The Effect of Corporate Social Responsibility on Stock Response to the S&P 500 Index Additions

by

William Mountain

A research project submitted in partial fulfillment of the requirements for the degree of Master of Finance

Saint Mary's University

Written for MFIN 6692.0 under the direction of Dr. N. Attig

Approved: _____
Faculty Advisor

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Abstract

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August 2013

Using a sample 150 firms that were recently added to the S&P 500 Index, we investigate whether corporate social responsibility ratings alters stock response after addition to the S&P 500 Index. We define and construct an appropriate data set, taken from the years 1990 to 2010. After controlling for factors connected with the addition to the Index, our tests find no relationship between corporate social responsibility and the stock response. We conclude that our empirical analysis does not lend credence to the relevance of CSR in improving stock response to the S&P500 index addition.

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List of Tables, Figures and Appendices

Chapter 1: Introduction

Two current topics of interest to researchers are the effect on a corporation of increased Corporate Social Responsibility and the effect of inclusion into Standard & Poor's 500 Index. There is strong evidence that addition to the S&P 500 provides long term value to firms (Chen, Noronha, & Singal, 2004). Corporate Social Responsibility, although showing more mixed results, has demonstrated some positive correlation with long term value. The purpose of this paper is to investigate whether high corporate social responsibility alters stock response after announcement of addition to the S&P 500 Index.

Views on Corporate Social Responsibilities (hereinafter referred to as CSR) lie between two extremes. The first extreme is the classical view that states a corporation is an institution aimed towards profit whose only responsibility to society is to provide goods and services that return maximum benefits to shareholders. At the other end of the extreme is the socioeconomic view that asserts that a corporation is a member of a larger society and has responsibilities other than simply maximizing profits.

Although CSR has been defined in many ways, in this paper it will refer to progressive actions a firm takes with respect to their community, to the environment and to their suppliers and employees that are beyond what is legally required. The term CSR came into common usage in the 1960s and has

been a important concern for United States based firms since the 1980s. Recent CSR initiatives include increased efforts to improve relations with employees, suppliers and consumers, to reduce global environmental footprint and to expand philanthropic contributions. Studies have shown that the public appreciates any efforts to improve CSR. Information on CSR related activities is regularly published in a section of a firm's annual report. Many firms also issue special publications on CSR and promote their CSR activities on their corporate websites. Several studies have examined the relationship between finance performance and CSR. Their findings on this question will be discussed later in this paper.

The extent of CSR activities can be studied through a number of qualitative measures. However, quantitative measurement of CSR is much more difficult. Although there are several published CSR indices (MSCI ESG STATS, KLD Research and Analytics, Net Balance Foundation's CRI), the formulations are different and the results are not consistent. In this paper, we have decided to use the index of CSR rating provided by MSCI ESG STATS as our measure of CSR.

The S&P 500 Index is the most widely used benchmark for measuring the performance of large capitalization U.S. based stocks (Platikanova, 2008). Addition to the Index is an "information-free" event. That is, S&P claims that addition to the index does not signify an endorsement of that stock's future

expectations. "Company additions to and deletions from an S&P equity index do not in any way reflect an opinion on the investment merits of the company" (Denis, McConnell, Ovtchinnikov, & Yu, 2003). Despite this, there is a great deal of research that shows a positive correlation between entry in the Index and long term corporate value.

This paper will review the literature on the definitions and measures of CSR and explain our chosen index of CSR. We will also review the literature on the importance of inclusion in the S&P 500. The sampling techniques and methodology used for the empirical results will be described. A discussion of the statistical model, univirate and multivariate tests results will be presented. We will then present those conclusions that may be reasonably drawn from the statistical results.

Chapter 2: Literature Review

Because there is no research that directly links CSR and the addition to the S&P 500 index, this literature review will focus independently on those areas of research associated with CSR and with the addition to the S&P 500.

2.1 Corporate Social Responsibility

There have been several studies linking to CSR to financial performance, stakeholder value, corporate governance, over-investment and merger enhancement. These relationships are important to consider as they may themselves affect the addition to the S&P 500.

Margolis & Walsh (2003) reviewed 109 firms and showed a wide variance of results when CSR is hypothesised to predict financial performance. Roughly half or 54 of the results showed a positive relationship between CSR and financial performance. Non-significant relationships were found in 28 studies, while a mixture of results were found in 20 studies. Only seven studies found a negative relationship.

Long-term firm (stakeholder) value is very important to investors. While some authors, such as Barnea & Rubin (2010), have opposed the hypothesis of CSR investments enhancing firm value, Jo & Harjito (2011) found that CSR is a firm enhancing investment. It is important to note that Jo & Harjito (2011) corrected for endogeneity and simultaneity bias, which had not been accounted

for in past work. Jo & Harjito conclude that CSR activities do not constitute an over-investment in their sample period, contrary to the conclusions reached by Barnea & Rubin.

It has been shown that the effects of CSR activities are stronger when analyst following is higher. Jo & Harjoto (2011) report "Our results suggest that firms' engagement in CSR activities, together with external monitoring by security analysts, is value enhancing". As a rise in analyst following is guaranteed after a firm's inclusion into the S&P 500 index, this implies that the inclusion will help the positive effect of CSR.

Some studies state that CSR activities are over-valued and conclude that firms invest in CSR for private-benefit not for shareholder value. Improving their reputation as good global citizens brings a "warm-glow effect", which does not return value back to the firm, but provides utility only to the managers (insiders). This theory leads Barnea & Rubin, (2010) to the conclusion that CSR spending can create a conflict between different groups of shareholders. This conflict will be less in those firms with a larger fraction of insider ownership.

There are clear indications that CSR does affect decision making in operations and investments purchases. This leads us to the conclusion that it is worthwhile to investigate the relationship, if any, between investment in CSR and the inclusion in the S&P 500 Index.

2.2 Standard & Poor's 500 Index Addition

Inclusion in the Standard & Poor's 500 Index is an important milestone in a firm's financial history and many studies have examined the possible connection with a number of important factors, including short/long-term price effects, earnings expectations, earnings quality, volume effects and liquidity effects. Denis, McConnell, Ovtchinnikov, & Yu (2003) make note that studies that examine the prices of common stocks when they become included in The Standard & Poor's (S&P) 500 Index have appeared regularly in leading journals since 1986.

Capital gains is a large source of investment income. Therefore, stock price changes are the most commonly studied topic when investigating the effects of S&P inclusion on firms' financial performance. Lynch & Mendenhall (1996), Erwin & Miller (1998) and Platikanova (2008) all that found that inclusion in the Index results in a permanent price increase. A common theory that explains this permanent increase is that financial market demand curves are long-term downward sloping, assuming the imperfect substitute hypothesis. This is opposed to the long held assumption that stocks are perfect substitutes with perfectly elastic demand curves.

Increased investor awareness is frequently described as an important factor in explaining the positive effects associated with the inclusion in the Index.

Several mutual funds attempt to mimic the Index movements and fund managers follow all constituents of the Index. This investor awareness hypothesis is used by Chen, Noronha, & Singal (2004) to explain the permanent increase in price following inclusion in the index. CSR could have a similar effect, as some forms of CSR, such as philanthropy, bring positive awareness of a corporation.

In dealing in capital markets, two other positive attributes are liquidity and efficiency. Liquidity is strongly associated with investor awareness in the Efficient Market Hypothesis. Other capital will come from Exchange Traded Funds. ETFs of indices hold all constituents and have become very popular investments. When constituents are added and deleted, ETF's must be adjusted accordingly. Erwin & Miller (1998) show the associated effects from liquidity and efficiency in their paper.

Chapter 3: Methodology

3.1 Sample Selection

This paper analyzed firms added to the S&P additions from 1991 to 2010. Over that time, Standard and Poor's recognized 553 firms as being added to the Index. Several additions resulted from mergers, spinoffs or name changes that were already included in the Index. For example, in 1999 El Paso Corporation acquired Sonat Inc. Prior to the merger Sonat Inc. was included in the Index but El Paso Corp. had not. After the merger, Sonat was dropped and El Paso was added. El Paso is not considered a true addition to the Index. Also in 2000, 3Com Corp. was deleted from the Index after spinning of its mobile computing division Palm. In turn, Palm Inc. was added to the Index to replace 3Com Corp. Palm Inc. is also not considered a true addition. After mergers, spinoffs and name changes are removed from the sample, 422 firms remain. Of these, CSR data is available MSCI ESG STATS for 150 firms. These 150 firms are then matched with data from COMPUSTAT to create the final sample. A list of these firms appears in Appendix A.

3.2 Subsample

A subsample was constructed by excluding those firms whose announcement was made in years 2007 and 2008. It is hoped that restriction to this subsample may mitigate the effects of the financial crisis of 2007. Herein after the Subsample will refer to this subsample that attempts to remove the effects of the 2007 crisis. This list of firms in the subsample appears in Appendix B.

3.3 CSR Measure

Data measuring a firm's corporate social performance was obtained from MSCI ESG STATS. A wide range of CSR related items is compiled from various sources, including government agencies, non-governmental organizations, global media publications, annual reports, regulatory filings, proxy statements, and company disclosures. These ratings are the successor to KLD, as used in a number of prior papers, such as Deng, Kang, & Low (2013)

MSCI ESG STATS tracks CSR in the following seven areas: Community, Corporate Governance, Diversity, Employee Relations, Environment, Human Rights, and Product Characteristics. For each area, a number of strengths and concerns is defined. For each firms, a binary rating is assigned to the strengths and concerns. We calculated a score for each area by adding the number of strengths and subtracting the number of concerns. We then summed the area scores to obtain an overall CSR index. . Index additions in each year are associated with CSR measures for the previous year, to remove endogeneity.

3.4 Other Data Sources

Equity Prices for each firm were obtained from COMPUSTAT's database, from the obtained equity prices the equity returns were manually calculated. S&P 500 Index prices were obtained from Yahoo Finance, from the obtained Index prices the Index returns were manually calculated. All control variables were obtained from COMPUSTAT's database. S&P additions were obtained from COMPUSTAT's database and Chen, Noronha and Singal (2004).

The industries are divided into eight categories as defined by the North American Industry Classification System (NAICS). These categories are represented by their two digit SIC codes.

3.5 Method

An event study was performed surrounding the announcement date of additions to the Index. The mean adjusted model is selected for the event study. The mean adjusted model is consistent Capital Asset Pricing Model, assuming unsystematic risk is zero and the systematic risk is set to one. It assumes the expected return is $E(R_{nt})$. Therefore, the predicted expected return after addition is equal to $E(R_{nt})$. The mean adjusted model is generated by:

$$R = E(R_{nt}) + \varepsilon_{nt}, \text{ where } E(\varepsilon_{nt}) = 0.$$

Brown and Warner (1985) find that although the mean adjusted model is perhaps the simplest model, it provides very similar results to comparable sophisticated models. We choose the announcement date, rather than the effective addition date, as markets are assumed to be efficient, this is similar to the method used by Chen, Noronha, & Singal (2004). The market model is used with the S&P 500 Index with the market parameters estimated over an 80 day window. S&P 500 Index was chosen to represent the market because of its relevance in the paper. Cumulative abnormal returns are calculated for three different periods, the announcement date, a 20 day period from day(t) and a 40 day period from day(t).

After CAR is calculated an OLS regression analysis was performed using the following model:

$$CAR_i = B_0 + B_1 CSR_i + B_2 \text{ROA}_i + B_3 LOGMCAP_i + B_4 LEV_i + B_5 D_{1i} + B_6 D_{2i} + B_7 3 +$$
$$B_6 D_{3i} + B_7 D_{4i} + B_8 D_{5i} + B_{10} D_{6i} + B_{11} D_{7i} + B_{12} D_{8i} + \varepsilon_i$$

CAR represents the cumulative abnormal return, calculated as described above. CSR was calculated for year (t-1), as described above. ROA represents a firms return on assets in year(t), LOGMCAP represents the natural logarithm of a firms market cap in year(t), LEV represents a measure of the firms leverage in year(t), and D_{1i} to D_{8i} represent industry classes, used to control for industry fixed effects.

Chapter 4: Results

4.1 Descriptive Analysis

As shown in Table 1, the distribution of industry and average CAR in relation to CSR measures is presented for the Subsample that excludes the 2007 crisis data. The distribution of CSR is normally distributed around zero with 62% of observations being in the negative one and positive one range.

The industries are divided into seven categories as defined by the North American Industry Classification System (NAICS). These categories are represented by the variables D1 through D7. The first and last categories, which are the manufacturing and retail industries, comprise approximately fifty percent of the sample. CAR fluctuates between -1.467 (CSR +5) and .07590 (CSR -4) with no visual trend to be seen.

Table 1 -Descriptive Analysis

CSR	N	D1	D2	D3	D4	D5	D6	D7	CAR
-5	2	0	0	2	0	0	0	0	-0.01262
-4	3	1	0	1	1	0	0	0	0.07590
-3	5	1	0	0	2	0	1	0	0.04211
-2	10	1	0	2	3	0	2	2	-0.12188
-1	21	5	1	10	1	0	2	2	-0.05494
0	19	1	0	7	3	2	0	6	0.04365
1	22	1	0	10	2	1	2	5	-0.11038
2	9	2	0	5	0	0	0	2	-0.58373
3	7	0	0	4	1	0	1	1	-0.61369
4	2	0	0	0	1	0	1	0	0.05953
5	1	0	0	0	0	0	0	1	-1.46918
	Sum	12	1	41	14	3	9	19	

4.2 Univariate Analysis

This section studies the effects of the S&P 500 addition announcement on cumulative abnormal returns. The time periods considered are the day of addition annoucement, the following twenty days and the following forty days. A review of the effects of corporate social responsibility on cumulative abnormal returns over the same periods without controlling for size, returns and industry effects follows.

The effects on cumulative abnormal returns (CAR) are reported in Table 2 for the three periods for the full sample. The CAR in the first period is 1.07% with significance at the 1% level in the full sample and 1.24% with significance at 1% level in the subsample. In the second period the CAR is -2.71% in the full sample with significance at the 10% level and postive but insignificant in the subsample. In the third period the CAR is -7.03% in the full sample with significance at the 1% level and -3.48% with significance at the 10% level in the subsample. The reduction in test significance between the full sample and the subsample may be attributed to the reduction in the sample size.

Table 2 - Univariate CAR

	CAR	T	N
Full Sample			
AD	0.0107***	3.92	150
AD to +20	-0.0271*	-2.23	150
AD to +40	-0.0703***	-3.89	150
Subsample			
AD=0	0.0124***	(3.86)	101
AD to +20	0.00443	(0.44)	101
AD to +40	-0.0348*	(-2.13)	101

*, **, and *** denote significance at the 10%, 5% and 1% level,
respectively
AD represents addition announcement date

As shown in Figure 1, the CAR revert to zero after 16 days in the full sample and after 32 days in the subsample. For the firms in our study price effects after additon to the Index are temporary.

Figure 1
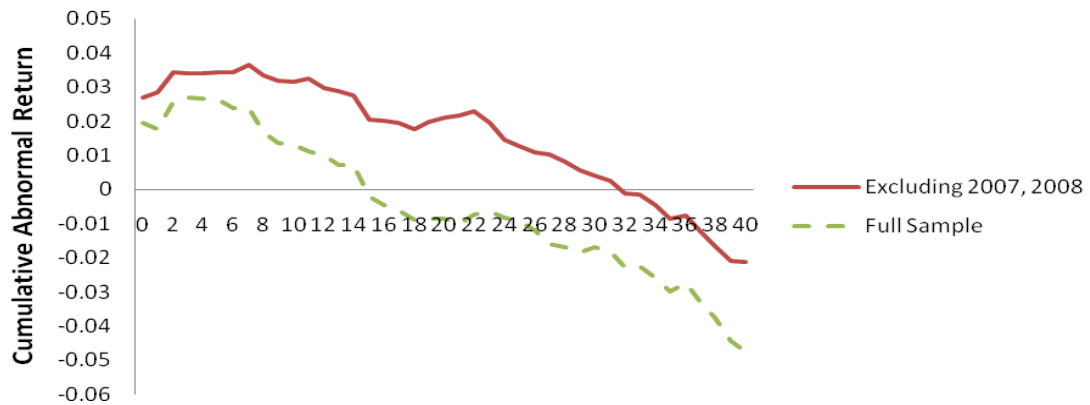
A standard univariate regression is used to test the hypothesis that high CSR measures have positive effects on post addition CAR and the results appear in Table 3. In the full sample, CSR has a negative and insignificant relationship with CAR in all three periods. In the subsample, CSR is shown to be have a positive but insignificant relationship in the first two periods and a negative and insignificant relationship in the third. R^2 values are low in all six tests with 0.3% being the largest in the subsample during the second period.

Table 3 - Univariate CSR

	AD		AD to +20		AD to +40	
Full Sample						
CSR	-0.000466	(-0.33)	-0.000466	(-0.33)	-0.00218	(-0.23)
Intercept	0.0105***	(3.67)	-0.0275*	(-2.30)	-0.0711***	(-4.03)
N	150		150		150	
R^2	0.001		0.000		0.000	
Subsample						
CSR	0.000773	(0.39)	0.000773	(0.39)	-0.00116	(-0.15)
Intercept	0.0123***	(3.80)	0.00237	(0.23)	-0.0390*	(-2.29)
N	101		101		101	
R^2	0.002		0.003		0.000	

*, **, and *** denote significance at the 10%, 5% and 1% level, respectively
t-statistics are in parenthesis
AD represents addition announcement date

4.3 Multivaritate Analysis

A multivariate regression is used to test the hypothesis that high CSR measures have positive effects on post addition CAR, while controlling for leverage, size, returns and industry effects. Table 4 shows the results for the same full sample and the same three periods. In the first period, CSR has a positive but insignificant effect. Industry dummy variables D1 to D8 have significant effects with t values all above 1.71. Leverage, size and return are not insignificant in the short run. When evaluating the second period, the R^2 value is largest at 12.2. The CSR *t* value increased but is still insignificant. The CSR negative coefficient shows positive correlation with CAR since CAR was previously shown to be negative over this period for the full sample. Industry effects are less significant in this period compared to the announcement day. Size and leverage are now significant and positively correlated, but returns remain insignificant. In the third period, CSR significance is less than the second but larger than the first. Industry effects become less significant the longer the evaluation period for CAR and returns stay insignificant. Size and leverage remain significant and positively correlated.

Table 4 - Multivariate Full Sample

	AD		AD to +20		AD to +40	
CSR	0.000470	(0.32)	-0.00605	(-0.96)	-0.00849	(-0.89)
ROA	0.0102	(0.27)	-0.0245	(-0.15)	-0.340	(-0.95)
LOGMCAP	-0.00554	(-1.30)	0.0679**	(3.32)	0.0787*	(2.37)
LEV	-0.000153	(-0.26)	0.00899***	(3.71)	0.0165***	(4.65)
D1	-0.0579*	(-2.20)	-0.199	(-1.86)	-0.190	(-1.33)
D2	-0.0765	(-1.73)	-0.221	(-1.32)	-0.177	(-1.20)
D3	-0.0505	(-1.93)	-0.169	(-1.64)	-0.129	(-1.01)
D4	-0.0461	(-1.76)	-0.181	(-1.78)	-0.175	(-1.34)
D5	-0.0725**	(-2.82)	-0.0676	(-0.66)	-0.0442	(-0.35)
D6	-0.0463	(-1.71)	-0.182	(-1.73)	-0.143	(-1.04)
D7	-0.0625*	(-2.35)	-0.179	(-1.69)	-0.122	(-0.91)
D8	-0.0537*	(-2.10)	-0.257*	(-2.56)	-0.193	(-1.53)
_cons	0.112*	(2.53)	-0.455*	(-2.29)	-0.603	(-1.98)
N	148		148		148	
R^2	0.088		0.122		0.082	

t statistics in parentheses

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

Table 4 shows the results from the identical multivariate regression used with the subsample. The eighth industry cateogory is omitted in the regression because no observations remain for the public administration industry when data for 2007 and 2008 are removed. With the smaller sample size we see less significant results across all variables, with all R^2 values below 8%. CSR, which has its largest significance in the first period, loses it positive correlation with CAR. The results in Table 2 show CAR in the subsample is positive in the first and second periods and negative in the third. Table 5 shows CSR's coefficient to be negative in the period two and positive period three, opposite to Table 4.

Table 5- Multivariate - Subsample

	AD		AD to +20		AD to +40	
CSR	0.00163	(0.92)	-0.00259	(-0.57)	0.000902	(0.12)
ROA	-0.00000686	(-0.00)	0.0973	(0.50)	0.192	(0.56)
LOGMCAP	-0.00984	(-1.82)	0.00481	(0.28)	-0.0163	(-0.50)
LEV	-0.00411	(-0.34)	0.0166	(0.34)	0.0961	(1.44)
D1	-0.0517	(-1.73)	-0.125	(-1.08)	-0.0936	(-0.60)
D2	-0.0219	(-0.75)	0.00101	(0.01)	-0.0713	(-0.46)
D3	-0.0444	(-1.55)	-0.139	(-1.24)	-0.140	(-0.94)
D4	-0.0452	(-1.54)	-0.162	(-1.39)	-0.178	(-1.10)
D5	-0.0721*	(-2.52)	-0.0662	(-0.59)	-0.0731	(-0.49)
D6	-0.0453	(-1.49)	-0.133	(-1.17)	-0.118	(-0.75)
D7	-0.0607*	(-2.07)	-0.126	(-1.10)	-0.107	(-0.69)
_cons	0.150**	(2.80)	0.0777	(0.43)	0.186	(0.59)
N	100		100		100	
R^2	0.159		0.077		0.045	

t statistics in parentheses

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

Chapter 5: Conclusions

We have examined whether high corporate social responsibility is associated with enhanced returns on the announcement of addition to the S&P 500 Index. First, we performed four univariate tests: cumulative abnormal returns (CAR) on the full sample and on the restricted subsample, and Corporate Social Responsibility (CSR) on the sample and the subsample. The tests of Cumulative Abnormal Returns (CAR) show only positive and statistically significant results in the short term affects after addition to the Index. This result agrees with a similar study by Harris and Gruel (1986) but is not consistent with other prior studies. Univariate testing of CSR did not show any statistically significant results. Multivariate tests of CSR, controlling for leverage, size, returns and industry effects, also showed no significant results and finally, CSR's correlation with CAR was inconsistent.

Perhaps we can attribute the inconclusive statistical results to the absence of consistent CSR data. Information on only 36% of possible additions to the S&P 500 Index since 1990 was available from MSCI ESG STATS. However, other studies, such as Margolis & Walsh (2003), also found no significant relationship between CSR and financial performance.

While it may indeed be true that there is a positive correlation between Corporate Social Responsibility and cumulative abnormal returns from S&P

addition and that our results come from the lack of appropriate data, we cannot

reach such a conclusion from this study.

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Appendix A - Company List

Full Sample

Company ID	Name	Addition Date	SIC Industry Code
63643	ABERCROMBIE & FITCH -CL A	3/23/2007	56
30697	AFFILIATED COMPUTER SERVICES	3/26/2004	73
12950	AIRGAS INC	9/2/2009	50
29968	AK STEEL HOLDING CORP	6/25/2008	33
125595	AKAMAI TECHNOLOGIES INC	7/6/2007	73
15708	ALLERGAN INC	1/31/1992	28
64768	AMAZON.COM INC	11/15/2005	59
105365	AMERICAN TOWER CORP	11/13/2007	48
14282	AMPHENOL CORP	9/23/2008	36
11923	ANADARKO PETROLEUM CORP	7/22/1997	13
1632	ANALOG DEVICES	9/23/1999	36
1678	APACHE CORP	7/22/1997	13
31122	APOLLO GROUP INC -CL A	5/9/2002	82
1704	APPLIED MATERIALS INC	3/8/1995	35
9063	AUTONATION INC	2/19/2003	55
22794	BJ SERVICES CO	5/10/2002	13
65609	C H ROBINSON WORLDWIDE INC	2/23/2007	47
12485	CABLEVISION SYS CORP -CL A	12/13/2010	48
20548	CABOT OIL & GAS CORP	6/16/2008	13
60894	CAMERON INTERNATIONAL CORP	1/23/2008	35
31549	CAREMARK RX INC	3/19/2004	59
64410	CARMAX INC	6/22/2010	55
13599	CELGENE CORP	10/30/2006	28
23945	CEPHALON INC	11/11/2008	28
12850	CERNER CORP	4/23/2010	73
163946	CF INDUSTRIES HOLDINGS INC	8/21/2008	28
27786	CHESAPEAKE ENERGY CORP	2/24/2006	13
3062	CINTAS CORP	2/23/2001	23
20779	CISCO SYSTEMS INC	12/22/1993	35
3107	CLIFFS NATURAL RESOURCES INC	12/14/2009	10
140541	COACH INC	8/26/2004	31
111864	COGNIZANT TECH SOLUTIONS	11/10/2006	73
120093	CONSOL ENERGY INC	6/22/2006	12
2710	CONSTELLATION BRANDS	6/28/2005	20
23877	COVENTRY HEALTH CARE INC	8/24/2005	80
25340	D R HORTON INC	6/28/2005	15

61483	DAVITA HEALTHCARE PARTNERS	7/25/2008	80
62655	DEAN FOODS CO	3/28/2006	20
20653	DENBURY RESOURCES INC	3/26/2009	13
13700	DENTSPLY INTERNATL INC	11/7/2008	38
3905	DEVRY INC	6/2/2009	82
61409	DIAMOND OFFSHRE DRILLING INC	2/20/2009	13
12206	DIRECTV	11/28/2006	48
164296	DISCOVERY COMMUNICATIONS INC	2/23/2010	48
4016	DOLLAR GENERAL CORP	7/9/1998	53
4094	DUN & BRADSTREET CORP	11/25/2008	73
114524	EBAY INC	7/16/2002	73
16721	ELECTRONIC ARTS INC	7/15/2002	73
14535	EW SCRIPPS -CL A	12/13/2005	27
126296	EXPEDIA INC	9/26/2007	47
4494	EXPEDITORS INTL WASH INC	10/3/2007	47
121077	F5 NETWORKS INC	12/14/2010	73
14225	FASTENAL CO	9/8/2008	52
175404	FIRST SOLAR INC	10/9/2009	36
13204	FISHER SCIENTIFIC INTL INC	7/27/2004	50
28477	FLIR SYSTEMS INC	12/29/2008	38
4108	FLOWSERVE CORP	9/25/2008	35
4510	FMC CORP	8/12/2009	28
142811	FMC TECHNOLOGIES INC	5/29/2009	35
4843	FOREST LABORATORIES -CL A	11/14/2000	28
145049	GAMESTOP CORP	12/7/2007	57
24856	GILEAD SCIENCES INC	6/25/2004	28
160329	GOOGLE INC	3/28/2006	73
12788	HARMAN INTERNATIONAL INDS	1/27/2006	36
5492	HARRIS CORP	9/15/2008	36
5581	HELMERICH & PAYNE	2/22/2010	13
5709	HORMEL FOODS CORP	2/25/2009	20
26061	IAC/INTERACTIVECORP	11/24/2006	73
136725	INTUITIVE SURGICAL INC	5/27/2008	38
62374	IRON MOUNTAIN INC	12/31/2008	42
6216	JACOBS ENGINEERING GROUP INC	10/19/2007	16
121718	JUNIPER NETWORKS INC	5/26/2006	35
6799	KEYSPAN CORP	8/7/2000	49
110685	L-3 COMMUNICATIONS HLDGS INC	11/23/2004	36
14960	LABORATORY CP OF AMER HLDGS	10/25/2004	80
61567	LAUDER (ESTEE) COS INC -CL A	12/30/2005	28

6649	LEGGETT & PLATT INC	10/14/1999	25
6682	LEUCADIA NATIONAL CORP	8/22/2007	99
6994	MANITOWOC CO	11/9/2007	35
141400	MASSEY ENERGY CO	6/17/2008	12
25783	MCAFEE INC	12/17/2008	73
13644	MCCAW CELLULAR COMM -CL A	6/23/1993	48
7146	MCCORMICK & CO INC	3/14/2003	20
160256	METROPCS COMMUNICATIONS INC	6/24/2009	48
27965	MICROCHIP TECHNOLOGY INC	9/4/2007	36
7343	MICRON TECHNOLOGY INC	9/20/1994	36
142953	MONDELEZ INTERNATIONAL INC	3/27/2007	20
140760	MONSANTO CO	8/8/2002	1
7620	MURPHY OIL CORP	8/8/2005	29
7637	MYLAN INC	4/16/2004	28
63892	NATIONAL OILWELL VARCO INC	3/8/2005	35
147579	NETFLIX INC	12/14/2010	78
8804	NEW CENTURY ENERGIES INC	10/27/1998	49
29173	NEWFIELD EXPLORATION CO	12/14/2010	13
7912	NOBLE ENERGY INC	10/1/2007	13
7970	NORTHEAST UTILITIES	3/10/2009	49
135990	NRG ENERGY INC	1/22/2010	49
8151	ONEOK INC	3/10/2010	49
28180	O'REILLY AUTOMOTIVE INC	3/20/2009	55
8215	OWENS-ILLINOIS INC	12/29/2008	32
25880	PATTERSON COMPANIES INC	10/5/2005	50
142460	PEABODY ENERGY CORP	11/14/2006	12
8694	PEPCO HOLDINGS INC	11/5/2007	49
14359	PIONEER NATURAL RESOURCES CO	9/17/2008	13
15709	PLUM CREEK TIMBER CO INC	1/14/2002	24
8717	PRECISION CASTPARTS CORP	5/25/2007	37
119314	PRICELINE.COM INC	10/30/2009	73
66446	QUANTA SERVICES INC	6/25/2009	17
64166	QUEST DIAGNOSTICS INC	12/6/2002	80
8873	QUESTAR CORP	11/24/2006	49
6788	RANGE RESOURCES CORP	12/14/2007	13
122841	RED HAT INC	7/21/2009	73
112168	REPUBLIC SERVICES INC	11/28/2008	49
24925	ROPER INDUSTRIES INC/DE	12/17/2009	38
9248	ROSS STORES INC	12/14/2009	56
165123	SAIC INC	12/15/2009	73
157855	SALESFORCE.COM INC	9/9/2008	73
61513	SANDISK CORP	4/13/2006	35

9445	SCANA CORP	12/26/2008	49
9699	SIGMA-ALDRICH CORP	9/19/1994	28
9772	SMITH INTERNATIONAL INC	9/25/2006	28
9777	SMUCKER (JM) CO	10/30/2008	20
17110	SOLECTRON CORP	12/21/1998	36
9882	SOUTHWEST AIRLINES	7/5/1994	45
9904	SOUTHWESTERN ENERGY CO	5/30/2008	49
25434	STARBUCKS CORP	6/5/2000	58
63527	STERICYCLE INC	11/13/2008	49
10115	STRYKER CORP	12/5/2000	38
60992	SUNEDISON INC	5/25/2007	36
15855	SYMANTEC CORP	3/24/2003	73
10420	TELLABS INC	6/26/1995	36
7991	TEREX CORP	12/13/2006	35
10466	TESORO CORP	9/20/2007	29
10530	THERMO FISHER SCIENTIFIC INC	12/20/1996	38
176404	TIME WARNER CABLE INC	3/24/2009	48
62984	TITANIUM METALS CORP	10/23/2007	33
10631	TOTAL SYSTEM SERVICES INC	12/31/2007	73
10793	TYSON FOODS INC -CL A	8/4/2005	20
10972	U S SURGICAL CORP	6/24/1992	38
10920	UNITED PARCEL SERVICE INC	7/15/2002	42
29150	URBAN OUTFITTERS INC	2/2/2010	56
15247	VALERO ENERGY CORP	4/22/2004	29
11115	VARIAN MEDICAL SYSTEMS INC	2/5/2007	38
66368	VERISIGN INC	1/26/2006	73
11300	WASHINGTON POST -CL B	12/24/2007	48
11399	WESTERN DIGITAL CORP	6/24/2009	35
11550	WISCONSIN ENERGY CORP	10/24/2008	49
149318	WYNN RESORTS LTD	11/7/2008	79
22325	XILINX INC	11/2/1999	36
28256	XTO ENERGY INC	12/23/2004	13

Appendix B - Company List

Subsample

Company ID	Name	Addition Date	SIC Industry Code
30697	AFFILIATED COMPUTER SERVICES	26/3/2004	73
12950	AIRGAS INC	2/9/2009	50
15708	ALLERGAN INC	31/1/1992	28
64768	AMAZON.COM INC	15/11/2005	59
11923	ANADARKO PETROLEUM CORP	22/7/1997	13
1632	ANALOG DEVICES	23/9/1999	36
1678	APACHE CORP	22/7/1997	13
31122	APOLLO GROUP INC -CL A	9/5/2002	82
1704	APPLIED MATERIALS INC	8/3/1995	35
9063	AUTONATION INC	19/2/2003	55
22794	BJ SERVICES CO	10/5/2002	13
12485	CABLEVISION SYS CORP -CL A	13/12/2010	48
31549	CAREMARK RX INC	19/3/2004	59
64410	CARMAX INC	22/6/2010	55
13599	CELGENE CORP	30/10/2006	28
12850	CERNER CORP	23/4/2010	73
27786	CHESAPEAKE ENERGY CORP	24/2/2006	13
3062	CINTAS CORP	23/2/2001	23
20779	CISCO SYSTEMS INC	22/12/1993	35
3107	CLIFFS NATURAL RESOURCES INC	14/12/2009	10
140541	COACH INC	26/8/2004	31
111864	COGNIZANT TECH SOLUTIONS	10/11/2006	73
120093	CONSOL ENERGY INC	22/6/2006	12
2710	CONSTELLATION BRANDS	28/6/2005	20
23877	COVENTRY HEALTH CARE INC	24/8/2005	80
25340	D R HORTON INC	28/6/2005	15
62655	DEAN FOODS CO	28/3/2006	20
20653	DENBURY RESOURCES INC	26/3/2009	13
3905	DEVRY INC	2/6/2009	82
61409	DIAMOND OFFSHRE DRILLING INC	20/2/2009	13
12206	DIRECTV	28/11/2006	48
164296	DISCOVERY COMMUNICATIONS INC	23/2/2010	48
4016	DOLLAR GENERAL CORP	9/7/1998	53
114524	EBAY INC	16/7/2002	73
16721	ELECTRONIC ARTS INC	15/7/2002	73

14535	EW SCRIPPS -CL A	13/12/2005	27
121077	F5 NETWORKS INC	14/12/2010	73
175404	FIRST SOLAR INC	9/10/2009	36
13204	FISHER SCIENTIFIC INTL INC	27/7/2004	50
4510	FMC CORP	12/8/2009	28
142811	FMC TECHNOLOGIES INC	29/5/2009	35
4843	FOREST LABORATORIES -CL A	14/11/2000	28
24856	GILEAD SCIENCES INC	25/6/2004	28
160329	GOOGLE INC	28/3/2006	73
12788	HARMAN INTERNATIONAL INDS	27/1/2006	36
5581	HELMERICH & PAYNE	22/2/2010	13
5709	HORMEL FOODS CORP	25/2/2009	20
26061	IAC/INTERACTIVECORP	24/11/2006	73
121718	JUNIPER NETWORKS INC	26/5/2006	35
6799	KEYSPAN CORP	7/8/2000	49
110685	L-3 COMMUNICATIONS HLDGS INC	23/11/2004	36
14960	LABORATORY CP OF AMER HLDGS	25/10/2004	80
61567	LAUDER (ESTEE) COS INC -CL A	30/12/2005	28
6649	LEGGETT & PLATT INC	14/10/1999	25
13644	MCCAW CELLULAR COMM -CL A	23/6/1993	48
7146	MCCORMICK & CO INC	14/3/2003	20
160256	METROPCS COMMUNICATIONS INC	24/6/2009	48
7343	MICRON TECHNOLOGY INC	20/9/1994	36
140760	MONSANTO CO	8/8/2002	1
7620	MURPHY OIL CORP	8/8/2005	29
7637	MYLAN INC	16/4/2004	28
63892	NATIONAL OILWELL VARCO INC	8/3/2005	35
147579	NETFLIX INC	14/12/2010	78
8804	NEW CENTURY ENERGIES INC	27/10/1998	49
29173	NEWFIELD EXPLORATION CO	14/12/2010	13
7970	NORTHEAST UTILITIES	10/3/2009	49
135990	NRG ENERGY INC	22/1/2010	49
8151	ONEOK INC	10/3/2010	49
28180	O'REILLY AUTOMOTIVE INC	20/3/2009	55
25880	PATTERSON COMPANIES INC	5/10/2005	50
142460	PEABODY ENERGY CORP	14/11/2006	12
15709	PLUM CREEK TIMBER CO INC	14/1/2002	24
119314	PRICELINE.COM INC	30/10/2009	73
66446	QUANTA SERVICES INC	25/6/2009	17
64166	QUEST DIAGNOSTICS INC	6/12/2002	80
8873	QUESTAR CORP	24/11/2006	49

122841	RED HAT INC	21/7/2009	73
24925	ROPER INDUSTRIES INC/DE	17/12/2009	38
9248	ROSS STORES INC	14/12/2009	56
165123	SAIC INC	15/12/2009	73
61513	SANDISK CORP	13/4/2006	35
9699	SIGMA-ALDRICH CORP	19/9/1994	28
9772	SMITH INTERNATIONAL INC	25/9/2006	28
17110	SOLECTRON CORP	21/12/1998	36
9882	SOUTHWEST AIRLINES	5/7/1994	45
25434	STARBUCKS CORP	5/6/2000	58
10115	STRYKER CORP	5/12/2000	38
15855	SYMANTEC CORP	24/3/2003	73
10420	TELLABS INC	26/6/1995	36
7991	TEREX CORP	13/12/2006	35
10530	THERMO FISHER SCIENTIFIC INC	20/12/1996	38
176404	TIME WARNER CABLE INC	24/3/2009	48
10793	TYSON FOODS INC -CL A	4/8/2005	20
10972	U S SURGICAL CORP	24/6/1992	38
10920	UNITED PARCEL SERVICE INC	15/7/2002	42
29150	URBAN OUTFITTERS INC	2/2/2010	56
15247	VALERO ENERGY CORP	22/4/2004	29
66368	VERISIGN INC	26/1/2006	73
11399	WESTERN DIGITAL CORP	24/6/2009	35
22325	XILINX INC	2/11/1999	36
28256	XTO ENERGY INC	23/12/2004	13

Appendix C - Industry Variable List

SIC Code	Industry	Variable
01-09	Agriculture, Forestry & Fishing	
10-14	Mining	D1
15-17	Construction	D2
20-39	Manufacturing	D3
40-49	Transportation, Communications, Electric, Gas & Sanitary Services	D4
50-51	Wholesale Trade	D5
52-59	Retail Trade	D6
60-67	Finance, Insurance & Real Estate	Omitted
70-89	Services	D7
91-99	Public Administration	D8