denis et al (2003) contend that the information effect

could be caused by the closer scrutiny that was hypothesized by Dhillon & Johnson (1991), but that they cannot rule out the possibility that "S&P (unknowingly) has access to information not available to other market participants" and that "despite its assertions to the contrary, [it] embeds some analysis of the future prospects of the candidate companies when it chooses one to be included in the index" (Denis et al, 2003).

One final explanation for the price response to S&P 500 index changes is proposed by Chen, Noronha, & Singal (2004). By examining both additions to and deletions from the S&P 500 the authors are able to find evidence that casts doubt on the information hypothesis of Denis et al (2003) and Dhillon & Johnson (1991), the liquidity effect of Hegde & McDermott (2002), and the downward sloping demand curve of Shleifer (1986).[3] Chen et al (2004) find evidence of an asymmetric price response between additions and deletions. That is, "there is a permanent increase in the price of added firms but no permanent decline for deleted firms" (Chen et al, 2004). This casts doubt on the information, liquidity, and demand curve explanations because all three of them would predict a similar, yet opposite, price response for additions and deletions. Chen et al (2004) posit an explanation for the price effect based on investor awareness levels. They claim that "there is an increased awareness for added stocks as investors learn about them, but a smaller drop in awareness for deleted stocks" (Chen et al, 2004) since investors do not simply forget about them. They posit that the increased awareness following an S&P 500 addition leads to enhanced monitoring by investors, improved access to capital markets, and a reduction in information asymmetry which will all lead to an increase in price, and that these three items don't decrease to the same degree following a deletion from the index.

[3] The price pressure hypothesis of Harris & Gurel (1986) having been already largely rejected due to numerous studies that document the price increase surrounding addition to be permanent.

5: Hypotheses

The empirical tests performed in this thesis can be separated into two parts. The first part consists of an analysis of the price and volume reactions that occur as a result of a firm's addition to or deletion from the DS400. Consistent with prior research, Becchetti et al (2007) and Ramchander et al (2009), I hypothesize that firms added to the DS400 will exhibit an abnormally positive price and volume reaction, while firms that are deleted from the DS400 will exhibit an abnormally positive volume reaction and an abnormally negative price reaction. More formally, the following hypotheses will be tested:

Hypothesis 1:

H_0: Actual returns earned by firms added to the DS400 around time of addition = Expected returns of those firms had the event of addition never occurred

vs

H_a: Actual returns earned by firms added to the DS400 around the time of addition > Expected returns of those firms had the event of addition never occurred

Hypothesis 2:

H_0: Actual returns earned by firms deleted from the DS400 around the time of deletion = Expected returns of those firms had the event of deletion never occurred

vs

H_a: Actual returns earned by firms deleted from the DS400 around the time of deletion < Expected returns of those firms had the event of deletion never occurred

Hypothesis 3:

H_0: Trading volume of firms added to the DS400 around the time of addition = Expected trading volume of those firms had the event of addition never occurred

vs

H_a: Trading volume of firms added to the DS400 around the time of addition > Expected trading volume of those firms had the event of addition never occurred

Hypothesis 4:

H_0: Trading volume of firms deleted from the DS400 around the time of deletion = Expected trading volume of those firms had the event of deletion never occurred

vs

H_a: Trading volume of firms deleted from the DS400 around the time of deletion > Expected trading volume of those firms had the event of deletion never occurred

If the above null hypotheses are not rejected and there is no evidenced price or volume reaction to DS400 addition or deletion it would provide evidence to suggest that not only does CSR information have no significant influence on financial performance, assuming that DS400 changes are used by investors as a source of CSR information, but also that social investors have no significant influence on the capital markets.

If, on the other hand, the above 4 null hypotheses are rejected and it is evidenced that additions are met with a positive price and volume response, and deletions are met with a positive volume response and a negative price response. It would seem to indicate one of two things. Either price and volume are being influenced by social investors who use the DS400 as a

source of CSR information (I will call this the *Demand Effects* explanation), or the news of DS400 inclusion or removal is providing some information as to the intrinsic value of the added or deleted firm and this change in the expected future distribution of cash flows is influencing the firm's stock price (I will call this the *Information Effects* explanation). The next set of empirical tests in this paper attempts to determine whether the *demand effects* or the *information effects* explanation is most appropriate.

In an effort to distinguish among the two competing explanations for a price response to DS400 changes, the methodology that Denis et al (2003) applied to the S&P 500 is applied here to the DS400. That is, the eps forecasts of professional equity analysts are examined for periods surrounding the event of addition to or deletion from the DS400. In theory equity analysts base their projections for a firm's future earnings on a strictly fundamental analysis of the firm's intrinsic value. That is, the firm's expected distribution of future cash flows. Therefore, unlike stock prices, eps forecasts are not influenced by demand shocks. They can only be influenced by information that is perceived by the analyst to affect the distribution of the firm's future cash flows. This distinction leads to the following hypotheses being tested:

Hypothesis 5:

H_0: Change in analyst eps forecast for an added firm surrounding the event of addition to the DS400 = Change in analyst eps forecast for a non-added firm during the same time period

vs

H_a: Change in analyst eps forecast for an added firm surrounding the event of addition to the DS400 ≠ Change in analyst eps forecast for a non-added firm during the same time period

Hypothesis 6:

H_0: Change in analyst eps forecast for a deleted firm surrounding the event of deletion from the DS400 = Change in analyst eps forecast for a non-deleted firm during the same time period

vs

H_a: Change in analyst eps forecast for a deleted firm surrounding the event of deletion from the DS400 ≠ Change in analyst eps forecast for a non-deleted firm during the same time period

If the null hypotheses cannot be rejected it would seem to indicate that CSR information has no effect on the forecasts of equity analysts, at least to the extent that such information is conveyed by changes to the DS400, and that any observed price reaction to these changes is more likely to be caused by *demand effects* and the influence of social investors.

On the other hand, if it is found that DS400 additions are accompanied by more favourable analyst eps forecast responses and DS400 deletions are accompanied by less favourable analyst eps forecast responses, it would provide support for the *information effects* explanation that DS400 changes are a source of information regarding a firm's intrinsic value. Also, to the extent that the information conveyed by the DS400 changes is information related to a firm's CSR performance, this result would provide evidence supporting a positive linkage between CSR and financial performance.

It is also possible that it will be found that DS400 additions are met with less favourable anayst eps forecast responses and DS400 deletions are met with more favourable analyst eps forecast responses. This result would imply that any observed positive price reaction to the event of addition or negative price reaction to the event of deletion would most likely be the result of very strong *demand effects*. That is, the influence of social investors would have to be so strong as to overcome the fact that there is some information about the firm's intrinsic value

being conveyed that is driving the stock's price in the opposite direction. Obviously, this result would also indicate that DS400 changes convey some news concerning the added or deleted firm's intrinsic value, and to the extent that this new relates to the firm's CSR performance, it would indicate a negative relationship between CSR and financial performance.

6: Data

A key assumption made in this study is that social investors use the event of a DS400 change as a source of information concerning the added or deleted firm's CSR performance. While this is certainly true for social investors whose strategy is to passively track the DS400, of which there are many. It is not obviously the case for all social investors. Additionally, in order for this thesis to put forth any evidence concerning the linkage between CSR and financial performance it must be assumed that DS400 changes convey information related to a firm's CSR performance and nothing else. Therefore an examination of the methodology used to construct the DS400, accompanied by an analysis of its usefulness as a proxy for CSR performance is warranted at this stage.

6.1: The Domini 400 Social Index (DS400)

The Domini 400 Social Index (DS400) was launched on May 1st, 1990 by the company KLD Research & Analytics. It was the first index of its kind, a benchmark designed to measure the effects of socially responsible investment screens on investment performance. Over the years, as the popularity of socially responsible investing has become more widespread, many more of these indexes have been created. In fact KLD itself now maintains 18 different socially responsible indexes and as of March 31st 2008 there was more than $11 billion invested in funds that track a KLD maintained index (KLD, 2008).

The DS400 is a float-adjusted, market capitalization weighted index of common U.S. equities that is derived from the S&P 500 stock index. This means that at all times the DS400 seeks to maintain sector and industry weights close to that of the S&P 500. The DS400 always consists of 250 firms that are also on the S&P 500 index, 100 additional large and mid cap companies, and 50 small cap companies with exceptional environmental, social or governance performance (KLD, 2008). A very detailed methodology is followed in order to determine which stocks will make up the index. This selection process may be broken down into four steps: (i) Qualification, (ii) Approval, (iii) Selection and (iv) Monitoring (KLD, 2008).

Step 1: Qualification

In this step KLD screens the entire eligible investment universe, selecting only those companies that meet the minimum financial and ESG[4] criteria that are demanded by the DS400. The eligible investment universe consists of the 3000 largest U.S. equities and companies are only considered for addition to the DS400 if they can pass all of the following screens:

(a) Must have market capitalization > $200 million

(b) Must have share price > $5.00

(c) Must have trailing 12 month earnings > 0

(d) Must have a debt to equity ratio < 70%, or ≤ the industry average

(e) Must have > 5 million shares outstanding

(f) Must be listed on either NYSE, AMEX, or NASDAQ

[4] ESG is an acronym which stands for Environmental, Social and Governance. It represents, in broad terms, the socially responsible investing factors that are considered by KLD when forming the DS400 and other indexes.

(g) Must not be involved in any of the following industries: (i) Tobacco, (ii) Alcohol, (iii) Gambling, (iv) Firearms, (v) Military Weapons, or (vi) Nuclear Power.

Step 2: Approval

All stocks that pass the initial screening process are then submitted to the index committee for approval. KLD then keeps a list of approved companies from which all future index additions will be drawn. A company will be approved if it is either: (i) one of the top ESG performers on the S&P 500, (ii) one of the top ESG performers in the entire investable universe, (iii) one of the top ESG performers in its industry, (iv) a company whose products and/or services are deemed beneficial to society, (v) a small cap company with exceptional ESG characteristics, or (vi) a company that has demonstrated a commitment to improving its ESG performance. The committee uses KLD's own ESG reports to evaluate the ESG performance of all qualified firms.

KLD keeps continuously updated ESG reports on all of the 3000 largest U.S. equities. These reports essentially tabulate the strengths and weaknesses (concerns as per KLD) of each company for each ESG issue that KLD has identified. Table 1 presents the ESG issues that are evaluated by KLD in their ESG reports.

Step 3: Selection

Since the DS400 is always maintained at 400 firms, a new firm is only added to the index when another one is removed. When a company is removed, for any of the reasons that are described in step 4, a new company is then chosen from the list of approved companies to replace it. The new company that is chosen will be chosen in order to keep sector and industry weights as close as possible to those of the S&P 500, and also to ensure that the index maintains

its distribution as: (i) 250 firms that are also on the S&P 500 index, (ii) 100 additional large and mid cap firms, and (iii) 50 additional small cap firms.

Step 4: Monitoring

The DS400 is continually monitored to ensure that all companies continue to meet all of the criteria for inclusion on the index. A company may be removed from the index at any time if it is deemed that it no longer meets the criteria for index inclusion. There are several reasons why a company may be removed from the DS400, they are:

(a) Corporate Actions: If a company listed on the DS400 acquires another company that is also listed on the DS400, then the new company remains on the index and 1 new company is added to the index. If a merger takes place between a firm that is listed on the index and another that is not, then the ESG merits of the new company are evaluated and a decision is made about whether the new firm should remain on the index.

(b) Delisting from NYSE, AMEX, or NASDAQ: Any company that is delisted by one of the major U.S. stock exchanges will be removed from the DS400.

(c) Bankruptcy Filing: Any company that files for bankruptcy will be removed from the DS400.

(d) Deteriorating Financial Quality: A company will be removed for financial reasons if any of the following occurs: (i) Impending bankruptcy, (ii) Downgrade of credit rating to junk bond status, (iii) Market capitalization less than $200 million for more than 6 months in any one year, (iv) 12 month trailing average of stock price less than $5, (v) 12 month trailing average earnings less than 0, (vi) Removal from S&P 500.

(e) Failure of ESG screens: If it is determined that the company is no longer a top ESG performer, or if it enters one of the aforementioned banned industries, then it will be removed from the DS400.

Another issue of great importance to the event study in this thesis is how KLD disseminates the news of changes to the companies on the DS400. This procedure has changed several times over the years. From the inception of the index (May 1st, 1990) until Feb. 26th, 2003, KLD communicated index changes to the affected company on the date when the index change came into effect. No press release was made by KLD, but the affected companies could choose to further publicize the news if they desired. Beginning Feb. 27th, 2003, KLD began making public announcements of each index change (Ramchander et al, 2009). The current system in place at KLD involves publicizing the index changes from the previous month on the 15th of the next month. This system came into effect in April 2006.

By limiting the sample of DS400 changes in this paper to those that occurred between May, 1990 and April, 2006 all of the observations for which the effective date and announced date of index change do not correspond have been removed. Hence, it is reasonable to use the date upon which the index change became effective as the event date for the studies conducted in this thesis.[5]

Some academic work has questioned the usefulness of DS400 changes as a proxy for CSR performance. One criticism is that the technique of screening out certain industries is "not an adequate way of extensionally defining [CSR]" (Van Oosterhout & Heugens, 2008). The argument goes that the decision as to which industries to exclude is largely arbitrary and may not necessarily reflect the moral viewpoint of all investors. For example while companies that

[5] The same date convention was employed by Becchetti et al (2007) and Ramchander et al (2009).

engage in the production of alcohol or tobacco products are excluded from the index, there is no reason to believe that companies in these industries may not perform better in many other CSR related areas, such as concern for the environment, than firms that operate within industries that are eligible for inclusion. This point is definitely valid, and it is certainly true that every social investor will have different ideas about what constitutes socially responsible behaviour on the part of corporations. The construction process followed by the DS400 can necessarily only follow one set of values, which may not be shared by all, and to say that a firm that is not present on the DS400 is not a high CSR performer would be incorrect. For the purposes of this thesis however, we need only assume that the DS400 is viewed by the investing public as a collection of firms that exhibit excellent CSR performance, that many social investors track it as part of their investment strategy, and that others use it as a source of CSR information.[6] The fact that some deserving companies may be left off of the index is largely irrelevant.

A second criticism against the use of the DS400 to measure CSR is that when constructing the index "it is KLD's deliberate intention to select firms that generate better-than-average financial returns" (Van Oosterhout & Heugens, 2008). If this is true it would mean that if evidence is found of a performance effect on firms that are added to or deleted from the DS400 it would be "empirically impossible to determine if this effect should be attributed to the potentially positive performance implications of [CSR], or the exceptional quality of the KLD

[6] It is assumed that the typical investor receives their CSR related information from secondary sources such as DS400 participants and KLD rankings. Given that primary sources of CSR information are not widely available, and can be difficult to interpret. For example, in preparation of its ESG reports KLD compiles CSR information from the following sources: (i) Company websites, (ii) Regulatory filings, (iii) Industry sources (trade papers, journals), (iv) Government data (EPA & OSHA), (v) Non-governmental organizations and non-profit groups, (vi) Media searches, (vii) Direct communication with company (KLD, 2008). While most of these sources are publicly available, it is assumed that most investors do not perform a comprehensive CSR audit and will instead tend to rely on opinions from a secondary source such as KLD.

analysts for picking 'winners' in the stock market" (Van Oosterhout & Heugens, 2008). This view certainly provides one possible explanation for any observed performance effects surrounding a DS400 change, and it is indeed very difficult to rule out empirically. However if we believe the index construction methodology that has been published by KLD and outlined above, no claims are made to support this viewpoint.

I would agree that KLD is in the business of encouraging people to incorporate SRI into their investment decisions. That being the case, they have a clear marketing incentive to showcase that the firms on their indexes achieve above average performance results. However if we believe that they follow the DS400 construction methodology that they have published, and that has been described in this section, there is nothing about the construction of the index which indicates that KLD is attempting to choose companies that are likely to generate superior future returns. It is true that numerous financial screens are applied to the companies on the DS400, but none of them can be reasonably expected to predict future financial outperformance. While I believe that the use of DS400 changes as an indicator to the market of a firm's CSR performance is still valid, it remains a possibility that KLD is in fact performing some financial analysis of added companies, without explicitly stating so.

In July 2009 the DS400 changed its name to the FTSE KLD 400 Social Index (KLD400). The index construction methodology described above remains essentially the same, except that the index is no longer based on the S&P 500. The KLD400 now seeks to keep industry and sector weights equal to those of the FTSE All World USA index, and subsequently includes 250 top ESG performers from that index and not from the S&P 500. The index changes examined in this study all occurred between May 1st, 1990 and March 31st, 2006. Hence, this paper will continue to refer to the index as the DS400.

6.2: Samples of Additions and Deletions

The effective dates of changes to the DS400 and the identification information of the companies involved in said changes were obtained directly from KLD. As previously mentioned the time span covered by this data ranges from May 1st, 1990 until March 31st, 2006. This initial sample of index changes consisted of 313 additions to the index and 311 deletions from the index. The 400 firms that were initially chosen to make up the DS400 at inception were excluded from this study since the creation of a stock index seems to be a fundamentally different event from changes to an index that is already in existence. Also, having 400 firms with the same event date would have led to data clustering issues.

Each observation in this initial sample of 313 additions and 311 deletions was then entered into a search of the Factiva database. The goal of this search was to eliminate any deletion event observations where the firm was deleted due to failing one of the DS400's financial screens, and also to eliminate any addition or deletion event observations where other pertinent news could have been expected to influence the returns of that company around the event date. For the addition sample 31 observations were removed for one of the following reasons:

(a) Company was not actually added to the index it merely underwent a name or cusip change (8 observations).

(b) Company was involved in other news around the event date. For example, merger talks, addition to S&P 500, or major news release concerning a product or service. (23 observations).

For the deletion sample 227 observations were removed for one of the following reasons:

(a) Company was acquired and hence ceased trading (188 observations).

(b) Company declared bankruptcy (12 observations).

(c) Company was delisted from NYSE, AMEX, or NASDAQ (7 observations).

(d) Company underwent a name or cusip change (8 observations).

(e) Company was deleted from S&P 500 (5 observations).

(f) Other news surrounding event date would have influenced the firm's returns (7 observations).

The remaining sample consists of 282 addition events and 84 deletion events. It is these two samples that were tested for price and volume reaction surrounding the event of addition or deletion respectively. To the extent that the Factiva searches identified firms that were deleted due to the failure of one of the DS400's financial screens, the samples should be free from the effects of financial distress. The market return and volume data for each of the added and deleted firms was obtained from the CRSP database.

6.3: Analyst Forecast Data from I/B/E/S

In order to test for the cause of any price or volume reaction to DS400 changes analyst eps forecast data was obtained from the I/B/E/S database. Three different types of forecasts were obtained from the database.

(a) Current Year Forecasts = Eps forecasts (in dollars) for the fiscal year whose end date is the first fiscal year end date following the date of DS400 addition or deletion.

(b) 1 Year Ahead Forecasts = Eps forecasts (in dollars) for the fiscal year whose end date is the second fiscal year end date following the date of DS400 addition or deletion.

(c) Long Term Growth Forecasts = Projected growth rate in earnings (in percent) for the next three to five years.

By obtaining these three different types of forecasts for both the sample of additions and deletions six separate samples are created. They are: (i) Long Term Growth Forecasts for firms added to the DS400, (ii) Current Year Forecasts for firms added to the DS400, (iii) 1 Year Ahead Forecasts for firms added to the DS400, (iv) Long Term Growth Forecasts for firms deleted from the DS400, (v) Current Year Forecasts for firms deleted from the DS400, and (vi) 1 Year Ahead Forecasts for firms deleted from the DS400.

The first step in the construction of the six samples is to download from I/B/E/S all individual analyst forecasts made within the period beginning 4 months prior to the event date and ending 4 months after the event date for each sample firm and forecast horizon. The individual analyst forecasts are then divided into two separate groups based on whether they were made before or after the event date. The first group is called the 'pre' time period and it encompasses the date range: {Event date – 4 months, Event date}. The second group is called the 'post' time period and it encompasses the date range: {Event date, Event date + 4 months}. For each of the two time periods the median of all individual analyst forecasts is calculated. This is the variable that is compared between the 'pre' and 'post' periods in order to determine if the event of DS400 addition or deletion has any effect on the analyst forecasts.

The case of merely dividing the forecast data into 'pre' and 'post' time periods and then calculating the medians is the simplest situation that occurs during this data collection process. Depending on the proximity of the event date to the firm's fiscal year end date complications may arise. The complications occur due to the fact that sometimes announcements of companies' annual earnings occur during either the 'pre' or 'post' time periods. This is a problem because companies' past earnings are a major source of information that will tend to alter analysts' forecasts for future fiscal periods. In fact, in 1981 a survey was conducted where

123 analysts were asked to rank in order of importance "the sources of company information that they use in their work" (Lees, 1981). The results of this survey were that "10ks and other reports to the SEC" (Lees, 1981) were ranked as the second most important source of information behind only "interviews with company executives" (Lees, 1981). Since the 10-k form contains the information on company earnings, it is safe to say that earnings announcements are a source of information that could reasonably be expected to alter an analyst's eps forecast. Obviously having such an event occur during either the 'pre' or 'post' time periods would make it impossible to distinguish the effects of DS400 addition or deletion from the effects of the earnings announcement. Therefore in the case where such an announcement did occur it is possible that either the 'pre' or 'post' time period is shortened to less than 4 months so as to exclude the earnings announcement date, or that the observation is dropped from the analysis entirely. Appendix B provides more details concerning the four observed cases of when earnings announcements occurred in relation to the event of addition to or deletion from the DS400 and how these situations were dealt with when creating the samples used for the portion of the study involving analyst forecasts.

Analyst forecast data from I/B/E/S was downloaded for 287 of the DS400 additions and 84 of the DS400 deletions.[7] However, due to missing data in I/B/E/S and the possible co-incidence of event dates and earnings announcement dates that is detailed in Appendix B, some of these observations were lost. Table 2 displays, for all six of the analyst forecast samples, the number of observations lost due to insufficient data along with the average number of forecasts used to calculate the 'pre' and 'post' period medians.

[7] These are the same observations that passed the Factiva screening process applied in section 6.2, with an additional 5 addition observations which were screened out of the event study for having other pertinent news surrounding the event date, but are included here because the news seemed unlikely to influence eps forecasts to the same extent as it did event period returns.

6.4: Benchmark Construction

In this paper's examination of the analyst forecast reaction to DS400 changes, the variable of interest is the change in median eps forecast between the pre-event and post-event periods. One problem with using this variable is the well documented phenomenon that analysts, in general, tend to decrease their forecasts over the course of the fiscal year.[8] This phenomenon, often known as the 'optimism bias', means that for any firm the change in median eps forecast between two consecutive time periods is likely to be negative. The implications for this study being that even if the null hypothesis that the DS400 change has no effect on eps forecasts is accepted, the expected value of the change in eps forecast between the 'pre' and 'post' periods is still less than zero. Therefore, simply comparing the change in median eps forecast between the 'pre' and 'post' periods to zero is insufficient, and another basis for comparison must be adopted. The method used to circumvent the optimism bias in this paper, and also in the paper by Denis et al (2003), is to create benchmarks consisting of firms that have not undergone the event of addition to or deletion from the DS400, and then to compare the results from our samples with those of the benchmarks.

There are two benchmarks used in this study, one which is named the All Firms Benchmark and one which is named the Industry Matched Benchmark. The All Firms Benchmark consists of all firms for which I/B/E/S data is available for the pertinent time periods. That is, for each separate event date in all of the six samples, all firms tracked by the I/B/E/S database that have at least one eps forecast made during the 4 month pre-event period and the 4 month post-event period are included. It should be noted that the same firm will likely occur

[8] As noted by Denis, McConnell, Ovtchinnikov and Yu (2003) and documented by Brous (1992).

more than once in the benchmark as it will be included for each of the event dates for which it has available data.

The second benchmark that is used in this study, called the Industry Matched Benchmark, is very similar in its construction to the All Firms Benchmark. In fact, the only difference is that when the sample of added or deleted firms is compared to the All Firms Benchmark each observation in the sample is compared to the mean change in median eps forecast of all firms in I/B/E/S that have the same event date as the sample observation, while when using the Industry Matched Benchmark each observation in the sample data set is compared only to firms having the same event date and coming from the same industry.[9]

As was done with the six samples of added or deleted firms, some outlying observations were removed from the benchmarks.[10] The procedure used to remove the outliers was to first calculate the raw change in median eps forecast between the 'pre' and 'post' periods as:

$$Raw\ Change = \Delta eps = eps_{post} - eps_{pre} \qquad (1)$$

Where,

eps_{post} = The median eps forecast from the 'post' period

eps_{pre} = The median eps forecast from the 'pre' period

Then the top and bottom 1% of the distribution of the raw changes was deleted. Table 3 shows the distribution of the raw changes for all six benchmarks prior to outliers being removed. It also displays the final sample size of each benchmark after the outliers were removed.

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[9] This matching procedure is described in more detail in section 7.4.

[10] Table 2 presents details as to the outliers that were removed from the six sample data sets.

7: Methodology

7.1: Event Study Methodology[11]

The first empirical tests that are performed in this thesis are event studies surrounding the events of either addition to or deletion from the DS400. The logic underlying the event study methodology is simple and fairly intuitive. Firstly, for each firm in the sample, an estimate of its expected return during the event period is made. This expected return is then subtracted from the firm's actual return during the event period and an abnormal return is calculated. If we assume that markets are efficient, i.e. any new pertinent information is quickly reflected in stock prices, and that the only pertinent information that is made public during the event period is the change to the DS400, then we can reasonably attribute any significant abnormal returns to the news of the index change. Obviously, the first step in any such analysis is to estimate the expected returns for the sample companies. For the event study in this thesis two different methods are used to estimate the expected returns for the sample companies during the event period. They are the market model method and the market adjusted returns method.[12]

Market Model Method:

The market model,

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it},\ E(\varepsilon_{it}) = 0,\ var(\varepsilon_{it}) = \sigma^2_{\varepsilon_t} \qquad (2)$$

Where,

R_{it} = the return from sample firm i on day t

[11] The event study methodology employed in this study is that suggested by Mackinlay (1997).

[12] In this section the subscript i refers to a firm in the sample, the subscript t refers to a day within the estimation period (-300,-46), and the subscript τ refers to a day within the event period (-5,5). Assuming the event date is day 0.

R_{mt} = the return from the market index on day t

α_i, β_i and $\sigma_{\varepsilon_t}^2$ are the parameters of the market model,

is estimated for each sample firm using OLS regression with daily returns for the time period beginning 300 days prior to the event date and ending 46 days prior to the event date. The market model parameters are estimated for two different scenarios, one where the CRSP equally weighted index is used as the market index and one where the CRSP value weighted index is used as the market index. Once the market model parameter estimates, $\hat{\alpha}_i, \hat{\beta}_i, and\ \hat{\sigma}_i^2$, are found through OLS regression, it is then possible to calculate the expected return for security i on any day τ within the event period as:

$$E(R_{i\tau}) = \hat{\alpha}_i + \hat{\beta}_i R_{m\tau} \qquad (3)$$

Market Adjusted Returns Method:

The market adjusted returns method is in essence a simplified version of the market model. With this method the expected return for sample firm i on day τ within the event period is merely set to equal the return for some market index on that day. In other words,

$$E(R_{i\tau}) = R_{m\tau} \qquad (4)$$

As was done with the market model method, both the CRSP equally weighted market index and CRSP value weighted market index were used.

Once the expected returns for each sample firm are calculated, the next step in an event study is to calculate the abnormal returns earned by each firm on each day of interest surrounding the event. In this study the event period consists of daily returns beginning 5 days prior to the event date and ending 5 days after the event date. Given that the actual return

earned by firm i on day τ is $R_{i\tau}$, then the abnormal return for firm i on day τ, $AR_{i\tau}$, can be calculated as:

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau}) \quad (5)$$

The abnormal returns may be analysed as calculated above or they may be cumulated over several days during the event period. In an effort to gain a more complete understanding of the pattern of abnormal returns surrounding the event in question, cumulative abnormal returns are examined over several different event windows. Given that the event date is defined as day 0, the event windows used in this study are (-1,0), (0,0), (0,1), and (-1,1) to capture abnormal returns directly surrounding the event, (-5,-2) and (-3,-1) to capture abnormal returns leading up to the event, and (1,3) and (2,5) to capture any abnormal returns earned in the period just after the event. Obviously in order to make inferences concerning the mean cumulative abnormal returns, $\overline{CAR}$s, earned over these event windows, it is necessary to aggregate the individual abnormal returns, $AR_{i\tau}$, across two dimensions. Firstly, the abnormal returns must be aggregated across all firms in the sample and then they must be cumulated over the time period of the given event window.

The process of aggregation across the entire sample of N firms is as simple as taking the average. The mean abnormal return for sample firms on day τ is given by:

$$\overline{AR}_{\tau} = \frac{1}{N}\sum_{i=1}^{N} AR_{i\tau} \quad (6)$$

In order to cumulate the daily mean abnormal returns over the time periods specified by the different event windows the daily mean abnormal returns are merely added up.

$$\overline{CAR}_{\tau_1,\tau_2} = \sum_{\tau=\tau_1}^{\tau_2} \overline{AR}_{\tau} \quad (7)$$

Where the event window is defined as the time period $[\tau_1, \tau_2]$.

The resulting $\overline{CAR}$s can now be tested statistically. In this study two separate statistical tests are employed. They are the Patell Z test and the Generalized Sign Test.

Patell Z Test[13]

A simple significance test of the mean cumulative abnormal returns would involve creating the test statistic

$$Z = \frac{\overline{CAR}_{\tau 1,\tau 2}}{std(CAR_{\tau 1,\tau 2})} \quad (8)$$

for each event window and then testing the null hypothesis that mean cumulative abnormal returns are equal to zero using the standard normal distribution N(0,1). This is not exactly the method employed in this study. This study employs a variation of this statistical test, proposed by Patell (1976), where each abnormal return, $AR_{i\tau}$, is first standardized by an estimator of its standard deviation before being cumulated over time and aggregated across all sample firms (Mackinlay, 1997). The advantage of this method is that it takes into account the fact that not all firms in the sample have available return data for the entire estimation period, as well as the fact that the act of making predictions outside of the estimation period involves an increase in uncertainty. What follows is a brief outline of how the Patell Z test statistic is calculated. For a complete derivation of the Patell Z test please consult Patell (1976).

The abnormal returns, $AR_{i\tau}$, are calculated in the same manner as above and Patell shows that they are distributed such that $AR_{i\tau} \sim N(0, C_{it}\sigma_i^2)$, where σ_i^2 is the variance of residuals for each firm which can be estimated using the market model and C_{it} is a factor that

[13] Methodology of the Patell Z test is summarized from Patell (1976).

allows for an increase in variance due to the fact that predictions must be made outside of the estimation period. Patell also shows that:

$$C_{it} = 1 + \frac{1}{T} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{t=1}^{T}(R_{mt} - \bar{R}_m)^2} \quad (9)$$

Where,

T = the number of daily returns in the estimation period

$\bar{R}_m$ = the mean return on the market during the estimation period

Since the variance in the above distribution is unknown a t test can be constructed with test statistic:

$$t^* = \frac{AR_{i\tau}}{s_i\sqrt{c_{it}}} \sim t_{T-2} \quad (10)$$

Where,

s_i = the estimate of σ_i and the t distribution has T-2 degrees of freedom.

After first cumulating through time for each sample firm using the equation:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \quad (11)$$

Patell shows that a second test statistic can be constructed as

$$W_i = \frac{CAR_i(\tau_1, \tau_2)}{s_i\sqrt{c_{it}L}} \sim t_{T-2} \quad (12)$$

Where,

L = the number of days in the given event window.

The final step in the calculation is to take into account that each firm in the sample could have a different number of days in its estimation period, T. Accounting for this fact leads to the realization that W_i is normally distributed with

$$E(W_i) = 0 \tag{13}$$

And

$$var(W_i) = \frac{T_i - 2}{T_i - 4} \tag{14}$$

Then by assuming large samples and invoking the Central Limit Theorem Patell generates the test statistic:

$$Z = \frac{\sum_{i=1}^{N} W_i}{\left(\sum_{i=1}^{N} \frac{T_i - 2}{T_i - 4}\right)^{1/2}} \sim N(0,1) \tag{15}$$

It is this Z test statistic that is used in this paper. This test statistic is thought to be an improvement over the traditional Z test statistic, shown by equation (8), because it accounts for the increase in uncertainty when making predictions outside of the estimation period, through the variable C_{it}, and it accounts for the fact that not all observations in the sample have a complete set of estimation period returns by using the variance as calculated in equation (14).[14]

Generalized Sign Test[15]

The other statistical test that is employed in this event study is the non-parametric generalized sign test, which is based on the ratio of positive to negative abnormal returns

[14] For the sample of additions to the DS400 only 13 of the 282 sample firms do not have data for the entire 255 day estimation period. Of these 13 only 4 have less than 100 days of estimation data, they have 61, 72, 56 and 35 days of data respectively. For the sample of deletions from the DS400 all 84 firms have data for the entire 255 day estimation period.

[15] The methodology of the Generalized Sign Test is summarized from Cowan (1992).

earned during the event window. While the test does not take into account the magnitude of the abnormal returns it does provide an idea of whether firms are likely to earn positive or negative abnormal returns around the time of changes to the DS400. Most importantly, because it ignores the magnitude of the abnormal returns, the results from the Generalized Sign Test are free from the influence of a few outlying firms who may earn abnormal returns of very large magnitude during the specified event window.

"The generalized sign test examines whether the number of stocks with positive cumulative abnormal returns in the event window exceeds the number expected in the absence of abnormal performance. The number expected is based on the fraction of positive abnormal returns in the [...] estimation period" (Cowan, 1992).

If each day in the estimation period is denoted as $t_1, t_2, \dots, t_T$, there are N firms in the sample, and we let $S_{it} = \{1\ if\ AR_{it} > 0, and\ 0\ otherwise\}$, then the expected number of positive abnormal returns in the absence of abnormal performance is:

$$\hat{p} = \frac{1}{N}\sum_{i=1}^{N}\frac{1}{T}\sum_{t=t_1}^{t_T} S_{it} \qquad (16)$$

Additionally, if w represents the number of stocks which have positive cumulative abnormal returns in the event window, then using the normal approximation to the binomial distribution the following test statistic can be calculated:

$$Z_G = \frac{w - n\hat{p}}{[n\hat{p}(1-\hat{p})]^2} \sim N(0,1) \qquad (17)$$

The non-parametric Generalized Sign Test along with the parametric Patell Z test should give a rather complete picture of market return behaviour surrounding a firm's addition to or deletion from the DS400.

7.2: Volume Event Study Methodology[16]

As was previously mentioned, the stock market reaction to DS400 component changes is tested using not only a traditional return based event study but also a volume event study. The results of this volume event study are meant to be interpreted in conjunction with those from the return based event study in order to gain a more complete picture of the stock market reaction to news of changes to the DS400. These volume event studies are very similar in methodology to the return based event studies that have already been described. The major difference being that, rather than market returns, the variable of interest in a volume event study is log-transformed relative trading volume (V).

As with the traditional event study first the expected log transformed relative trading volume is estimated and then abnormal log transformed relative trading volume is calculated for each day in the event period as:

$$AV_{i\tau} = V_{i\tau} - E(V_{i\tau}) \qquad (18)$$

Where,

$AV_{i\tau}$ = abnormal log transformed relative trading volume for firm i on day τ

$V_{i\tau}$ = actual log transformed relative trading volume for firm i on day τ

$E(V_{i\tau})$ = estimate of the expected log transformed relative trading volume for firm i on day τ.

As has been mentioned the variable used to measure trading volume is known as log transformed relative trading volume (V) and it is calculated as follows:

$$\mathrm{V} = \ln\left(\frac{n_{it}\times 100}{S_{it}} + 0.000255\right) \qquad (19)$$

[16] The methodology of volume event studies is summarized from Campbell and Wasley (1996).

Where,

n_{it} = the number of shares traded on day t by firm i

S_{it} = the number of outstanding shares of firm i on day t

The method of dividing the number of shares traded by the total number of shares outstanding, as is done in equation (19), to create a relative trading volume measure is preferred to the alternative absolute measure because the number of shares traded depends upon the number of shares outstanding making the relative measure a more "natural measure for intertemporal comparison" (Yadav, 1992). The relative trading volume is transformed using the natural logarithm because without this transformation its distribution is not normal. "Means are significantly larger than medians, left tails are very thin, and right tails are fat. [...] The natural log transformed volume measures exhibit more symmetry. [...] The means nearly equal the medians, and both tails are reasonably well specified relative to the normal distribution" (Ajinkya & Jain, 1989). The constant 0.000255 is added in order to prevent the undefined natural logarithm of 0 from occurring.

In this study only the market model method of estimation was used to estimate $E(V_{i\tau})$. The market model employed is the same as that in equation (2) except that log transformed relative trading volume is used instead of returns. The estimation procedure is also exactly the same as that followed in the case of the returns based event study. However, for the volume study 4 different market indexes were used when estimating the model. The 4 market indexes are (i) CRSP equally weighted NYSE & AMEX index, (ii) CRSP value weighted NYSE & AMEX index, (iii) CRSP equally weighted NASDAQ index, and (iv) CRSP value weighted NASDAQ index. In each of these cases the index is constructed by taking the log transformed relative trading volume, as was described earlier, for every firm that is followed by CRSP that trades on one of the

exchanges specified by the name of the index. All these measures are then either averaged together equally, or weighted by market capitalization as per the name of the index. Since the DS400 includes firms that trade on the NYSE, AMEX, and NASDAQ it is not possible to specify volume data from just one (or two) of these exchanges. This is why results are reported using all four of the indexes listed above.

The exact same aggregation procedure that was employed in the returns based event study is applied to the abnormal volume results obtained from equation (18) and the exact same statistical tests, Patell Z Test and Generalized Sign Test, are performed. The same methodologies may be followed simply replacing all $AR_{i\tau}$ terms with $AV_{i\tau}$.

7.3: Frequency of Analyst Forecast Increases and Decreases[17]

After performing return and volume event studies surrounding the events of DS400 addition and deletion in order to examine the price reaction of firms that are added to or deleted from the index, the next round of empirical testing in this paper deals with the analyst eps forecast reaction to the same events in an attempt to determine the cause of any observed price reaction. One way to study the effects of DS400 changes on analyst eps forecasts is to examine whether median eps forecasts are likely to increase, decrease, or remain un-changed following the event of either addition to or deletion from the DS400. Of course, since it has already been established that due to an optimism bias it is more likely that any median eps forecast will decrease than increase, it is necessary to compare the results from the addition and deletion samples to a benchmark that is not affected by the DS400 index changes. Therefore, for this battery of tests, the frequency of median forecast increases, decreases, and no changes is presented for all six samples alongside their respective All Firms Benchmarks. Furthermore, if

[17] The methodology used in this section and section 7.4 is adapted from that used by Denis, McConnell, Ovtchinnikov, and Yu (2003) in their similar study of S&P 500 index additions.

it is assumed that the All Firms Benchmarks are indicative of the population of all firms, then it is possible to apply the normal approximation to the binomial distribution and test for significant differences between the proportion of forecast decreases for sample firms and the proportion of forecast decreases in the population (in this case the All Firms Benchmarks).

Specifically, if we let:

p = the probability that the median eps forecast for a firm will decrease following the event of addition to or deletion from the DS400

p_0 = the proportion of median eps decreases in the population (i.e. the All Firms Benchmark)

$\hat{p}$ = the proportion of median eps decreases in the sample of either DS400 additions or deletions

n = the number of firms in the sample of either DS400 additions or deletions.

Then by applying the normal approximation to the binomial distribution the hypothesis:

$$H_0: p = p_0 \qquad \text{vs.} \qquad H_a: p \neq p_0$$

Can be tested using the test statistic:

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}} \sim N(0,1)^{18} \qquad (20)$$

7.4: Magnitude of Analyst Forecast Changes

In order to completely analyse the analyst forecast changes surrounding the events of addition to or deletion from the DS400 it is necessary to look not only at the frequency with which they increase or decrease, but also at their magnitude. This section presents the

[18] Proportion test methodology from Wackerly et al (2002).

methodology used to study the magnitude of the analyst forecast changes for each of six samples.

To test the magnitude the change in three separate, but related, variables is calculated from before to after the event of DS400 addition or deletion. The three variables are the raw change in forecast, the price standardized change in forecast, and the eps standardized change in forecast. The raw change in forecast is calculated using equation (1), while the price and eps standardized forecasts are calculated as:

$$\text{Price Standardized Change} = \frac{\Delta eps}{P} \tag{21}$$

$$\text{Eps Standardized Change} = \frac{\Delta eps}{eps_{pre}} \tag{22}$$

Where,

P = the sample firm's share price

$\Delta eps, eps_{pre}, and\ eps_{post}$ are as defined in section 6.4

The share prices are taken from the CRSP database of monthly stock returns. The price used is the closing price from this database closest in time to the event date, provided that it occurs on or before the event date.

The price standardized and eps standardized forecast changes are included in order to make the observations more comparable across a sample of firms of different sizes. Because the firms in the samples may be of significantly different sizes, the standardized variables are expected to provide more insight than the raw change. Of course only the raw change variable is reported for Long Term Growth Forecasts since these are already made in percentage terms, and hence no additional value is gained from further standardization.

As was previously mentioned benchmarks are employed as a means of controlling for the optimism bias in analyst forecasts. The two benchmarks that are used are the All Firms Benchmark, consisting of all firms followed by the I/B/E/S database over the time periods matching the sample, and the Industry Matched Benchmark, where the median forecast changes of sample firms are compared only to similar forecast changes for firms that share the same first two SIC code digits.

Specifically the procedure used to test the magnitude of forecast changes for firms that have been either added to or deleted from the DS400 is that firstly a t-test is performed on the sample of added or deleted firms, testing the hypothesis:

$H_0: x = 0$ vs $H_0: x \neq 0$

Where x represents the variable that is being analysed, either the raw change, price standardized change, or the eps standardized change. Due to the optimism bias it is entirely reasonable to expect this t-test to show negative significance. Secondly, the same t test is performed on the All Firms Benchmark which matches the given sample. Obviously it is fully expected that these benchmarks will also show evidence of the optimism bias. The most important part of the analysis comes when the samples of added or deleted firms are compared to the All Firms and Industry Matched Benchmarks. If once again we let x = one of the three variables used to represent median forecast change and we further represent each event date in the sample as $E_1, E_2, \ldots, E_N$, then the following procedure is used to test the difference between the samples of added or deleted firms and the two benchmarks.

Firstly, for the All Firms Benchmark the mean x for each event date is calculated. For example, for event date E_1 all firms that have available data in I/B/E/S for the period beginning four months prior to E_1 and ending four months after have the variable x calculated for them.

Then the average of all these x's is taken. This leaves one value of $\bar{x}$ representing each event date in the All Firms Benchmark. For example, $\bar{x}_{E_1}$ represents the average of all x variables occurring around event date E_1 in the benchmark, and x_{E_1} is the x value from the observation in the sample of added or deleted firms that occurs around the same event date, E_1. The final step is to produce a sample of differences:

$$\{x_{E_1} - \bar{x}_{E_1}, x_{E_2} - \bar{x}_{E_2}, \dots, x_{E_N} - \bar{x}_{E_N}\}$$

A t test is then performed on this sample, testing the hypothesis:

$$H_0: x_{sample} - x_{benchmark} = 0 \qquad \text{vs} \qquad H_a: x_{sample} - x_{benchmark} \neq 0$$

When comparing the samples of added or deleted firms to the Industry Matched Benchmark the same procedure is followed, except that when calculating $\bar{x}$ from the benchmark only observations matching the event date and the 2-digit SIC code of the sample firm are included in the average. This leads to a smaller number of firms being included in the benchmark, but will help determine if industry effects are driving the results.

8: Results

The empirical tests performed in this thesis can be divided into two parts. The first part consists of event studies testing the stock price and trading volume reaction to the events of addition to or deletion from the DS400, while the second part consists of examining the reaction of analyst forecasts to the same events with the goal of determining whether any observed price reaction from the first part should be attributed to *demand effects* or *information effects*.

In section 8.1 the price and volume reactions surrounding additions to the DS400 are examined, while the same reactions for deletion events are examined in section 8.2. The results

from tests of the frequencies of median analyst forecast increases and decreases are presented in section 8.3, while results from tests of the magnitude of analyst forecasts are presented in section 8.4.

When interpreting the results from sections 8.1 and 8.2 it is important to make a distinction between the results of market return event studies and those of volume event studies. While these two sets of results are related in the sense that they both indicate a reaction, or lack of reaction, on the part of investors in response to the event in question, they also differ somewhat in their interpretation. "Price changes represent the aggregate consensus evaluation of information while the corresponding trading volume is considered to be an indication of the lack of consensus in interpreting the information" (Yadav, 1992). Essentially, while a trading volume reaction to some event indicates that the event is causing investors to react in some way, it does not indicate that all market participants agree on how the event should be interpreted. On the other hand a large price reaction to an event, in one direction or another, indicates either that aggregate market demand has shifted, or that the event conveys some information about the future prospects of a company that is being interpreted in the same manner by the majority of investors. A large volume reaction in the absence of a price reaction would indicate that the market is in widespread disagreement about how to evaluate the event.

8.1: Price and Volume Effects of Addition to the DS400

Tables 4 and 5 present the results from the returns based and volume event studies respectively, for the sample of additions to the DS400. In table 4 the event windows chosen to capture return behaviour surrounding the event date ([0,0], [-1,0], [0,1], [-1,1]) do in fact show some signs of positive significance. Particularly, the window capturing the event date only shows significance for both the Patell Z and Generalized Sign tests for all four specifications of

the event study. Conversely, none of the event windows designed to capture abnormal returns for periods prior to or following the event date ([-5,-2], [-3,-1], [2,5], [1,3]) show any significant sign tests and only one instance of a significant Patell Z test, for the event window (-3,-1).

The volume results from table 5 show that the event window capturing the event date only displays a significant sign test for all 4 test specifications, while not a single other significant sign test is found for any of the other event windows. The Patell Z test results show no significance whatsoever when the test is specified using a benchmark of trading volumes from NYSE and AMEX, but does show significance at the 5% level for the event date and also some significance for the event window (-5,-2) for the two specifications of the study that used a market benchmark based on NASDAQ trading volumes. A simple explanation for this could be that since trading volumes are generally higher on the NYSE and AMEX than on NASDAQ it is only natural that the tests specified using the NASDAQ benchmark will show greater abnormal trading volume.

If we rely on the generalized sign test to interpret the results of tables 4 and 5 together, it is seen that on the day of addition to the DS400 it is statistically probable that an added firm will exhibit an increase in the trading activity of its stock. Also, it is statistically probable that this trading activity will drive the price of the stock upwards at an abnormal rate. That is, there does indeed seem to be some positive price reaction to the event of a firm's addition to the DS400. There also does not seem to be any increased likelihood of added firms earning abnormal returns or trading at abnormal volumes in the days leading up to the addition or in the days following the addition, as evidenced by the insignificance of the sign tests for the event windows (-5,-2), (-3,-1), (2,5), and (1,3).

If we rely on the Patell Z test to interpret the results of tables 4 and 5 together, while less convincing than the sign test results, they seem to point to added firms earning positive abnormal returns, on average, on the event date, as evidenced by the significant Patell Z test statistics for event window (0,0) for all four specifications of the market return event study. The Patell Z test results in table 5 suggest that there is no abnormal trading volume surrounding the event date if the NYSE & AMEX benchmark is used, and the results using the NASDAQ benchmark are not very clear.

All in all the results point to a significantly positive price reaction on the day the stock is added to the DS400, with no significant price reaction in the days leading up to or following the event. Additionally there appears to be some positive volume reaction to the event, but it is not as evident as the price reaction. Two important inferences can be drawn from these results. Firstly, the fact that there is an observable positive price reaction to the event of addition implies either that social investors are exerting some influence on the market and driving the price up or that the event of addition is conveying some positive information to the market concerning the future earning potential of the added firm. Secondly, the fact that the volume effect is less evident than the price effect may indicate that there is very little disagreement amongst investors as to the interpretation of the event of addition. The issue of the cause of the price reaction will be taken up during the analysis of analyst forecast changes, the most important result to take away from this section is that there is a significantly positive price response to the event of addition to the DS400.

8.2: Price and Volume Effects of Deletion from the DS400

Tables 6 and 7 present the results from the returns based and volume event studies respectively, for the sample of deletions from the DS400. Beginning with table 6 we see that the

Patell Z test results show a fair amount of negative statistical significance, while the generalized sign test results do not show much significance at all. We also notice that the event window (0,0) exhibits negative significance in 3 of the 4 test specifications according to the Patell Z test, and the other three event windows designed to capture the immediate effects of the deletion event ([-1,0], [0,1], [-1,1]) show negative significance for 2 of the 4 test specifications using the Patell Z test. The event windows designed to catch any abnormal returns that may precede or follow the event do not show any significance, with the notable exception of the (-3,-1) event window which has a negatively significant Patell Z test statistic for all 4 test specifications. Also of note is the significantly positive sign test result for the (1,3) event window in panel A (ii) of table 6, possibly providing some evidence of a reversion in stock price very soon after the negative effects of the deletion.

The results of table 7 are much easier to interpret than those of table 6. All of the event windows designed to capture the direct effects of the event have significant Patell Z test statistics in every instance. Also, the (0,0) event window and the (0,1) event windows have significant sign tests in all four instances. Meanwhile, for the test specifications using the NYSE & AMEX benchmark, none of the other event windows show statistical significance for either of the two tests. There is some Patell Z test significance for the event windows (2,5) and (1,3) for the test specifications using the NASDAQ benchmark, but they are not corroborated by the sign test.

Upon examination of these results there does appear to be evidence of a negative price reaction and positive volume reaction surrounding the event of deletion from the DS400. However, in contrast to the additions to the DS400, the deletions seem to exhibit a volume reaction that is stronger than the price reaction. This may indicate that there is more

disagreement amongst investors as to how the event of deletion should be interpreted than there is for the event of addition. Another way to interpret the greater trading volume for deletions as opposed to additions is to consider that the event of a deletion is more likely to coincide with some negative CSR action than the event of an addition is to coincide with a positive one (Becchetti et al, 2007). In other words in the case of an addition event, the added company has most likely been a strong CSR performer for an extended period prior to being added to the index at a time when it meets its diversification needs. In the case of a deletion event the firm is most likely removed following some recent decrease in its CSR performance. Perhaps the firm decided to enter one of the DS400's banned industries, or revelations about some product safety or environmental issues just came to light. This timing issue means that the deletion sample provides a more direct means of testing the link between CSR and financial performance than the addition sample. Because theoretically, if an investor performed their own CSR research, the addition sample companies could have been identified prior to the addition event, while the deleted companies could not have been. Therefore the greater volume reaction on the part of the deletion sample could point to the fact that investors had already incorporated the CSR performance of the added firms into their analysis prior to the event of addition, but are not able to do the same for deletions. If this is the case it would cast doubt on the assumption that social investors tend to use DS400 inclusion as a source of CSR information.

There is also some evidence to suggest that deleted firms begin to earn abnormally low returns in the days preceding the event of deletion, but there is no indication of any increased trading activity in the days preceding the event. It is possible that if the company is deleted from the DS400 because of some recent revelations concerning an unfavourable CSR activity, for example a violation of environmental regulations or concerns about product safety, that the

market is reacting to this revelation rather than the event of deletion. If this is the case it is very possible that the market would react more quickly to the news than the DS400 would, due to time lags in the implementation of an index change.

There is also a very small amount of evidence suggesting that the negative return effect of the deletion event may very quickly reverse itself. This comes from the sign test results for the (1,3) event window in panel A (ii) of table 6 which show positive significance at the 5% level. While this evidence is far from conclusive, it may lend some support to a price pressure explanation for the observed negative price reaction surrounding the event of deletion. In this scenario the price of deleted companies is decreased on the event day due to the selling actions of investors tracking the index. The price then quickly reverts to a price more reflective of the firm's intrinsic value once the index trackers have re-balanced their portfolios. This issue is further examined by the tests performed in the next section.

8.3: Frequency of Analyst Forecast Increases and Decreases

Table 8 displays graphs showing, for each of the three forecast horizons, the proportion of sample firms that saw an increase, decrease, or no change in their median forecasts from before to after the event of addition to the DS400. The All Firms Benchmark is also provided for comparison. Table 9 displays the same data for firms that were deleted from the DS400, while the results of the tests of whether there is a significant difference between the frequency of decreases in the samples of added or deleted firms and the frequency of decreases in the All Firms Benchmarks are presented in table 10.

Upon inspection of the graphs in table 8 it would appear as though companies that are added to the DS400 exhibit fewer decreases in Current Year and 1 Year Ahead median eps forecasts than do other firms. The graphs also show a slightly more decreases of median Long

Term Growth Forecasts for firms added to the DS400 as compared to the All Firms Benchmark. This could imply that addition to the DS400 is seen by analysts as a favourable indicator of near term future earnings, but has no bearing on the firm's long term growth prospects. However, according to the results presented in table 10 only the 1 Year Ahead Forecasts show significantly fewer decreases for added firms than for the benchmark, although the test statistic of Z = -1.5852 for the Current Year Forecasts is close to showing some significance.

When examining the graphs for companies deleted from the DS400, table 9, we see a slightly greater frequency of decrease in Current Year median eps forecasts for firms deleted from the index, but a slightly lower frequency of decrease in Long Term Growth and 1 Year Ahead Forecasts. The results of the statistical tests presented in table 10 show none of these differences to be statistically significant.

Based on the data concerning the frequency of increases and decreases of analyst forecasts following a change to the DS400, several observations can be made. First of all, these results present no evidence to suggest that the event of deletion from the DS400 has any effect on the forecasts of stock analysts. Conversely, there is some evidence to suggest that addition to the DS400 may influence at least the 1 Year Ahead median eps forecasts of equity analysts. Interestingly, the results of the frequency tests indicate that the price reaction to DS400 changes may be driven by different causes depending on whether the company is added or deleted. That is, based on the evidence that there is some analyst eps forecast reaction to the event of DS400 addition, the event of DS400 addition may convey some positive information concerning the near future earning potential of the added firm indicating that the price reaction to DS400 additions may be caused by *information effects*. Conversely, the lack of a reaction from analyst forecasts to the event of DS400 deletion points to the price reaction from deletions being

caused by *demand effects*. It is also possible, and perhaps more likely, that the small size of the deletion samples makes it difficult to apply tests that are based on proportions rather than magnitudes. The magnitude results in the next section should shed more light on the situation.

8.4: Magnitude of Analyst Forecast Changes

Expanding on the frequency tests performed in the previous section, the magnitude of the change in median analyst forecast is now analysed. Table 11 presents the results of tests conducted on the magnitude of forecast changes for firms added to the DS400, as compared to all firms in the I/B/E/S database, and to the Industry Matched Benchmark, while table 12 presents the same results for firms deleted from the DS400.

The results presented in table 11 indicate that there appears to be some correlation between the event of a firm's addition to the DS400 and the change in the median forecasts of analysts. In fact if we look at the change in median eps forecast standardized by price there is positive significance at the 1% level relative to both the All Firms and Industry Matched Benchmarks for both Current Year and 1 Year Ahead Forecasts. When the percent change in median eps forecast variable is used, we find positive significance at the 1% level relative to both benchmarks for 1 Year Ahead Forecasts and at the 10% level relative to the Industry Matched Benchmark for Current Year Forecasts. The results for the raw change in median eps forecasts are also presented, but due to the potentially large difference in annual earnings between the firms in the sample this variable provides little intuition for the cases of Current Year and 1 Year Ahead forecasts.

Taken together with the frequency results reported in tables 8 and 10 it seems that there is sufficient reason to believe that 1 Year Ahead median analyst forecasts for firms added to the DS400 are less likely to decrease, and are decreased by smaller amounts than other firms.

Also, this trend appears to persist even when compared to firms in the same industry[19]. There is also some evidence to suggest that Current Year median eps forecasts tend to decrease by smaller amounts for firms that are added to the DS400 than for other firms. However, this effect does not appear to be quite as strong as it is for the 1 Year Ahead Forecasts.

A distinction should be made between the Current Year and 1 Year Ahead Forecasts that have just been discussed and the Long Term Growth Forecasts that are also analysed. While the Current Year and 1 Year Ahead eps forecasts are analyst projections, in dollars, for what the earnings of a specific firm will be for a certain fiscal year, Long Term Growth Forecasts are analyst projections, in percentage terms, for how much earnings will grow in the next 3-5 years. The fact that the Long Term Growth Forecasts are already in percentage terms is the reason that no standardization by price or eps is necessary. While we do find that the change in median Long Term Growth Forecasts for added firms are, on average, less negative than for benchmark firms, the results are not strong enough to show statistical significance. Therefore, it can perhaps be interpreted that analysts tend to view addition to the DS400 as having some positive earnings effects for the next couple of fiscal periods, but tend to view it as irrelevant when considering the added firm's earnings prospects for a period 3 to 5 years in the future. A similar conclusion can be drawn when analysing the proportion test results of tables 8 and 10.

The results from this section do seem to suggest a reaction on the part of analyst eps projections in response to the event of DS400 addition. This evidence would seem to point to the observed price response to additions to the DS400 being at least partly attributable to *information effects*. That is, since analysts base their eps projections on the future earning potential, or intrinsic value, of the firm, it would appear that the event of DS400 addition is

[19] For the purposes of this thesis, firms whose SIC codes match to the first 2 digits are considered to be in the same industry

somehow altering the analyst opinions as to this intrinsic value. This same information would also cause an increase in the added firm's stock price. If this proposition is accepted it can also be said that to the extent that addition to the DS400 conveys information concerning CSR performance only, this result points to a positive link between CSR performance and analyst earnings forecasts.

Table 12 presents the changes in analyst forecast magnitude for firms that have been deleted from the DS400. The results in this table are sharply different than those of table 11. The results in table 12 show that in every single instance, referring to the standardized variables only for Current Year and 1 Year Ahead Forecasts, the change in median analyst forecasts for deleted firms is slightly more positive than that of benchmark firms. The slight differences, however, present absolutely no statistical significance. Therefore it can only be said that it appears as though the event of deletion from the DS400 has no effect on changes in median analyst eps forecasts. Contrary to the results from the addition sample, this result provides no evidence for the price response to deletion from the DS400 being driven by *information effects*.

The results presented in this thesis document a positive price reaction for firms that are added to the DS400 and a negative price reaction for firms that are deleted from the DS400. Furthermore, it is evidenced that the event of DS400 addition is also accompanied by a significantly positive change in Current Year and 1 Year Ahead analyst eps forecasts, while the event of DS400 deletion appears to have no effect on analyst forecasts. This is an interesting result in that it appears as though the price response to DS400 additions is at least partly attributable to *information effects*, while the price response to DS400 deletions is entirely attributable to *demand effects*.

9: Conclusion

At the onset of this thesis four questions were posed. The first two questions dealt with the issue of corporate social responsibility in relatively broad terms asking (i) if corporations have a moral duty to assume CSR initiatives, and (ii) if it may in fact be financially beneficial for them to do so. Based on the review of the literature provided in this paper there are several conclusions which may be gleaned.

As to the issue of whether or not firms have moral and ethical responsibilities toward society, I believe that this issue depends entirely on how the corporation is viewed. That is, if the corporation is viewed as being nothing more than a vehicle for efficiently creating shareholder wealth, then it is clear that in order to fulfill this purpose it must have no other motive than the profit motive. However if the corporation is viewed more like an individual, then it becomes clear that it must obey the same codes of morality and ethics that all individual humans adhere to. Complications arise from the fact that the corporation cannot be placed exclusively into either category. We know that the corporation is not a person, but it has some of the same rights and privileges as a person, therefore it straddles the two definitions making its ethical responsibilities somewhat unclear. In my opinion research in the field of business ethics that begins by assuming either that the corporation is a wealth creating vehicle, or a moral actor in its own right, is probably not going to contribute usefully to the debate. In my opinion it would be more productive to take the perspective that corporations are wealth creating vehicles whose decisions are guided by individual moral actors. This perspective allows us to focus on how to best incorporate the ethical constraints that are placed upon individual humans into the framework of the wealth creating vehicle known as the corporation.

The second question posed at the beginning of this thesis asks whether corporate social responsibility has an effect on a firm's financial performance. While the academic literature on this topic consists of many contradictory results, when Orlitzky et al (2003) collected the majority of this research together they found that there appears to be "a positive association between [CSR] and [financial performance] across industries and across study contexts" (Orlitzky et al, 2003). The main problem with research in this area is that it is very difficult to approximate CSR in an empirical setting, and as a consequence most empirical research relies on the results of surveys or subjective rankings. I believe that before it will be possible to reach any kind of consensus on this topic it will first be necessary to come up with some more objective measures of CSR that are better suited to empirical testing. In the meantime, it seems obvious that there are many situations where a company can benefit financially by increasing its CSR performance and many cases where it can benefit financially from behaving in a non-socially responsible manner. Until the concept of CSR is better defined and more measurable it would seem to me that research in this area is better focused on specific industries and companies where the CSR issues that are faced can be more properly defined.

The third and fourth questions that were posed at the onset of this thesis deal with (iii) the influence of SRI on the capital markets and (iv) what insights SRI may offer concerning the relationship between CSR and financial performance. For help with the third question we can look to the results concerning the price and volume reactions to DS400 additions and deletions presented in this paper.

The results in this thesis document a positive price reaction to the event of a firm's addition to the DS400 and a negative price reaction to the event of a firm's deletion from the DS400. Therefore it seems clear that the event of a DS400 change has, at the very least, an

observable effect on the capital markets. If we assume, for the moment, that the observed price reaction to additions and deletions is entirely attributable to the actions of social investors who use DS400 changes as a source of CSR information, then we can use these results as an indication of the influence of SRI on the capital markets. The results in this paper indicate that added firms earn, on average, abnormal returns of approximately +0.25% on the day of the addition. Similarly, deleted firms experience, on average, abnormal returns of approximately -0.3% on the day of deletion. For the purposes of comparison, consider that in their study of changes to the S&P 500 Chen et al (2004) evidenced announcement day mean abnormal returns of + 5.446% for firms added to the S&P 500 and – 8.462% for firms deleted from the S&P 500 (Chen et al, 2004). These figures quite obviously point to the fact that SRI is not currently influencing the capital markets to the same degree as more traditional investment strategies, and provide some evidence that the capital markets are currently not serving Lydenberg's (2005) public interest. However, the mere fact that DS400 changes are met with a statistically significant price reaction would appear to suggest that the actions of socially responsible investors are not entirely trivial. This result, coupled with statistics from the Social Investment Forum's (2008) *2007 Report on Socially Responsible Investing Trends in the United States* which indicate that the amount of money invested in SRI continues to increase, provides some indication that CSR concerns may play a bigger role in the capital markets in the near future.

According to the evidence presented in this thesis SRI appears to have an observable effect on the capital markets, although it is relatively small compared to the influence of non-social investors. However, even a small price reaction may still tell us something about the relationship between CSR and financial performance.

A major part of this thesis dealt with testing analyst forecasts in an effort to attribute the observed price reaction to DS400 changes to one of two conflicting effects. *Demand effects* refer to the influence of social investors who use the event of a DS400 change as a source of CSR information. In all likelihood these social investors are passively tracking the DS400. On the other hand, *information effects* refer to the possibility that the event of addition to or deletion from the DS400 is conveying some information about the future earning potential of the firm to the market, which investors are then using to adjust the stock price of the added or deleted firm. Interestingly, evidence is presented in this thesis to suggest that median analyst eps forecasts are influenced by the event of DS400 addition, but not by the event of DS400 deletion. This result suggests that the price response to DS400 additions may be caused by *information effects*, while the price response to deletions appears to be caused by *demand effects*.

Examining the addition results in isolation it can be said that, to the extent that DS400 additions are interpreted by investors as a source of CSR information and nothing else, equity analysts tend to perceive some positive link between CSR and financial performance. It should be noted that this assumption is quite strong, and that it cannot be ruled out that KLD is performing some analysis of the future earnings potential of the firms that are added to the index, as suggested by Van Oosterhaut & Heugens (2008). Curiously, however, the same result is not observed for deletions from the DS400. In this case the price response seems to be entirely attributable to *demand effects* caused by social investors, and suggests no link between CSR and financial performance. So how is it that DS400 addition events may provide some evidence for a link between CSR and financial performance, and deletion events do not?

First of all the differing results between addition and deletion events casts some doubt on the possible explanation that KLD is incorporating some financial analysis of firms into its

DS400 component decisions. If KLD is adding firms that it believes will perform better in the future it should also be removing firms that it believes will perform poorly, and yet analysts don't seem to view the future prospects of deleted firms as being any more bleak than those of benchmark firms. One possible explanation for the differing results between additions and deletions is an explanation based on investor awareness akin to that provided by Chen et al (2004) in their study of S&P 500 index changes.

Recall that firms which are added to the DS400 fall into one of three categories. They are either one of (i) 250 firms also on the S&P 500, (ii) 100 additional large and mid cap firms, or (iii) 50 small cap firms. It is possible that the event of a firm being added to the DS400 leads to greater awareness about that firm in the investing community, along with an enhanced corporate image for being recognized as being socially responsible. This increased awareness could potentially also lead to increased scrutiny on the part of investors who are now following the company more closely than they were previously. Increased scrutiny could possibly lead to improved management and better future results. Conversely when a company is deleted from the DS400, awareness does not simply disappear. Investors do not forget about the company after it has been removed from the index, and the company is still under the same scrutiny as it was previously. If this explanation is accepted then the results of this thesis do not indicate a relationship between CSR and financial performance, the price response to deletions is entirely attributable to the actions of social investors, most likely DS400 trackers, and the price response to additions is partly attributable to the actions of social investors and partly attributable to the firm management coming under increased scrutiny.

One possible way to test the accuracy of this explanation would be to check for differences in the price and analyst forecast responses to DS400 additions between firms

already on the S&P 500 and firms that are not. Since the firms that are already present on the S&P 500 are already experiencing increased scrutiny we should see that the price and analyst forecast results are mostly driven by firms not on the S&P 500.

It can be concluded, based on the evidence herein, that social investors do have an observable and measurable impact on the market for financial capital, although it is relatively small. It is also possible that equity analysts reward companies which are perceived to be high CSR performers with more favourable near term eps forecasts, but do not similarly punish companies whose CSR performance has deteriorated. However, the possibilities that either KLD subversively embeds some financial analysis of added and deleted firms into its index decisions, or that increased investor awareness and scrutiny leads to improved financial performance on the part of added firms cannot be ruled out as alternative explanations for the evidenced analyst eps forecast reaction.

References

Ajinkya, B. B., & Jain, P. C. (1989). The behavior of daily stock market trading volume. *Journal of Accounting and Economics, 11*(4), 331-359. doi:DOI: 10.1016/0165-4101(89)90018-9

Anderson, J. C., & Frankle, A. W. (1980). Voluntary social reporting: An iso-beta portfolio analysis. *The Accounting Review, 55*(3), 467-479.

Aupperle, K. E., Carroll, A. B., & Hatfield, J. D. (1985). An empirical examination of the relationship between corporate social responsibility and profitability. *The Academy of Management Journal, 28*(2), 446-463.

Becchetti, L., Ciciretti, R., & Hasan, I. (2007). *Corporate social responsibility and shareholder's value: An event study analysis.* Unpublished manuscript. Retrieved April 22nd, 2009, from www.frbatlanta.org

Berle, A. A., & Means, G. C. (Eds.). (1932). *The modern corporation and private property.* New York: Macmillan.

Bowen, H. R. (1953). *Social responsibilities of the businessman;* ([1st] ed.). New York,: Harper.

Brous, P. A. (1992). Common stock offerings and earnings expectations: A test of the release of unfavorable information. *The Journal of Finance, 47*(4), 1517-1536.

Campbell, C. J., & Wasley, C. E. (1996). Measuring abnormal daily trading volume for samples of NYSE/ASE and NASDAQ securities using parametric and nonparametric test statistics. *Review of Quantitative Finance and Accounting, 6*(3), 309-326.

Chen, H., Noronha, G., & Singal, V. (2004). The price response to S&P 500 index additions and deletions: Evidence of asymmetry and a new explanation. *The Journal of Finance, 59*(4), 1901-1929.

Cowan, A. R. (1992). Nonparametric event study tests. *Review of Quantitative Finance and Accounting, 2*(4), 343-358.

Davis, K., & Blomstrom, R. L. (1971). *Business, society, and environment: Social power and social response* (2nd ed.). USA: McGraw-Hill Book Company.

Davis, K. (1960). Can business afford to ignore social responsibilities? *California Management Review (Pre-1986), 2*(000003), 70.

Davis, K. (1973). The case for and against business assumption of social responsibilities. *The Academy of Management Journal, 16*(2), 312-322.

Denis, D. K., McConnell, J. J., Ovtchinnikov, A. V., & Yu, Y. (2003). S&P 500 index additions and earnings expectations. *The Journal of Finance, 58*(5), 1821-1840.

Dhillon, U., & Johnson, H. (1991). Changes in the standard and poor's 500 list. *The Journal of Business, 64*(1), 75-85.

Eberstadt, N. N. (1973). What history tells us about corporate responsibility. *Business and Society Review / Innovation, Autumn*, 76-81.

Fisher-Vanden, K., & Thorburn, K. S. (2008). Voluntary corporate environmental initiatives and shareholder wealth. *CEPR Discussion Paper no. DP6698,*

Freeman, R. E. (1984). *Strategic management : A stakeholder approach*. Boston: Pitman.

Friedman, M. (1970, September 13, 1970). The social responsibility of business is to increase its profits. *The New York Times Magazine,*

Garone, S. J. (1999). *The link between corporate citizenship and financial performance* No. 1234-99-RR)The Conference Board.

Griffin, J. J., & Mahon, J. F. (1997). The corporate social performance and corporate financial performance debate: Twenty-five years of incomparable research. *Business & Society, 36*(1), 5-31. doi:10.1177/000765039703600102

Harris, L., & Gurel, E. (1986). Price and volume effects associated with changes in the S&P 500 list: New evidence for the existence of price pressures. *The Journal of Finance, 41*(4), 815-829.

Hasnas, J. (1998). The normative theories of business ethics: A guide for the perplexed. *Business Ethics Quarterly, 8*(1), 19-42.

Hegde, S. P., & McDermott, J. B. (2003). The liquidity effects of revisions to the S&P 500 index: An empirical analysis. *Journal of Financial Markets, 6*(3), 413-459. doi:DOI: 10.1016/S1386-4181(02)00046-0

Jensen, M. C. (2002). Value maximization, stakeholder theory, and the corporate objective function. *Business Ethics Quarterly, 12*(2), 235-256.

KLD Research & Analytics. (2008). *Domini 400 social index methodology*. USA: KLD Research & Analytics. doi:March 31, 2008

Kurtz, L. (2008). Socially responsible investment and shareholder activism. In A. Crane, A. McWilliams, D. Matten, J. Moon & D. S. Siegel (Eds.), *The oxford handbook of corporate social responsibility* (pp. 249). USA: Oxford University Press.

Kurucz, E. C., Colbert, B. A., & Wheeler, D. (2008). The business case for corporate social responsibility. In A. Crane, A. McWilliams, D. Matten, J. Moon & D. S. Siegel (Eds.), *The oxford handbook of corporate social responsibility* (pp. 83). USA: Oxford University Press.

Lees, F. A. (1981). *Public disclosure of corporate earnings forecasts*. New York ; Ottawa: Conference Board in Canada.

Lydenberg, S. (2005). *Corporations and the public interest: Guiding the invisible hand*. USA: Berrett-Koehler Publishers Inc.

MacKinlay, A. C. (1997). Event studies in economics and finance. *Journal of Economic Literature, 35*(1), 13-39.

Mason, E. S.,ed. (1959). *The corporation in modern society,*. Cambridge,: Harvard University Press.

Mele, D. (2008). Corporate social responsibility theories. In A. Crane, A. McWilliams, D. Matten, J. Moon & D. S. Siegel (Eds.), *The oxford handbook of corporate social responsibility* (pp. 47). USA: Oxford University Press.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies, 24*(3), 403-441. doi:10.1177/0170840603024003910

Patell, J. M. (1976). Corporate forecasts of earnings per share and stock price behavior: Empirical test. *Journal of Accounting Research, 14*(2), 246-276.

Pava, M. L., & Krausz, J. (1995). *Corporate responsibility and financal performance*. USA: Quorum Books.

Ramchander, S., Schwebach, R. G., & Staking, K. (2009). *The informational relevance of strategic corporate social responsibility.* Working Paper.

Seavoy, R. E. (1982). *The origins of the american business corporation, 1784-1855*. USA: Greenwood Press.

Sethi, S. P. (1975). Dimensions of corporate social performance: An analytical framework. *California Management Review (Pre-1986), 17*(000003), 58.

Shleifer, A. (1986). Do demand curves for stocks slope down? *The Journal of Finance, 41*(3, Papers and Proceedings of the Forty-Fourth Annual Meeting of the America Finance Association, New York, New York, December 28-30, 1985), 579-590.

Simpson, P. L. P. (1997). *The politics of aristotle* [The Politics] (P. L. P. Simpson Trans.). USA: The University of North Carolina Press.

Social Investment Forum. (2008). *2007 report on socially responsible investing trends in the united states*. USA: Social Investment Forum.

Solomon, R. C. (1992). *Ethics and excellence : Cooperation and integrity in business*. New York: Oxford University Press.

Stanwick, P. A., & Stanwick, S. D. (1998). The relationship between corporate social performance, and organizational size, financial performance, and environmental performance: An empirical examination. *Journal of Business Ethics, 17*(2), 195-204.

Tsoutsoura, M. (2004). *Corporate social responsibility and financial performance*UC Berkeley: Center for Responsible Business.

Van Oosterhout, J. (., & Heugens, Pursey P. M. A. R. (2008). Much ado about nothing: A conceptual critique of corporate social responsibility. In A. Crane, A. McWilliams, D. Matten, J. Moon & D. S. Siegel (Eds.), *The oxford handbook of corporate social responsibility* (pp. 197). USA: Oxford University Press.

Vance, S. G. (1975). Are socially responsible corporations good investment risks? *Management Review, 64*(8), 18.

Vogel, D. (2005). *The market for virtue :The potential and limits of corporate social responsibility*. Washington, D.C.: Brookings Institution Press.

Wackerly, D. D., Mendenhall III, W., & Scheaffer, R. L. (2002). *Mathematical statistics with applications* (6th ed.). USA: Wadsworth Group.

Wood, D. J. (1991). Corporate social performance revisited. *The Academy of Management Review, 16*(4), 691-718.

Yadav, P. K. (1992). Event studies based on volatility of returns and trading volume: A review. *British Accounting Review, 24*, 157-184.

Appendix A

Tables

Table 1: Issue Areas used to evaluate companies under consideration for the DS400 index[20]

ISSUES	STRENGTHS	CONCERNS
Community Relations	Charitable Giving Innovative Giving Non-US Charitable Giving Support for Education Support for Housing Volunteer Programs Other Strengths	Investment Controversies Negative Economic Impact Tax Disputes Other Concerns
Corporate Governance	Compensation Ownership Political Accountability Transparency Other Strengths	Compensation Ownership Political Accountability Transparency Accounting Other Concerns
Diversity	Board of Directors CEO Employment of the Disabled Gay & Lesbian Policies Promotion Women & Minority Contracting Work/Life Benefits Other Strengths	Controversies Non-Representation Other Concerns
Employee Relations	Health and Safety Retirement Benefits Union Relations Cash Profit Sharing Employee Involvement Other Strengths	Union Relations Health and Safety Retirement Benefits Workforce Reductions Other Concerns
Environment	Beneficial Products & Services Clean Energy Management Systems Pollution Prevention Recycling Other Strengths	Agricultural Chemicals Climate Change Hazardous Waste Ozone Depleting Chemicals Regulatory Problems Substantial Emissions Other Concerns
Human Rights	Labor Rights Relations with Indigenous Peoples Other Strengths	Labor Rights Relations with Indigenous Peoples Burma Other Concerns
Product	Benefits the Economically Disadvantaged Quality R&D / Innovation Other Strengths	Antitrust Marketing/Contracting Controversies Safety Other Concerns

[20] This table is taken from KLD Research & Analytics (2008).

Table 2: Description of Analyst Forecast Samples

n(original) = full sample of all additions/deletions

PRE & POST = number of observations lost due to a lack of data in I/B/E/S for both the PRE and POST time periods

PRE = number of observations lost due to a lack of data in I/B/E/S for the PRE time period only

POST = number of observations lost due to a lack of data in I/B/E/S for the POST time period only

OUT = number of outlying observations deleted†

n(final) = final sample size

Mean # Forecasts (PRE) = the mean number of forecasts used to calculate the median eps forecast from the pre-event period

Mean # Forecasts (POST) = the mean number of forecasts used to calculate the median eps forecast from the post-event period

	n (original)	PRE & POST	PRE	POST	OUT†	n (final)	Mean # Forecasts (PRE)	Mean # Forecasts (POST)
Panel A: Long-Term Growth Forecasts								
Addition Sample	287	36	32	26	1	192	4.21	3.83
Deletion Sample	84	32	9	4	0	39	5.36	4.64
Panel B: Current Year Forecasts								
Addition Sample	287	15	34	12	0	226	17.7	16.93
Deletion Sample	84	17	9	0	1	57	18.41	19.79
Panel C: 1-Year Ahead Forecasts								
Addition Sample	287	13	39	12	0	223	15.3	15.17
Deletion Sample	84	17	9	0	0	58	14.17	15.71

† Outliers were removed from the sample if, for Current Year and 1 Year Ahead Forecasts, the change in magnitude of the median eps forecast between 'pre' and 'post' periods exceeded $20. Outliers were also removed if, for Long Term Growth Forecasts, the change in magnitude of the median forecast exceeded 70%.

Table 3: Description of Benchmarks

For each of the six benchmarks used in the study, the following tables show the distribution of the raw change in median eps forecast before outliers are removed, as well as the sample size of the benchmarks after outliers are removed.

Addition Sample Event Dates

Percentile	Δeps	n (final)
Panel A: Long-Term Growth		
100%	1385	
99%	25.5	
95%	10	
90%	5	
75%	2	
50%	0	
25%	-3	
10%	-7.5	
5%	-11.5	
1%	-30	
0%	-1386.2	
		302066
Panel B: Current Year		
100%	8000	
99%	0.91	
95%	0.2334	
90%	0.115	
75%	0.03	
50%	-0.00805	
25%	-0.1	
10%	-0.33	
5%	-0.6	
1%	-2.56	
0%	-72000	
		603880
Panel C: 1-Year Ahead		
100%	4100	
99%	1.095	
95%	0.285	
90%	0.145	
75%	0.04	
50%	-0.015	
25%	-0.135	
10%	-0.395	
5%	-0.685	
1%	-2.55	
0%	-72000	
		487962

Deletion Sample Event Dates

Percentile	Δeps	n (final)
Panel A: Long-Term Growth		
100%	1385	
99%	25	
95%	10	
90%	5	
75%	2	
50%	0	
25%	-3	
10%	-7.3	
5%	-11	
1%	-30	
0%	-1067.38	
		83893
Panel B: Current Year		
100%	7323.2895	
99%	0.885	
95%	0.235	
90%	0.12	
75%	0.03	
50%	-0.0075	
25%	-0.095	
10%	-0.31	
5%	-0.57	
1%	-2.395	
0%	-72000	
		161160
Panel C: 1-Year Ahead		
100%	1950	
99%	1.07	
95%	0.285	
90%	0.1475	
75%	0.04	
50%	-0.015	
25%	-0.13	
10%	-0.3666	
5%	-0.645	
1%	-2.35	
0%	-52000	
		120246

Table 4: Market Return Effects of Addition to the Domini 400 Social Index

This table presents the results from an event study of firms that have been added to the DS400, the event date (day 0) being the date of addition to the index. The mean cumulative abnormal return, number of positive and negative cumulative abnormal returns, and results from the Patell Z Test and Generalized Sign Test are presented for each of 8 separate event windows. The sample used consists of 282 additions to the DS400 that occurred between May 1st 1990 and March 31st 2006. The expected returns used in the study were estimated using both the market model and the market adjusted returns method, and using both the CRSP equally weighted index and CRSP value weighted index.

*,**,*** denote significance at the 10%, 5%, and 1% levels respectively. Assuming a 1-tailed test of the following hypotheses:

For the Patell Z Test: H0: $\overline{CAR} = 0$, Ha: $\overline{CAR} > 0$

For Generalized Sign Test: H0: (Number of positive CARs) – E(Number of positive CARs) = 0, Ha: (Number of positive CARs) – E(Number of positive CARs) > 0

Panel A: Market Model								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z
(-5,-2)	0.17%	0.197	141:141	0.623	0.12%	-0.121	131:151	-0.657
(-3,-1)	0.12%	0.887	137:145	0.147	0.14%	0.881	138:144	0.177
(-1,0)	0.25%	1.184	159:123	2.769***	0.33%	1.729**	157:125	2.441***
(0,0)	0.26%	1.456*	149:133	1.577*	0.27%	1.734**	160:122	2.798***
(0,1)	0.17%	0.372	139:143	0.385	0.15%	0.368	139:143	0.296
(-1,1)	0.16%	0.430	146:136	1.219	0.21%	0.712	148:134	1.368*
(1,3)	0.24%	0.429	137:145	0.147	0.27%	0.535	145:137	1.011
(2,5)	-0.06%	-0.731	143:139	0.862	-0.03%	-0.454	141:141	0.534

Panel B: Market Adjusted Returns								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z
(-5,-2)	0.16%	0.140	135:147	-0.062	0.42%	0.966	146:136	0.632
(-3,-1)	0.06%	0.608	132:150	-0.42	0.32%	1.655**	147:135	0.751
(-1,0)	0.25%	1.253	153:129	2.083**	0.46%	2.416***	165:117	2.895***
(0,0)	0.25%	1.496*	151:131	1.845**	0.34%	2.165**	155:127	1.704**
(0,1)	0.23%	0.548	137:145	0.176	0.33%	1.073	150:132	1.109
(-1,1)	0.22%	0.607	142:140	0.772	0.45%	1.599*	153:129	1.466*
(1,3)	0.27%	0.241	136:146	0.057	0.42%	0.978	145:137	0.513
(2,5)	-0.03%	-0.988	133:149	-0.301	0.22%	0.276	145:137	0.513

Table 5: Volume Effects of Addition to the Domini 400 Social Index

This table presents the results from a volume event study of firms that have been added to the DS400, the event date (day 0) being the date of addition to the index. The mean cumulative abnormal log transformed relative trading volume ($\overline{CARV}$), number of positive and negative cumulative abnormal log transformed relative volumes (CARVs), and results from the Patell Z Test and Generalized Sign Test are presented for each of 8 separate event windows. The sample used consists of 282 additions to the DS400 that occurred between May 1st 1990 and March 31st 2006. The expected log transformed relative volume measures used in the study were estimated using the market model, with each of the following 4 market indexes of log transformed relative trading volume: (i) CRSP equally weighted from NYSE & AMEX, (ii) CRSP value weighted from NYSE & AMEX, (iii) CRSP equally weighted from NASDAQ, (iv) CRSP value weighted from NASDAQ.

*,**,*** denote significance at the 10%, 5%, and 1% levels respectively. Assuming a 1-tailed test of the following hypotheses:

For the Patell Z Test: H0: $\overline{CARV} = 0$, Ha: $\overline{CARV} > 0$

For Generalized Sign Test: H0: (Number of positive CARVs) – E(Number of positive CARVs) = 0, Ha: (Number of positive CARVs) – E(Number of positive CARVs) > 0

Panel A: NYSE & AMEX Benchmark								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z
(-5,-2)	14.36%	0.246	136:146	-0.092	21.19%	0.596	139:143	0.280
(-3,-1)	5.80%	-1.044	134:148	-0.331	10.25%	-0.763	130:152	-0.792
(-1,0)	5.37%	-0.410	136:146	-0.092	9.04%	-0.170	137:145	0.042
(0,0)	6.32%	0.885	149:133	1.457*	8.47%	1.089	156:126	2.306**
(0,1)	5.64%	0.268	137:145	0.027	9.39%	0.496	136:146	-0.077
(-1,1)	4.69%	-0.627	130:152	-0.807	9.97%	-0.362	131:151	-0.673
(1,3)	1.51%	-0.453	141:141	0.503	5.86%	-0.269	141:141	0.518
(2,5)	1.03%	-0.636	133:149	-0.450	5.74%	-0.446	141:141	0.518

Panel B: NASDAQ Benchmark								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z
(-5,-2)	24.57%	1.783**	138:144	0.088	23.77%	1.374*	142:140	0.588
(-3,-1)	14.86%	0.724	138:144	0.088	16.01%	0.609	139:143	0.231
(-1,0)	12.50%	1.203	143:139	0.684	13.33%	1.021	140:142	0.35
(0,0)	10.12%	2.012**	157:125	2.352***	10.36%	1.832**	159:123	2.614***
(0,1)	12.73%	1.796**	142:140	0.565	12.03%	1.293*	146:136	1.065
(-1,1)	15.11%	1.287*	140:142	0.327	15.00%	0.832	138:144	0.112
(1,3)	11.23%	1.410*	143:139	0.684	8.12%	0.540	141:141	0.469
(2,5)	14.17%	1.582*	145:137	0.922	8.95%	0.516	144:138	0.826

Table 6: Market Return Effects of Deletion from the Domini 400 Social Index

This table presents the results from an event study of firms that have been deleted from the DS400, the event date (day 0) being the date of deletion from the index. The mean cumulative abnormal return, number of positive and negative cumulative abnormal returns, and results from the Patell Z Test and Generalized Sign Test are presented for each of 8 separate event windows. The sample used consists of 84 deletions from the DS400 that occurred between May 1st 1990 and March 31st 2006. The expected returns used in the study were estimated using both the market model and the market adjusted returns method, and using both the CRSP equally weighted index and CRSP value weighted index.

*,**,*** denote significance at the 10%, 5%, and 1% levels respectively. Assuming a 1-tailed test of the following hypotheses:

For the Patell Z Test: H0: $\overline{CAR} = 0$, Ha: $\overline{CAR} < 0$

For Generalized Sign Test: H0: (Number of positive CARs) – E(Number of positive CARs) = 0, Ha: (Number of positive CARs) – E(Number of positive CARs) < 0

Panel A: Market Model								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z
(-5,-2)	0.29%	0.216	41:43	0.106	0.31%	0.286	42:42	0.264
(-3,-1)	-0.51%	-1.645**	37:47	-0.767	-0.56%	-1.735**	34:50	-1.483*
(-1,0)	-0.37%	-1.423*	35:49	-1.204	-0.27%	-1.022	35:49	-1.264
(0,0)	-0.39%	-1.701**	35:49	-1.204	-0.31%	-1.344*	37:47	-0.828
(0,1)	-0.48%	-1.404*	36:48	-0.986	-0.40%	-1.136	38:46	-0.610
(-1,1)	-0.47%	-1.326*	34:50	-1.422*	-0.36%	-0.985	38:46	-0.610
(1,3)	0.27%	0.432	45:39	0.98	0.31%	0.531	49:35	1.792**
(2,5)	0.31%	0.978	42:42	0.325	0.22%	0.836	45:39	0.919

Panel B: Market Adjusted Returns								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z	$\overline{CAR}$	Patell Z	No. of Positive CARs: No. Of Negative CARs	Generalized Sign Z
(-5,-2)	0.09%	-0.221	43:41	0.839	0.34%	0.321	45:39	0.822
(-3,-1)	-0.65%	-1.957**	34:50	-1.13	-0.43%	-1.447*	34:50	-1.579*
(-1,0)	-0.38%	-1.402*	34:50	-1.13	-0.10%	-0.445	40:44	-0.270
(0,0)	-0.41%	-1.723**	38:46	-0.255	-0.26%	-1.015	41:43	-0.051
(0,1)	-0.55%	-1.440*	33:51	-1.348*	-0.29%	-0.660	40:44	-0.270
(-1,1)	-0.53%	-1.325*	36:48	-0.692	-0.13%	-0.316	40:44	-0.270
(1,3)	0.03%	-0.043	40:44	0.183	0.29%	0.522	47:37	1.258
(2,5)	-0.24%	-0.162	44:40	1.058	0.02%	0.296	44:40	0.603

Table 7: Volume Effects of Deletion from the Domini 400 Social Index

This table presents the results from a volume event study of firms that have been deleted from the DS400, the event date (day 0) being the date of deletion from the index. The mean cumulative abnormal log transformed relative trading volume ($\overline{CARV}$), number of positive and negative cumulative abnormal log transformed relative volumes (CARVs), and results from the Patell Z Test and Generalized Sign Test are presented for each of 8 separate event windows. The sample used consists of 84 deletions from the DS400 that occurred between May 1st 1990 and March 31st 2006. The expected log transformed relative volume measures used in the study were estimated using the market model, with each of the following 4 market indexes of log transformed relative trading volume: (i) CRSP equally weighted from NYSE & AMEX, (ii) CRSP value weighted from NYSE & AMEX, (iii) CRSP equally weighted from NASDAQ, (iv) CRSP value weighted from NASDAQ.

*,**,*** denote significance at the 10%, 5%, and 1% levels respectively. Assuming a 1-tailed test of the following hypotheses:

For the Patell Z Test: H0: $\overline{CARV} = 0$, Ha: $\overline{CARV} > 0$

For Generalized Sign Test: H0: (Number of positive CARVs) – E(Number of positive CARVs) = 0, Ha: (Number of positive CARVs) – E(Number of positive CARVs) > 0

Panel A: NYSE & AMEX Benchmark								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z
(-5,-2)	14.58%	0.112	44:40	0.847	20.13%	0.399	37:47	-0.661
(-3,-1)	8.94%	-0.137	37:47	-0.682	13.05%	0.105	36:48	-0.879
(-1,0)	27.95%	2.209**	43:41	0.629	34.41%	2.822***	42:42	0.432
(0,0)	22.38%	3.005***	51:33	2.376***	26.36%	3.554***	49:35	1.961**
(0,1)	27.92%	2.730***	47:37	1.503*	36.38%	3.582***	49:35	1.961**
(-1,1)	33.49%	2.297**	43:41	0.629	44.43%	3.177***	43:41	0.65
(1,3)	1.55%	0.117	36:48	-0.9	9.62%	0.720	42:42	0.432
(2,5)	7.27%	0.057	39:45	-0.245	15.22%	0.548	39:45	-0.224

Panel B: NASDAQ Benchmark								
	(i) CRSP Equally Weighted Index				(ii) CRSP Value Weighted Index			
Event Window	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z	$\overline{CARV}$	Patell Z	No. of Positive CARVs : No. Of Negative CARVs	Generalized Sign Z
(-5,-2)	25.21%	1.153	46:38	1.257	25.13%	1.154	41:43	0.194
(-3,-1)	16.83%	0.802	43:41	0.602	19.33%	1.082	41:43	0.194
(-1,0)	34.89%	3.180***	41:43	0.165	38.48%	3.613***	44:40	0.849
(0,0)	25.98%	3.680***	52:32	2.568***	27.38%	3.943***	51:33	2.378***
(0,1)	35.38%	3.753***	49:35	1.913**	38.80%	4.102***	49:35	1.941**
(-1,1)	44.29%	3.536***	42:42	0.384	49.90%	4.022***	45:39	1.067
(1,3)	11.46%	1.327*	40:44	-0.053	16.96%	1.707**	38:46	-0.462
(2,5)	17.75%	1.334*	40:44	-0.053	22.68%	1.579*	43:41	0.63

Table 8: Frequency of Forecast Increases and Decreases Surrounding Addition to the DS400

The graphs below show the percentage of times that the median eps forecast for a firm that has been added to the DS400 increases, decreases, or remains the same following the addition. The "All Firms" benchmark displays the same frequencies, surrounding the same event dates as the added firm sample, but consists of all firms in the I/B/E/S database. Results are presented for 'long-term growth' forecasts, 'current year' forecasts, and '1-year ahead' forecasts.

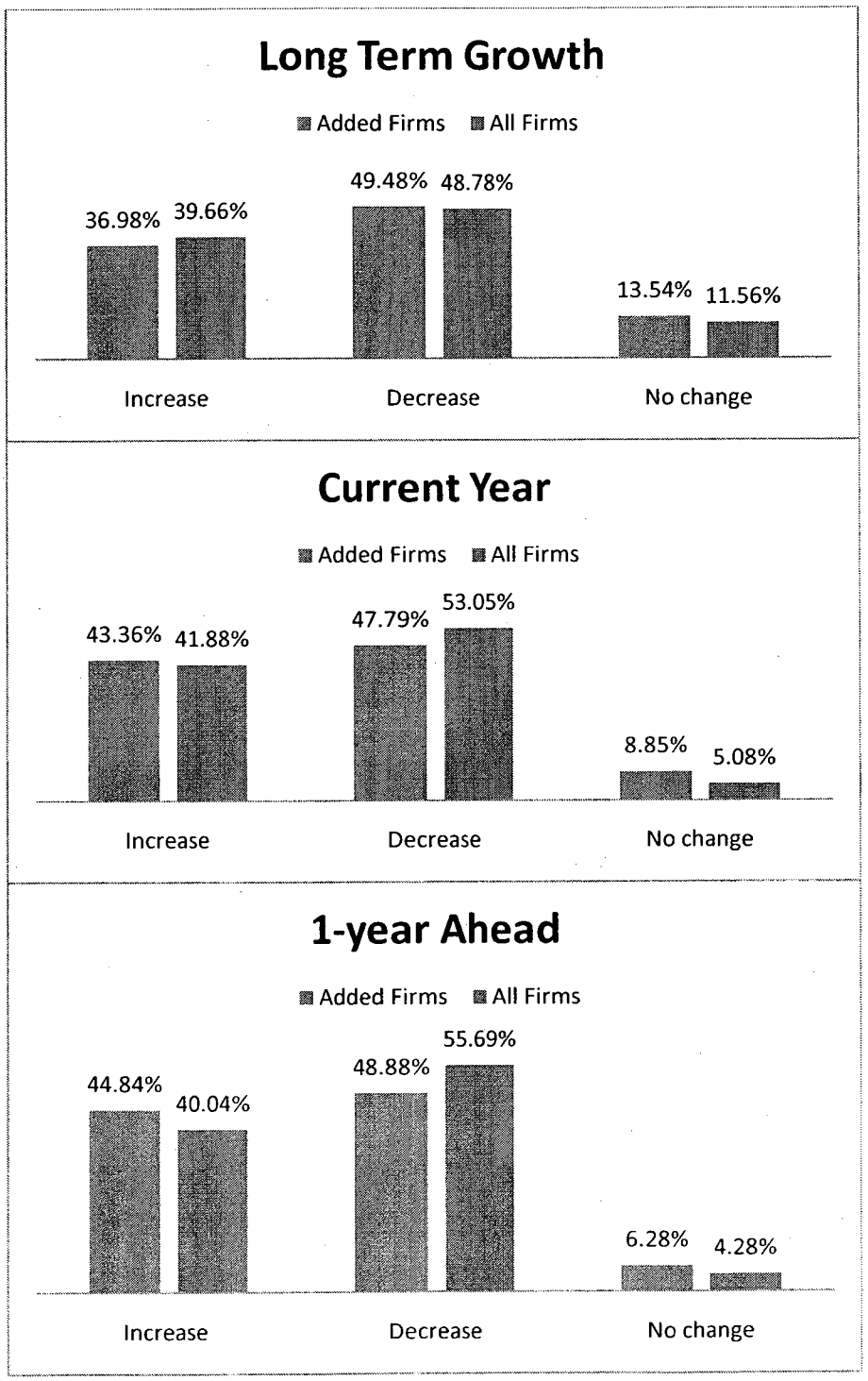


Table 9: Frequency of Forecast Increases and Decreases Surrounding Deletion from the DS400

The graphs below show the percentage of times that the median eps forecast for a firm that has been deleted from the DS400 increases, decreases, or remains the same following the deletion. The "all firms" benchmark displays the same frequencies, surrounding the same event dates as the deleted firm sample, but consists of all firms in the I/B/E/S database. Results are presented for 'long-term growth' forecasts, 'current year' forecasts, and '1-year ahead' forecasts.

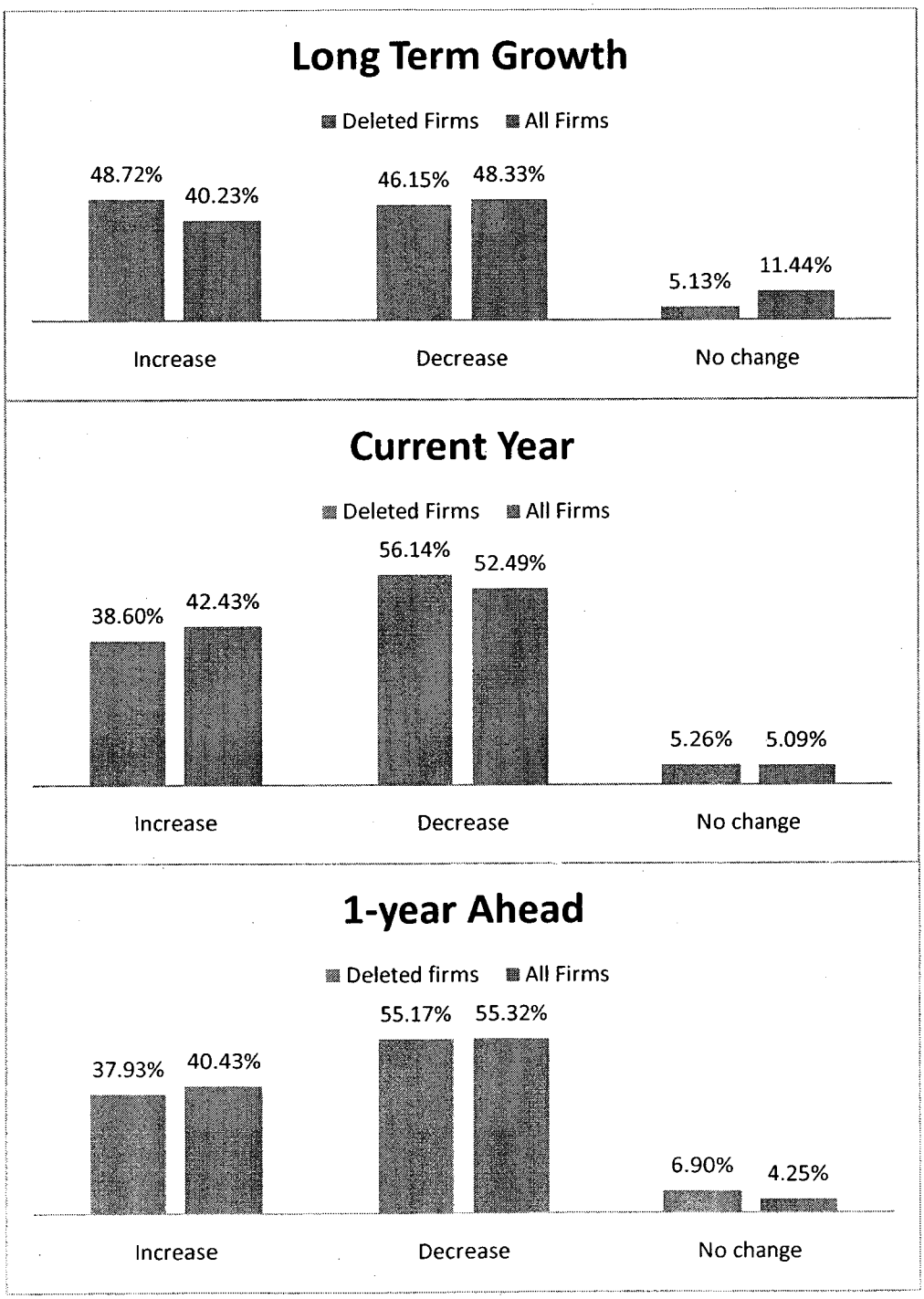


Table 10: Proportion Test Results

The following table displays Z statistics for the 2 tailed test of the hypothesis:

H_0 : P(decrease in median forecast for a firm added to or deleted from the DS400) = P(decrease in median forecast for any firm)

vs

H_a: P(decrease in median forecast for a firm added to or deleted from the DS400) ≠ P(decrease in median forecast for any firm)

Panel A presents the results from the sample of added firms, and panel B from the sample of deleted firms. Samples sizes, n, are also provided.

*, **, *** denote significance at the 10%, 5%, and 1% levels respectively.

Forecast Horizon	Z	n
Panel A: Added Firms		
Long-term Growth	0.1938	192
Current Year	-1.5852	226
One year ahead	-2.0475**	223
Panel B: Deleted Firms		
Long-term Growth	-0.272	39
Current Year	0.5519	57
One year ahead	-0.0226	58

Table 11: Magnitude of Forecast Changes for Firms Added to the Domini 400 Social Index

This table shows, for all three of the forecast change variables, the mean change in forecast for firms added to the DS400, the mean change in forecast for all firms in the I/B/E/S database, as well as the mean difference in forecast change between the added firms and the 'all firms' and 'industry matched' benchmarks. Panels A, B, and C show results for 'long-term growth', 'current year', and '1-year ahead' forecast horizons respectively. t Values are also presented for two tailed tests of the null hypothesis H0: x = 0, where x represents the variable being analysed.

*,**,*** denote significance at the 10%, 5%, and 1% levels respectively.

	Sample Size	Mean Δeps forecast for Added Firms	Mean Δeps forecast for All Firms	Mean Δeps forecast for Added Firms relative to "All Firms" benchmark	Mean Δeps forecast for Added Firms relative to "Industry Matched" benchmark
Panel A: Long Term Growth Forecasts					
Δ % Growth Forecast (%)	192	-0.982 %	-0.617 %	-0.365 %	-0.360 %
t Value		-2.35**	-56.88***	-0.88	-0.88
Panel B: Current Year Forecasts					
Δ Eps ($)	226	-0.049	-0.062	0.014	0.012
t Value		-2.96***	-188.44***	0.85	0.77
(Δ Eps) / Price (%)	226	-0.239%	-0.782%	0.567%	0.582%
t Value		-3.72***	-87.73***	7.98***	5.22***
(Δ Eps) / Eps_{pre} (%)	223	-8.04%	-14.31%	6.26%	9.68%
t Value		-1.67*	-55.72***	1.29	1.73*
Panel C: One Year Ahead Forecasts					
Δ Eps ($)	223	-0.042	-0.073	0.030	0.023
t Value		-2.58**	-180.01***	1.82*	1.50
(Δ Eps) / Price (%)	223	-0.204%	-0.799%	0.601%	0.654%
t Value		-3.61***	-67.25***	9.11***	4.14***
(Δ Eps) / Eps_{pre} (%)	221	-2.56%	-11.89%	8.92%	8.26%
t Value		-2.41**	-40.63***	7.51***	3.10***

Table 12: Magnitude of Forecast Changes for Firms Deleted from the Domini 400 Social Index

This table shows, for all three of the forecast change variables, the mean change in forecast for firms deleted from the DS400, the mean change in forecast for all firms in the I/B/E/S database, as well as the mean difference in forecast change between the deleted firms and the 'all firms' and 'industry matched' benchmarks. Panels A, B, and C show results for 'long-term growth', 'current year', and '1-year ahead' forecast horizons respectively. t Values are also presented for two tailed tests of the null hypothesis H0: x = 0, where x represents the variable being analysed. *,**,*** denote significance at the 10%, 5%, and 1% levels respectively.

	Sample Size	Mean Δeps forecast for Deleted Firms	Mean Δeps forecast for All Firms	Mean Δeps forecast for Deleted Firms relative to "All Firms" benchmark	Mean Δeps forecast for Deleted Firms relative to "Industry Matched" benchmark
Panel A: Long Term Growth Forecasts					
Δ % Growth Forecast (%)	39	-0.285 %	-0.547 %	0.113 %	0.383 %
t Value		-0.53	-26.96***	0.21	0.81
Panel B: Current Year Forecasts					
Δ Eps ($)	57	-0.109	-0.055	-0.050	-0.034
t Value		-3.11***	-89.76***	-1.42	-1.08
(Δ Eps) / Price (%)	57	-0.738%	-0.696%	0.030%	0.050%
t Value		-2.84***	-40.65***	0.12	0.20
(Δ Eps) / Eps_{pre} (%)	54	-9.50%	-13.15%	3.67%	4.42%
t Value		-2.65**	-26.05***	1.01	1.08
Panel C: One Year Ahead Forecasts†					
Δ Eps ($)	58	-0.092	-0.064	-0.030	-0.017
t Value		-2.02**	-83.12***	-0.68	-0.39
(Δ Eps) / Price (%)	58	-0.609%	-0.755%	0.109%	0.100%
t Value		-1.89*	-26.98***	0.34	0.32
(Δ Eps) / Eps_{pre} (%)	58	-8.39%	-10.43%	0.162%	2.07%
t Value		-1.82*	-24.96***	0.04	0.43

† For the sample of deleted firms relative to the 'industry matched' benchmark the sample size falls to 57 firms, as there was one firm in the initial sample for which no industry match could be made for the appropriate time period.

Appendix B

Analyst Forecast Data – Sample Construction Process

The core idea behind the analysis of the I/B/E/S forecast data is to separate individual analyst forecasts into two time periods. One consisting of the four months leading up to the event of the DS400 change, and the other consisting of the four months subsequent to the change. One complicating issue is that depending on when sample firms make announcements of earnings from previous fiscal periods these time periods may need to be shortened, or the observation may need to be dropped from the sample. The four timelines that follow illustrate the four situations that arose during the data collection process, along with how they were dealt with.

Firstly, the following dates and time periods need to be defined:

FYE0 = The date of the last fiscal year end prior to the event date.

ACT0 = The date the actual earnings from fiscal year 0 were announced.

EVT = The event date. I.e. the date the firm was added to or deleted from the DS400.

FYE1 = The first fiscal year end date to occur after the event date.

ACT1 = The date the actual earnings from fiscal year 1 were announced.

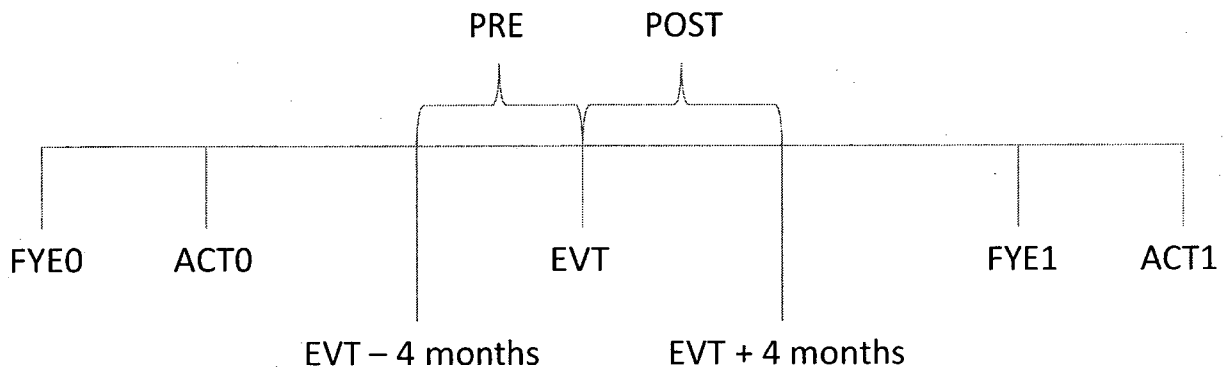
PRE = The time period prior to the event date, within which analyst forecasts are grouped and the median is calculated.

POST = The time period after the event date, within which analyst forecasts are grouped and the median is calculated.

It should also be noted that Current Year Forecasts are eps forecasts made for FYE1 and 1 Year Ahead Forecasts are eps forecasts made for FYE2. Also, Long Term Growth Forecasts are

not for any specified fiscal period and thus always have 'pre' and 'post' time periods consisting of the entire 4 months.

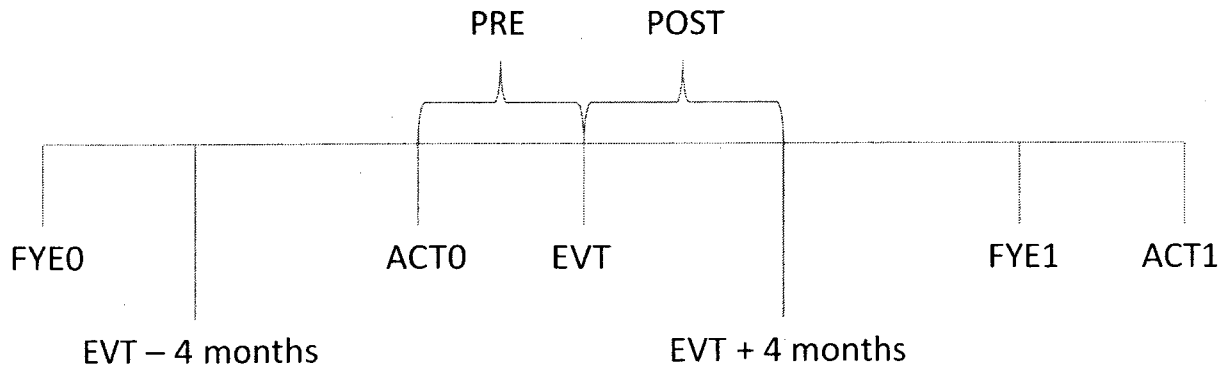
CASE 1: No earnings announcements occur within the 'pre' or 'post' periods.



Pre = {EVT – 4 months, EVT}

Post= {EVT, EVT + 4 months}

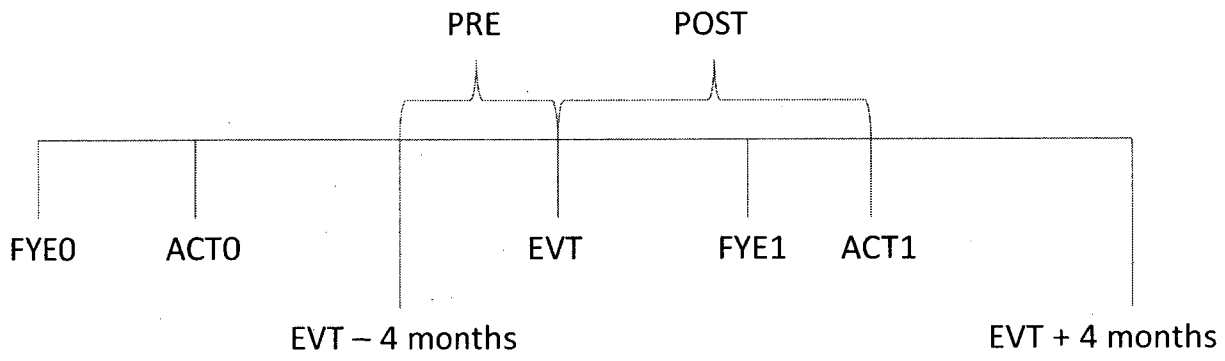
CASE 2: Earnings announcement from fiscal year 0 occurs within 'pre' period.



Pre = {ACT0,EVT}

Post = {EVT, EVT + 4 months}

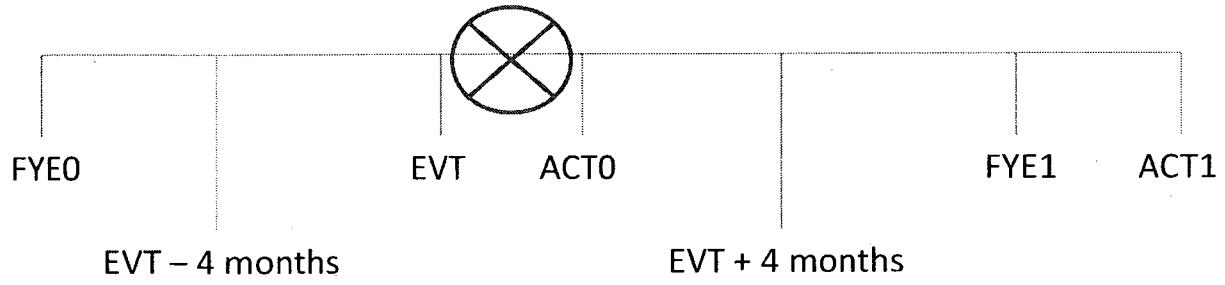
CASE 3: Earnings announcement from fiscal year 1 occurs within 'post' period.



Pre = {EVT – 4 months, EVT}

Post = {EVT, ACT1}

CASE 4: Earnings announcement from fiscal year 0 occurs within POST period (or on the event date).



In this situation the earnings announcement and event date occur so close together that it is practically impossible to distinguish their relative effects. Therefore, these observations were dropped from the sample.

In general, the 'pre' and 'post' time periods can be described as:

$$PRE = \{Max[EVT - 4\ months, ACT0], EVT\}$$

$$POST = \{EVT, Min[EVT + 4\ months, ACT1]\}$$

It should also be noted that the fiscal year end dates are not important in the time period delineation process due to the fact that while they signify the end of the fiscal year, there is no new information made available to analysts on that day. Therefore while it might seem odd that it is possible for an analyst to make an eps forecast for a fiscal period that is already over, these forecasts are allowed to remain in the sample because they are not influenced by any new information concerning actual realized past earnings.