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What Does Health Reform Mean for the Healthcare Industry? Evidence from the Massachusetts Special Senate Election

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ABSTRACT

President Obama's health insurance reform efforts, as embodied in the bills passed by the House and Senate in late 2009 and signed into law in March of 2010, have been described both as a boon and a death blow for private insurance industries. Using stock-price data on health care firms in the S&P health index, we exploit Republican Scott Brown's surprise victory in the Massachusetts Special Senate election to fill the seat of the late Ted Kennedy, which stripped Democrats of the 60-vote majority needed to pass the bill in the Senate, to evaluate the market's assessment of health reform on the health care industry. We find that the reduced likelihood of Health Reform's passage after the Brown election led to a significant increase in health industry stocks and average cumulative abnormal returns of 1.2 percent, corresponding to an increase in total market value of approximately $14.5 billion. Focusing on managed care (insurance) firms, we find an average cumulative abnormal return of 6.5 percent (a $6.7 billion increase in market value), with individual firms' cumulative abnormal returns ranging from around 5 to 9 percent.

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"This is the insurance company's dream, this bill"[1]

-- Howard Dean, former Chair, Democratic National Committee, December 16, 2009.

"The health bill creates a massive cash crunch and then bankruptcies for many insurers."

-- Richard Epstein, University of Chicago, December 22, 2009.[2]

"If Scott Brown wins, it will kill the health bill."

-- Rep. Barney Frank, January 15, 2010.[3]

"In a stunning blow to President Barack Obama, Republican Scott Brown won a bitter Senate race in Massachusetts on Tuesday and promised to be the deciding vote against his sweeping healthcare overhaul."

-- Reuters, January 20, 2010.

I. Introduction

In March of 2010, Congress enacted and the President signed sweeping health-reform legislation. The effort by President Obama and Congressional Democrats to expand health insurance coverage to many of the 46 million uninsured people living in the United States involves provisions aimed at increasing the number of people receiving health insurance both through the government as well as through private insurance. In particular, much of the bill is aimed at increasing participation in the private, non-group health insurance market. The plan is neither the single-payer system advocated by the far left nor the deregulated, free-market approach advocated by the far right. As such, it has drawn energetic criticism from both sides.

Critics on the left have assailed the Health Reform's[4] individual mandate requiring people to purchase private insurance as well as the lack of a strong, public-option in the

[1] http://abcnews.go.com/GMA/HealthCare/howard-dean-health-care-bill-bigger-bailout-insurance/story?id=9349392. Such sentiments are not limited to the left. According to former House majority leader Dick Armey (R, Texas), "Only the most blinkered of partisans can look at the "individual mandate" and not see it as the answer to the health insurance industry's prayers." See http://www.usnews.com/articles/opinion/2009/09/28/armey-individual-mandate-would-be-a-healthcare-industry-boondoggle.html

[2] Richard A. Epstein, "Harry Reid Turns Insurance Into a Public Utility," The Wall Street Journal, December 22, 2009, http://online.wsj.com/article/SB10001424052748704304504574610040924143158.html.

[3] Montgomery, Lori. "Democrats push for compromise on health bill," The Washington Post, January 16, 2010: A04.

[4] In the fall of 2009, the House and Senate each passed health reform bills. The bills were not identical, and, as such, any final bill would result from conference negotiations between the two houses. Throughout the paper, we use the term "Health Reform" to refer to the merged bill that would ultimately be passed. Although the actual health reform legislation is based on the Senate Bill with some changes negotiated with the House through the budget

legislation. They argue that these measures, which come at a time of increasing premiums and record-high insurance-industry profits, amount to a bribe to the insurance industry. Critics on the right, on the other hand, have responded to the provisions of the bill requiring insurers to cover even those with expensive, pre-existing conditions at the same rates charged to healthy people without a strong enough mandate requiring everyone to purchase insurance by noting that, under these conditions, healthy people will rationally decline to purchase insurance unless or until they become sick. This, they argue, will make it impossible for private insurers to compete, especially with a publicly-subsidized plan, and quickly drive them out of business.

Both sides of the argument have some merit. Ultimately, whether Health Reform is expected to be, on net, positive or negative for insurance companies and other firms in the health sector, is an empirical one. Characterizing the sign and magnitude of this effect is the subject of this article.

To identify the impact of health reform on insurance company stocks, we exploit the surprise victory of Republican Scott Brown over Democrat Martha Coakley in the Massachusetts special election to replace the late Edward Kennedy (Democrat) in the Senate. Brown's victory, which was largely unanticipated until shortly before the election, represents a shock to the likelihood of Health Reform being enacted. Thus, if Brown's victory is associated with an abnormal, positive return to health care stocks, this suggests that the markets interpreted health reform harmful to the health insurance industry, and vice-versa in the case of a negative abnormal return.[5]

Using an event-study approach, we find that Brown's victory induced a positive and significant effect on the stocks of health care and pharmaceutical firms.[6] The average cumulative abnormal return between January 14th and January 20th was 1.2 percent for Healthcare firms in the S&P 500 Index and 2.9 percent for the Index's Pharmaceuticals firms. Concentrating on those firms in the Managed Care sub-industry (i.e., health insurers), we find a

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reconciliation process (and including an executive order clarifying the bill's position on federal funding of abortions), at the time we study there was still a good deal of uncertainty regarding how the final bill (if passed) would bridge the gap between the House and Senate versions.

[5] We focus on the Brown election rather than the actual enactment of the bill because the election represented a significant shock to the likelihood of the bill's passage. In contrast, confidence in the bill's passage grew slowly but steadily in the weeks leading up to its enactment. Thus, it is likely that by the time the bill was actually signed, markets had already incorporated its impact into equity prices.

[6] One exception is in the facilities (hospitals) sub-sector, where we fine a negative effect, most likely due to the fact that Health Reform was widely expected to increase hospital utilization.

positive abnormal return of 6.5 percent.[7] Thus, the market appears to have judged Health Reform to be harmful to insurance and pharmaceutical interests.

The event study methodology used in this paper, first introduced by Fama, Fisher, Jensen and Roll (1969), has been used for over forty years to study the behavior of stock market prices around events such as earnings announcements and changes in regulatory, tax, fiscal or monetary policy.[8] Although the majority of these studies have focused on "economic" events, a number have considered the impact of political events on equity prices. Knight (2006) studies the Bush/Gore 2000 election and shows that, relative to what would have happened if Al Gore had won the race, "Bush-favored" firms enjoyed a 9 to 16 percent higher return under the Bush administration.[9] Other work on the 2000 election estimates that the delay in determining the results of the 2000 election resulted in lower returns on the U.S. (Nippani and Medlin, 2002) and Mexican and Canadian (Nippani and Arize, 2005) stock markets. Ferri studies the 2004 Bush/Kerry election and shows that Bush's victory, which was unexpected when stock markets closed on election day, was associated with a positive movement in equity values. Jayachanran (2006) studies Senator James' Jeffords' 2001 decision to leave the Republican party, shifting control of the U.S. Senate to the Democrats, and finds that firms that made donations to Republicans in the previous election cycle experienced negative returns following Jeffords' switch, while Democratic donors experienced positive returns. In related work, Den Hartog and Monroe (2008) show that the Jeffords switch was associated with negative returns for the oil and gas industries (which were favored under Republican policy) and positive abnormal returns for renewable energy stocks (which were favored under Democratic policy).

The remainder of this paper proceeds as follows. Section II discusses the timeline of the Massachusetts Special Election. Sections III presents the data and empirical strategy, and Section IV contains the results. Section V discusses robustness and Section VI concludes.

[7] Other sub-industries show smaller positive returns with the exception of Health Care Facilities, where we find a cumulative abnormal return of -3.6 percent. This negative return is most likely due to expectations that Health Reform, by increasing insurance enrollment and public health insurance programs, would increase hospitalizations.

[8] See MacKinlay (1997) and Binder (1998) for general surveys of the uses of these methods and Khotari and Warner (2006) for a more in-depth summary of the econometrics of event studies.

[9] In addition to the results of the paper, Knight (2006) also provides an extensive review of the literature on event studies and political events.

II. The Massachusetts Special Election

In the summer and fall of 2009, the Democratic Party held a 60-vote majority in the United States Senate. Due to the Senate's rules, 60 votes are required to end debate on a proposed bill and move to a vote. And, in light of strong, across-the-board Republican opposition to the proposals, without 60 Democratic votes it was highly unlikely that the Democrats would be able to bring proposed health care legislation to the floor for a vote.

Senator Edward Kennedy died on August 25, 2009 after a sixteen month battle with brain cancer.[10] On September 24, 2009, Massachusetts governor Deval Patrick appointed former Kennedy aide Paul G. Kirk Jr. to fill the seat that Kennedy had held for 47 years. Kirk would serve until a special election to fill Kennedy's seat was held on January 20, 2010.[11]

In the fall of 2009, the House of Representatives and Senate had each passed a health reform bill. Although broadly similar, there were sufficient differences in the bills that final passage of a combined bill would likely require another 60-vote majority in the Senate.[12] The Democratic candidate was Massachusetts attorney general, Martha Coakley, a supporter of health reform.[13] Her opponent was Massachusetts State Senator Scott Brown, who opposed health reform, saying "I am opposed to the health care legislation that is under consideration in Congress and will vote against it."[14] Brown also understood his role in the debate, declaring during his victory speech after the Republican primary "as the 41st senator, you can redirect the entire conversation." In other words, leading up to the special election, it was widely believed that a Coakley victory would likely lead to the passage of a compromise bill based on the House and Senate bills of 2009, while a Brown victory would make it extremely unlikely that such a bill would be passed. Thus, the Massachusetts special election, falling between passage of the bills in the House and Senate and reconsideration of a combined bill, became a critical test for Health Reform as envisioned by President Obama and the Democrats in 2009.

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[10] http://www.nytimes.com/2009/08/27/us/politics/27kennedy.html
[11] http://www.nytimes.com/2009/09/25/us/politics/25massachusetts.html
[12] For a comparison of the bills, see the Kaiser Family Foundation's chart at http://www.kff.org/healthreform/sidebyside.cfm. Ultimately, the Democrats used the budget reconciliation process, which did not require a 60 vote majority in the Senate, to pass Health Reform. However, discussion of this non-standard practice as a viable alternative did not begin until shortly after Brown's election.
[13] http://www.nytimes.com/2009/12/09/us/politics/09mass.html
[14] http://www.brownforussenate.com/issues.

Immediately following the primary elections to select candidates to vie for Kennedy's seat, Martha Coakley was considered a strong favorite. Massachusetts is a strongly Democratic state, having supported the Democratic candidate for President in each of the last six elections. Prior to Brown's election, Massachusetts's ten Representatives to the House of Representatives and both Senators were Democrats. Massachusetts' last Republican Representatives left office in 1997, and the last Republican Senator left office in 1979. As mentioned earlier, Kennedy had held the seat in question for 47 years.

Early polling placed Coakley well ahead of Brown. A Suffolk University/7News poll conducted in November, before the parties had chosen their candidates, put Coakley ahead of Brown in a hypothetical race by a 31 point margin, 58% to 27%. This perceived lead persisted into 2010, with a January 10th Boston Globe story showing Coakley up by 15 – 17 points.[15]

The race between Brown and Coakley began to tighten around the second week of January, when a group of polls emerged that showed Brown and Coakley in a statistical dead heat.[16] Then, around January 15, several polls emerged showing Brown had taken a 10-15 point lead over Coakley. On Friday, January 15th, President Obama announced that he would travel to Massachusetts to campaign for Coakley on Sunday, January 17th.[17]

In the January 19th election, Brown defeated Coakley 51.9 percent to 47.1 percent. The Boston Globe described the Brown victory as "one of the biggest upsets in Massachusetts political history," saying "the stunning, come-from-behind victory caps a dramatic surge in recent days as Brown … roared ahead of Coakley."[18]

Brown's surprise victory in Massachusetts provides an unforeseen shock to the likelihood of Health Reform being passed into law. As long as Brown's victory was not fully anticipated by equity markets, this event can be used to study the impact of a decrease in the likelihood of health reform on equity prices and thus whether Health Reform was expected to be a "dream" or a "nightmare" for health insurers and other health care firms. Evidence on the surprise embodied in the Brown victory is provided by the prediction market Intrade.com, which offered contracts

[15] Coakley led Brown 53% to 36% when counting undecided voters leaning toward a candidate as voting for that candidate. Excluding these undecided voters, Coakley led 50% to 35%.
http://www.boston.com/news/politics/2008/articles/2010/01/10/senate_poll_coakley_up_15_points/
[16] See http://www.realclearpolitics.com/epolls/2010/senate/ma/massachusetts_senate_special_election-1144.html.
[17] http://www.boston.com/news/politics/2008/articles/2010/01/16/obama_steps_into_suddenly_taut_senate_race/
[18] http://www.boston.com/news/nation/articles/2010/01/20/republican_trounces_coakley_for_senate_imperils_obama_health_plan/

on the likelihood of a Brown or Coakley victory.[19] As mentioned above, information about Brown's surge in the polls emerged late in the week before the election, culminating in Obama's decision on Friday, January 15, to go to Massachusetts over the weekend. Conveniently for the sake of this study, the markets were closed on Monday, January 18, in observance of the Martin Luthar King holiday. Thus, while new information accumulated over the weekend, the markets were unable to incorporate this information between the close of trading on January 15 and the opening on election day, January 19.

Figure 1 depicts the daily closing prices of the Intrade.com contracts on victory for Brown and Coakley (which can be interpreted as an assessment of the market's belief about the probability of victory by either candidate). Due to the presence of a third candidate, Joseph Kennedy (no relation to the deceased Senator), the numbers need not sum to 100. Through January 9, the victory probabilities stood steady at around 90% for Coakley and 10% for Brown. Over the next week, the contracts moved around somewhat, inching toward 70/30 in favor of Coakley at January 15th close. Over the weekend, however, the contracts reversed, closing at 77 for Brown and 25 for Coakley on January 18 before Brown's eventual victory the next day. Thus, much of the movement in expectations regarding the likelihood of a Brown victory occurred between the end of trading on January 15 and election day, during which time the markets were closed for the three day weekend.[20] In light of this, it does appear that Brown's victory came as a surprise to the markets and, as such, can be used to gauge the impact of the decline in the likelihood of health reform being passed on health care industry stocks.

III. Data, Empirical Strategy and Hypotheses

We analyze firms in the health care industry that were constituents of the S&P 500 on January 13, 2010. Each company is classified into its S&P Global Industry Classification

[19] The Intrade.com contract on a Brown or Coakley victory paid $100 if the named candidate and $0 otherwise. Thus, the contract price (divided by 100) can be interpreted as the market's view of the likelihood of the named candidate winning the election. Snowberg, Wolfers and Zitzewitz (2008) suggest directly using the intrade.com prices as independent variables rather than the occurrence of a particular event. We do not adopt this here due to the fact that the Brown and Coakely markets were relatively thinly traded and, while a Brown victory would presumably move the market's assessment of the likelihood of Health Reform being enacted, it is not a direct measure of this assessment. Since the election represents a clean event, we instead adopt the simpler event-study methodology.

[20] Corroborating the idea that Brown's victory came as a surprise, Howard Kurtz of the Washington Post details how the media were slow to pick up on the possibility that Brown might win. See http://www.washingtonpost.com/wp-dyn/content/article/2010/01/25/AR2010012500741.html

Standard (GICS) using the S&P Net Advantage database. Returns are based on the Datastream total return index, used to account for dividend distributions.

We begin our analysis of the anticipated impact of Health Reform on the broad health care industry by estimating the impact of Scott Brown's election on all healthcare constituents of the S&P 500.[21] Then, in order to get a more detailed view of the election's impact, we classify the firms into each of the seven healthcare sub-industries contained in the S&P 500 based on the S&P Global Industry Classification Standard (GICS) classification, namely: Health Care (HC) Distributors, HC Equipment, HC Facilities, HC Services, HC Supplies, Managed HC, and Pharmaceuticals. These seven sub-industry classifications allow for a more nuanced analysis as one would expect the Managed HC companies to react differently to Brown's election than HC facilities (Appendix Table 1 lists the companies in our analysis and their respective portfolios).

We employ the event study methodology as outlined by MacKinlay(1997) to estimate the change in return of these companies operating in the health industry as a result of the surprising election of Scott Brown. The method is, in principle, quite simple. We treat Brown's election as an exogenous shock to the likelihood of health reform being passed, and thus any abnormal returns to health care equities following the election can be attributed to the impact of the election. In practice, the identifying assumptions are that (i) the outcome of the election came as a surprise and so its impact was not incorporated into stock prices before the election took place, (ii) that markets are efficient so that the market's reaction to the election captures the "true" impact of the election on the firms in question, and (iii) that no other events occurred during the event window that might affect firms' abnormal returns.

In order to allow for the fact that the likelihood of Brown's victory may have been incorporated into stock prices in the days before the election and/or may not have been fully incorporated on election day (since the polls did not close until after the market did), we consider an event window beginning two trading days before the election day and ending one day after it. Thus the four trading days in the event window range from Thursday, January 14th to Wednesday, January 20th (inclusive). Our choice of the start date of the event window is motivated (as per Snowberg, Wolfers, and Zitzewitz (2008)) by referring to the Intrade

[21] We focus on firms in the S&P 500 since a necessary step in the analysis is to verify that there were no other common shocks to these firms' returns during the event window, which involves a firm-by-firm search of news databases. While firms in the S&P 500 tend to be large firms, at the same time they tend to be the major players in the industry.

prediction market. As figure 1 shows, the odds of Scott Brown winning the elections started to increase dramatically on January 14, 2010. Although a case could be made for starting the event window slightly earlier, one of the managed care firms we study, Aetna, announced in its 8-K quarterly earnings filing on January 12th that it expected lower earnings in 2010 than 2009. Hence, we start our event window on January 14th in order to allow markets to fully incorporate this news and avoid contaminating our study.

To address the question of whether there were other firm events that took place during the event window and might contaminate it, we reviewed the First Call Historical database, the NewsBank World News service, and Lexus/Nexus Academic for relevant news stories during the event period. Although some firms received idiosyncratic news during the event period, the news was not systematically good or bad, and such events there were (e.g., court rulings, recalls) were rare and unlikely to have broad effects at the industry or sub-industry level.[22] The major exception is Aetna's "negative-surprise" earnings announcement on January 12th discussed above, which could be interpreted as bad news for the industry in general and led us to choose January 14th as the start of the estimation window.

We estimate normal returns using the following market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \qquad \text{Eq. (1)}$$

where R_{it} is the daily arithmetic rate of return of firm (*i*) on day (*t*). As a broad measure of the market returns R_{mt}, we use the daily rate of return of the S&P Total Market Index.[23] ε_{it} is the error term for company (*i*) during period *t* , which we assume has the following characteristics:

$$\mathrm{E}(\varepsilon_{it}) = 0 \text{ and } \mathrm{Var}(\varepsilon_{it}) = \sigma^2(\varepsilon_i)$$

The market model is estimated during the period starting one day before the start of the event window and extending back 1000 trading days. Using the market model's estimated parameters ($\hat{\alpha}_i + \hat{\beta}_i R_{mt}$), we extrapolate the expected normal return of the equities during the event window. The impact of Brown's election on healthcare companies is assessed using firms' Abnormal Return (AR), which measures the difference between actual returns for these equities

[22] Events affecting only a single firm are captured by the idiosyncratic shock to firms' abnormal returns and will not bias the estimates of the impact of the election.

[23] We choose the S&P Total Market Index as our benchmark because it is a broad-based measure of equity markets. The results are essentially unchanged if the S&P Completion Index, which excludes firms in the S&P 500 (including the firms in our sample), the S&P 500, or the Wilshire 5000 is used as the benchmark for the market model.

during the event window vis-à-vis their estimation period's predicted returns. Hence, the (AR) of company (*i*) on day (t) is equal to;

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \qquad \text{Eq. (2)}$$

The Average Abnormal Return (AAR) of a specific portfolio on day (t) is the unweighted average of the abnormal returns of all N companies in that portfolio on day (t)

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it} \qquad \text{Eq. (3)}$$

This study investigates the total impact of Brown's election during the event period, by measuring the Cumulative Average Abnormal Return (CAAR) for all firms within a portfolio throughout the duration of the event window, which starts on day t1 and ends on day t2:

$$CAAR_{t1,t2} = \sum_{t=t1}^{t2} AAR_t \qquad \text{Eq. (4)}$$

The significance of the abnormal returns is evaluated using four common parametric and non-parametric tests.

Method 1: The Parametric Traditional Test (Binder, 1998):

Under the null hypothesis that the event under investigation has no impact on the equities, the distribution of the Abnormal Returns is assumed to be normally distributed with mean zero and variance $\sigma^2(\varepsilon_{it})$:

$$AR_{it} \sim N(0, \sigma^2(\varepsilon_{it})) \qquad \text{Eq. (5)}$$

It is assumed that the individual AR_{it}'s are independent and identically distributed, and that the standard deviation of the companies' abnormal returns remains unchanged during the event window. That is, the event affects the mean only, and leaves other parameters unchanged. Hence, the AAR_t's standard deviation ($\sigma(AAR_t)$) is estimated by calculating the standard deviation of the AR_{it} of each company on the same day (t) and dividing by the square root of the number of companies (Binder 1998). Under the assumption that the AR_{it}'s are normally distributed, the estimated standard deviation of AAR_t has a t-distribution:

$$\sigma(AAR_t) = \sigma(AR_t)/\sqrt{N} \qquad \text{Eq. (6)}$$

The null hypothesis that $AAR_t = 0$ is then tested using Z_1:

$$Z_1 = AAR_t / (\sigma(AR_t)/\sqrt{N}) \quad \text{Eq. (7)}$$

The $CAAR_{t1,t2}$'s standard deviation ($\sigma(CAAR_{t1,t2})$ is calculated from the cross-section estimate of the standard deviation of AAR_t as follows:

$$\sigma(CAAR_{t1,t2}) = [\sum_{t1}^{t2} \sigma^2(AAR_t)]^{1/2} \quad \text{Eq. (8)}$$

The following test statistic is t-distributed:

$$T_1 = (CAAR_{t1,t2}) / [\sum_{t1}^{t2} \sigma^2(AAR_t)]^{1/2} \quad \text{Eq. (9)}$$

Method 2: The Parametric Standardized Test (Boehmer, Musumeci, and Poulsen, 1991):

Brown and Warner (1980 and 1985) and Brown, Harlow, and Tinic (1988) find that the events in event studies can change the standard deviation of the abnormal returns during the event period, in addition to the mean. The new approach dispenses with the assumption of an unchanged standard deviation by constructing the Standardized Abnormal Returns (SAR) for each company by dividing the company's return by its standard deviation. The latter is estimated from its abnormal returns during the estimation period.

$$SAR_{it} = AR_{it} / \sigma_i \quad \text{Eq. (10)}$$

To test the null hypothesis that the abnormal returns for all N companies on day t of the event period are equal to zero we construct the test statistic:

$$Z_2 = (\sum_{i=1}^{N} SAR_{it}) / \sqrt{N} \quad \text{Eq. (11)}$$

Boehmer, Musumeci, and Poulsen (1991) construct a test to evaluate the hypothesis that the Standardized Cumulative Abnormal Returns (SCAR) for all companies during the whole event window is equal to zero. Their test is:

$$T_2 = \frac{1/N \sum_{i=1}^{N} SCAR_{it2}}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^{N} (SCAR_{it2} - \overline{SCAR})^2}} \quad \text{Eq. (12)}$$

where $SCAR_{it2}$ is the standardized cumulative abnormal return for company *(i)* over the whole event window period starting on day t_1 and ending on t_2. $\overline{SCAR}$ is the cross-section average of the N companies $SCAR_{it2}$. The test statistic T_2 is t-distributed (Savickas, 2003).

Method 3: The Nonparametric Generalized Sign Test (Cowan, 1992):

The first parametric test above assumes that the abnormal returns are identical, independent, and normally distributed across firms. Cowan's (1992) generalized sign test relaxes the normalcy assumptions of the parametric tests, since previous studies show that these restrictions are not necessarily held in practice.

The traditional sign test is a binomial test of whether the frequency of positive cumulative abnormal returns across companies in the event period exceeds a standard population median of p=0.5. The generalized sign test used in this study relaxes the traditional test's assumption that the distribution of abnormal returns is symmetric by testing whether the frequency of positive cumulative abnormal returns across companies in the event period exceeds the proportion of positive abnormal returns in the estimation period under the null hypothesis of no positive abnormal performance. By calculating the benchmark median of positive returns from the estimation period, we take into account any existing skewness in the distribution of abnormal returns.

To establish the benchmark median of positive returns during the estimation period p(+), we calculate the proportion of positive abnormal returns in the estimation period. Define (pos) as the number of companies whose cumulative average abnormal returns at the end of the event period are positive. N is the number of companies. The positive generalized sign tests are constructed as follows:

Positive Generalized Sign Test	
$Z_{Sign\ positive} = \frac{pos - Np_{(+)}}{\sqrt{Np_{(+)}(1-p_{(+)})}}$	Eq. (13)
$p_{(+)} = \frac{1}{N}\sum_{i=1}^{N} S_{(+),it}$	
$S_{+,it} = \begin{cases} 1\ if\ CAAR_{it} > 0 \\ 0\ \ otherwise \end{cases}$	

This statistic has normal distribution. The null hypothesis is that the proportion of positive cumulative abnormal returns in the event period is the same as the proportion of positive to negative returns during the estimation period.

Method 4: The Nonparametric Rank Test (Corrado, 1989):

Like the sign test, Corrado's nonparametric rank test does not require abnormal returns to be normally distributed to achieve proper specification under the null hypothesis, and "remains immune to misspecification under the null hypothesis" (Campbell and Wasley 1993, 88). The test is constructed by ranking the abnormal returns for each exchange for each event. The *rank* of a particular day's return is uniformly distributed regardless of the distribution of the abnormal returns themselves. The Corrado rank test makes use of this fact in constructing test statistics.

The rank of exchange *i*'s abnormal return for a certain event on day t is k_{it}. The Corrado rank measure as used in Meznar, Nigh, and Kwok (1998) is constructed as:

$$Z_{Rank} = \frac{\sum_{t=1}^{L} \bar{k}_t}{\sqrt{\sum_{t=1}^{L} s^2(\overline{k}_t)}} \qquad \text{Eq. (14)}$$

where N is the number of firms, L is the length of the event window, T_0 is the first day of the estimation period, and T_2 is the last day of the event window.

$$\bar{k}_t = \frac{1}{N}\sum_{i=1}^{N}(k_{it} - E(k_i)) \qquad \text{Eq. (15)}$$

$$E(k_i) = (0.5 * (T_2 - T_0 + 1)) + 0.5 \text{ , and} \qquad \text{Eq. (16)}$$

$$s^2(\overline{k}_t) = \frac{1}{(T_2 - T_0 + 1)}\sum_{t=T_0}^{T_2}\{\frac{1}{N}\sum_{i=1}^{N}(k_{it} - E(k_i))\}^2 \qquad \text{Eq. (17)}$$

The Z_{Rank} statistic converges to unit normal as the number of securities in the portfolio increases.

The statistical tests discussed above are meant to test for the presence of abnormal returns. Given the motivation of the paper, e.g., to assess whether equity markets support those who argue that Health Reform will help health care firms or those who argue it will harm them, we are agnostic as to the direction of the abnormal returns. Health reform is expected to have

several effects. It will increase the number of people who have insurance, it will affect the average cost of those who have insurance, and it will increase regulation on firms' prices and plans. All else equal, adding customers should increase profit. However, if the new customers are unhealthy, this could lead profit to decrease. New regulations could prevent firms from increasing prices or force them into unprofitable lines of business.

The balance between these factors will differ from sub-industry to sub-industry. However, there is one case where the impact of Health Reform is particularly clear. Hospitals are required to care for patients who present themselves at the Emergency Department, whether the patient can pay or not. As such, they are forced to care for patients who will not or cannot pay for the care they receive. This unpaid or "charity" care costs hospitals billions of dollars each year. Health Reform, by insuring many of these patients, is expected to significantly reduce hospitals' unpaid care (as well as increase utilization by those with insurance). As such, we expect the effect of Brown's election on health facilities (including hospitals) to be negative (corresponding to a positive impact of Health Reform on facility profits).[24]

IV. Results

Table 1 presents the results of the analysis for all the health care firms in the S&P 500 and decomposed into their sub-industries, pharmaceuticals, managed care (insurance), equipment, facilities, services, distributors and suppliers. Figure 2 plots the abnormal returns overall and for each segment over the four day event window.

We begin by considering all health care firms in the S&P 500 in the rows labeled "All". Columns (1-4) give the daily abnormal returns. The first row gives the estimated abnormal return for that day. The next two rows give the t-statistics for the AAR and SAR tests, respectively. Thus, overall, we see positive abnormal returns to healthcare firms on Day -2 (Thursday, January 14, 2010) and Day 0 (Tuesday, January 19, 2010) and insignificant abnormal returns on the other two days. Overall, there is a 1.2 percent abnormal return over the four day

[24] See Abelson, Reed, "Bills Stalled, Hospitals Fear Rising Unpaid Care," *The New York Times*¸Feb. 8, 2010, http://www.nytimes.com/2010/02/09/health/policy/09hospital.html, accessed June 22, 2010.

event window, significant at the one percent level for both the CAAR and SCAR tests. Using firm market values the day before the start of the event window, this estimate implies an increase in the firms' total market value of approximately $14.5 billion. Thus, Brown's election appears to have been beneficial for healthcare stocks as a whole. Although we are able to reject the null hypothesis of no effect using the non-parametric sign test, we are unable to reject using the rank test.

The remaining rows of the table decompose the effect by sub-industry. We begin with the sub-industries most discussed in the context of Health Reform: pharmaceuticals, managed care (insurers), and facilities (hospitals). For Pharmaceutical firms, we again find positive and significant effects. There are significantly positive abnormal returns on Days -2, 0 and +1. The cumulative abnormal return over the whole event window is 2.9 percent, significant at the 1 percent level by both the CAAR and SCAR tests. This corresponds to an increase in the total market value of pharmaceutical firms in our sample of approximately $20 billion.[25] Both of the non-parametric tests reject the null hypothesis of no effect.

The Managed Care sub-industry includes the major insurance companies (Aetna, CIGNA, Coventry Health Care, Humana, Unitedhealth Group, and WellPoint). The analysis shows positive and significant abnormal returns on days -2, -1 and 0. Overall, we find a 6.5 percent abnormal return, corresponding to an increase in the market value of these firms of approximately $6.7 billion, over the event window indicating that Brown's election and the subsequent decrease in the likelihood of passing Health Reform were interpreted as a good thing for the insurance industry. Thus, health reform appears to have been seen as harmful to insurance interests rather than a "dream scenario," at least as far as the markets are concerned.

The facilities sub-industry includes major hospital operators such as Community Health Systems, Lifepoint, Tenet and Universal Health Services. In contrast to the pharmaceuticals and managed care sub-industries, we find a significantly negative abnormal return for facilities associated with Brown's election. Although there is a small positive abnormal return on day -2, the other three days feature negative abnormal returns. Overall, we find a cumulative abnormal return of -3.6 percent during the event window, corresponding to a decrease of $730 million in the market value of these firms. This return is significantly different from zero according to both

[25] The increase in market value associated with Pharmaceutical firms is larger than the increase for all firms due to the facilities and services sub-industries, which experienced decreases in market value of $730 million and $23 million, respectively.

the CAAR and SCAR tests, although we are unable to reject the null of no effect using the rank tests.[26] As discussed above, the result that Health Reform is expected to benefit hospitals is not unexpected and results from the fact that increasing insurance rolls will significantly reduce the amount of uncompensated care that hospitals must provide.

The remainder of the table presents the results for the Equipment Services, Distributors, and Suppliers sub-industries. We find a small, positive effect for equipment, while the effects for services, distributors and suppliers are both small and statistically insignificant.

Before turning to robustness checks, a comment on interpreting the magnitude of the effects is in order. While we find an abnormal return of 1.2 percent associated with Brown's election, this is not the same as saying that Health Reform is expected to decrease the value of firms in our sample by 1.2 percent. This would only be an appropriate conclusion if the probability of reform were 1 before the election and 0 after. Otherwise, the estimate must be scaled by the change in the probability of reform. Thus, if the election decreased the probability of reform from 0.8 to 0.2, the appropriate back-of-the-envelope computation would be that reform was expected to decrease the value of the firms in our sample by 1.2/(0.8-0.2) = 2 percent. Since data on the likelihood of reform before and after the election is not available, we have focused on the effect of the election here instead of the impact of Health Reform *per se*. These concerns do not, however, affect the interpretation of the signs of the effect. Thus, a positive abnormal return associated with the election corresponds to Health Reform being expected to harm firm interests *as long as Brown's election decreases the probability of reform.* This assumption seems non-controversial.

V. Robustness

In this section, we briefly discuss several potential concerns with the analysis and show that the results are robust to addressing these factors.

V-1: Event Clustering and Cross-Sectional Correlation

The traditional event study methodology as described above is well-suited for situations where the firms in question are drawn from a variety of industries and the events that potentially

[26] The Sign test looks at the ratio of positive to negative abnormal returns. Thus, for facilities which are experiencing negative returns, we are interested in (1- Sign test p_value) which is significant at the 10% level.

affect each firm do not coincide in calendar time. In such cases, cross-sectional correlation is not likely to be important, as is assumed in the standard tests.

We are interested in studying the effect of a single event, the Brown-Coakley election on firms in a single industry, health care. In this case, it is likely that the unobserved shocks to firm returns are correlated across firms. This will cause the covariances between the abnormal returns to differ from zero, in which case the standard methodology may not be appropriate. Bernard (1987) discusses such concerns arising from clustering.

The typical way in which the literature addresses clustering/correlation issues is through the portfolio method, following Jaffe (1974). In this method, the securities in question are first aggregated into a portfolio, and then the portfolio is analyzed as a single security. Since the total value of the portfolio takes any correlation in firm returns into account, it implicitly addresses issues related to correlation in the returns. To implement the portfolio approach, we construct market-capitalization weighted portfolios for all health care firms in our sample and for firms in each of the eight sub-industries described above.[27] We conduct the event study analysis and the four parametric and non-parametric tests described above on each of these eight portfolios.

Table 2 presents the results of the analysis for the healthcare market capitalization weighted portfolio. Figure 3 plots the cumulative abnormal returns for that portfolio overall and by sub-industry over the four day event window.

The findings of the portfolio analysis align quite closely with those of the standard approach. The values of the CAARs are 2.2 percent for the overall healthcare market portfolio, 2.8 percent for Pharmaceuticals portfolio, 6.0 percent for the Managed HC portfolio, and -5.8 percent for the Facilities portfolio. The direction of the market reaction for these portfolios is consistent with our findings above, negative for the facilities sub-sector, and positive for the others. The CAARs are significantly different from zero at the 1% level for the parametric tests for each of these portfolios except for facilities, which is significant at the 5% level. The non-parametric Rank and Sign tests, along with the dummy regression confirm the statistical significance of these results to varying degrees of significance. The CAARs for all the above sectors except Facilities are significant at the 5% level for the Rank test, 10% level for the Sign test, and the 1% level for the dummy regression. The CAAR for facilities is significant at the

[27] The overall direction for the results is similar for equally-weighted portfolios. The results, omitted for the sake of brevity, are available from the authors.

10% level for the Rank and Sign tests and the 5% level for the dummy regression. The significance of the CAARs for these portfolios is consistent with our findings above. The CAARs for the Equipment, Services, Distributors, and Suppliers portfolios are not statistically significant.

V-2: Heteroskedasticity

Although the standardized tests described above address any heteroskedasticity in returns, an alternative approach to addressing potential heteroskedastcity uses a dummy variable regression with robust standard errors to evaluate the impact of Brown's election on each of the eight market-value-weighted portfolios.[28] Let $R_{p(i)t}$ be the return on portfolio (i) at time t, and let R_{mt} be the return on the market portfolio at time t. Let D_t be a dummy variable that equals one if t is one of the dates in the event window, and 0 otherwise. We estimate the equation:

$$R_{p(i)t} = \alpha_{p(i)} + \beta_{p(i)} R_{mt} + \delta_{p(i)} D_t + \varepsilon_{p(i)t} \qquad \text{Eq. (18)}$$

The coefficient $\delta_{p(i)}$ is then the average abnormal return for the portfolio (i) during the event.

The results of the dummy-variables regressions are presented in column (8) of Table 2 and are virtually identical to those of the standard approach. Column (9) of Table 2 simply multiplies $\delta_{p(i)}$ by 4: since our event window is 4 days long, the cumulative abnormal return during the entire event is $4^* \delta_{p(i)}$.

V-3: Small Number of Firms

The Rank test has been documented to be "consistently the best-specified and most powerful test statistic across numerous event conditions" (Campbell and Wasley 1993, 75). However, this test requires a sufficiently large number of securities in the portfolio to converge to unit normal. Since we investigate the impact of Brown's election on a single portfolio rather than multiple firms to address event clustering and cross-sectional correlation in section v-1 as per Jaffe (1974), we develop a new test to evaluate the significance of the cumulative impact

[28] Salinger (1992) attributes this approach to Gibbons (1980).

during the event period. This new approach is inspired by the rank test but is well specified for small sample size.[29]

Analogous to Corrado's Rank test, the test is constructed by first converting portfolio (p)'s excess returns to their respective ranks. That is, the difference between the actual returns of portfolio (p) and those predicted by the market model, are ordered from the smallest to the largest over the period starting with the first day of the estimation window and ending with the last day of the estimation window. Then the ranks during the event window are aggregated to construct D_{P_Rank}:

$$D_{P\_Rank} = \sum_{t=T_1}^{T_2} k_{pt}$$

where T_1 and T_2 are the first and last days of the event window, respectively and k_{pt} is the rank of the portfolio's excess return on day t of the event window. The event window's excess returns are converted to their respective ranks based on the ranks of identical excess returns in the estimation window.[30] Since the rank of the abnormal return each day is independently and uniformly distributed between 1 and T_0, D_{P_Rank} is the sum of L independent and identically distributed uniform random variables. We then test the null hypothesis of no excess abnormal return during the event period by comparing the realized value of D_{P_Rank} to the distribution under the null hypothesis. Abnormally large (resp. small) values of D_{P_Rank} indicate a positive (resp. negative) abnormal return associated with the event.[31]

The results of this modified test are presented in column (10) of table 2. These results reinforce the findings of Corrado's original Rank test. The results for the overall healthcare portfolio, in addition to the pharmaceutical, managed healthcare, and facilities are all significant

[29] Indeed, Corrado (1989) suggests but does not investigate a similar test statistic for the case of a small number of firms and single-day events. Our test is also similar to the SQ test proposed by Gelbach, Helland and Klick, again extended to the case of multi-day events.

[30] If the abnormal return on an event day t falls between the abnormal returns ranked k and k+1, we let k_{pt} = k+0.5. The results are essentially unchanged if we use a linear interpolation to compute k_{pt} or adopt the conservative assumption that k_{pt} = k or k_{pt} = k+1, depending on whether the data favors rejecting the null due to unusually high or low values of D_{P_Rank}.

[31] In our case, L=4 and the distribution of the sum of four independent variables distributed uniformly and discretely on 1 to 1000 can be directly computed. For the case of larger L, the distribution can be computed using formulas for the sum of continuous uniform variables.

at least at the 5% level.[32] The results for the Equipment, Services, Distributors, and Suppliers portfolios are not statistically significant.

VI: Individual Firm Analysis for Managed Care

The focus of the Health Reform has been on reforming insurance markets, and in particular in reforming insurance markets for individuals in order to reduce the number of uninsured people in the United States. Due to the importance of the insurance industry for both the political debate and real impact of Health Reform, in this section we investigate the firms in the managed care segment in more detail.[33]

The firms in this segment are Aetna, CIGNA, Coventry Health Care, Humana, Unitedhealth and WellPoint. In order to focus on managed HC, we conduct the event study with the four parametric and non-parametric tests and the dummy regression approach individually on each of the six managed HC (insurers) companies that are members of the S&P500. The firm-level analysis also helps put to rest any remaining concerns regarding cross-sectional correlation within this industry segment.

Table 3 presents the analysis results for the individual health insurance firms. Figure 4 plots the CAARs for these individual firms over the four day event window. The end of event window CAAR for Aetna is 6.2 percent, for CIGNA is 5.3 percent, and for WellPoint is 4.6 percent. The CAARs for these three companies are significant at the 1% level for the parametric test and dummy regression, at the 5% for the modified Rank test, and at the 10% for traditional Rank and the Sign tests. Unitedhealth's CAAR is 6.8 percent and is significant at the 5 percent level for the parametric, dummy regression, and the modified Rank test, and at the 10% level for the Rank test. It is not significant for the Sign test. Humana's CAAR is 9.3 percent which is significant at the 5% level for the parametric, dummy-regression, and modified Rank tests, and the 10% level for the Rank test. It is not significant for the Sign test. Coventry Health Care's CAAR is 6.7 percent, and is significant at the 10% level for the parametric test, and at the 10% level for the modified Rank test.

[32] The facilities portfolio is experiencing negative returns unlike the other portfolios, thus we are interested in the significant results of $(1\text{-}P_{P\_Rank})$, which is significant at the 5% level.

[33] The analysis in this section also allows us to address an additional potential criticism of the empirical methods, the fact that there are only six firms in the managed care segment, calling into question whether the standard test statistics are appropriate.

This is the most stringent analysis since it is done at the individual firm level for a single event, and yet all six insurance firms that constitute the Managed HC subsector record statistically significant reactions to the election of Scott Brown. This confirms our initial findings.

VII. Conclusion

The results of the event study in this paper show a strong link between Scott Brown's victory and positive abnormal returns for firms in the health care sector, and in the health insurance and pharmaceutical sub-sectors in particular. Given that Brown campaigned explicitly to defeat Health Reform, by virtue of being the 41st Republican vote, had the power to do so, we have interpreted the evidence as saying that markets expected the reform effort to be harmful to insurers.

While this interpretation is natural, Scott Brown's election did more to the Congressional landscape than merely defeat health reform. Thus, it raises the possibility that the abnormal returns we detected were not a result of Brown's opposition to health reform, but to some other contemporaneous change. For example, even if Brown did not explicitly oppose health reform, he would still represent the 41st Republican vote, which would increase the Republicans' bargaining power across the board. Brown described his own economic philosophy saying "I am a free enterprise advocate who believes that lower taxes can encourage economic growth."[34] Either the general movement toward a more Republican approach to business or a movement toward Brown's own stated economic philosophy could be interpreted as pro-business and thus lead equity prices to rise. However, while this might lead all stocks to rise (indeed, the Dow Jones Industrial Average rose 116 points on election day), it would not account for the *abnormal* returns experienced by health stocks.

A more subtle version of this critique is to note that, not only did Brown's election deal a severe blow to Health Reform, it also might have signaled that additional regulations aimed at the health care sector would become less likely in the future. Since the health sector is regulated more intensively than typical industries, this could result in an abnormal, positive return to health care stocks. Thus the abnormal returns we detected using the event study would contain the effects of provisions explicitly in Health Reform as well as other reforms that might be coming

[34] http://www.brownforussenate.com/issues

further down the line. Although our analysis is unable to separately indentify these effects, it seems unlikely that the Health Reform was believed to be a good thing for insurers but the effect on anticipated future regulations was so strong as to overwhelm this effect and generate a positive abnormal return following Brown's election. Further, if we interpret the Health Reform as containing not only the original legislation but also the additional regulations that would follow from it in the future, then both of these types of effects would be included in the broader definition of health reform.

Rather than test a hypothesis about the impact of an election or policy change on equities, this paper uses the efficiency of markets and the impact of Brown's surprise victory to judge which of the competing claims regarding the impact of health reform on the insurance industry, and on the health care industry more broadly, is supported by the market. If markets efficiently incorporate information on expectations about future performance, the results suggest that the markets side with Republicans, and that Health Reform was expected to harm the insurance industry. However, it should be pointed out that the positive abnormal returns associated with Brown's election do not necessarily invalidate the claims from the left that the bills were too generous to insurance companies, since it is likely that the two sides were referring to different counterfactuals in their statements. In particular, many liberal activists believe strongly that the right health care system is a single payer system such as the Canadian system or else a "Medicare-for-all" type system. Relative to this benchmark, the current bills were certainly more generous to insurance companies than a single-payer system was likely to be. Thus, while the expected defeat of health reform may have been good for insurers relative to the market's expectations before Brown's election, health reform might still have been better for insurers than liberals might have wanted.

Although we detected a significant, positive effect on health care stocks following Brown's election, within days this effect had eroded somewhat. This rebound likely due to several factors. First, in the days immediately after the election it became apparent that Brown's election would not end Democrats' efforts to pass Health Reform, which may have led markets to incorporate an increased belief in the likelihood of its passage. During a Town Meeting event in Ohio on January 22, President Obama declared "I'm going to keep up the fight for real, meaningful health insurance reforms. That's why we expanded the children's health insurance program to include four million more kids. And that's why I'll continue fighting for reform that

will hold the insurance industry accountable and bring more stability and security to folks in our health care system."[35] At the same time, Democratic strategists began to discuss methods of passing Health Reform that would not require 60 votes in the Senate, including the House passing the Senate's version of Health Reform and utilization of the budget reconciliation process (the tactics that were ultimately used to pass Health Reform).[36]

Although the short-term gains in health care stocks did not persist, the losses, coming as responses to additional information being integrated into markets in the days following the election, are fully consistent with our results. While Brown's election signaled a decrease in the likelihood of Health Reform passing and led to positive abnormal returns, Obama's speech and the Democrats new strategies both increased its likelihood and, consistent with our findings, led to losses.

[35] http://voices.washingtonpost.com/44/2010/01/obamas-jobs-speech-in-ohio-the.html

[36] In addition, in the days that followed the election, markets may have come to adjust their beliefs about the degree of regulatory uncertainty in the health sector. According to one analyst, "I think [the drop in stock prices is] because the market doesn't like uncertainty. Given the Massachusetts election, the market doesn't know what to do." (see http://www.marketwatch.com/story/story/print?guid=06A8328B-57CD-4026-B2CE-EE8547CF35AA) Finally, there was negative information about the industry coming out that was unrelated to the election, with Oppenheimer cutting CIGNA from "overperform" to "perform" on January 26, 2010.

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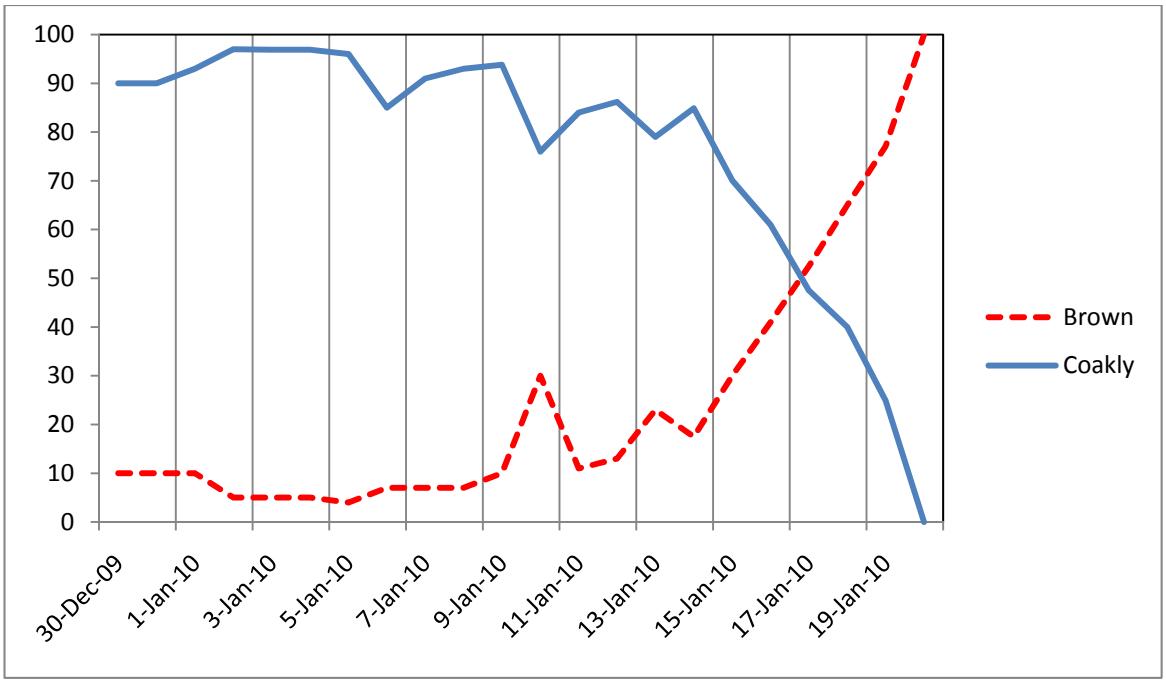

Figure 1: Intrade.com daily closing prices for the "Brown Victory" and "Coakley Victory" contracts, which paid $100 if the appropriate candidate won.[37]

[37] Interestingly, Brown's January 10th bump coincided with the Boston Globe's publication of its poll showing Coakley held a 15 point lead in the polls. However, the same article suggested that there were some "glimmers of hope for the Republican," possibly leading intrade.com traders to revise their beliefs about the possibility of Brown winning the election.
http://www.boston.com/news/politics/2008/articles/2010/01/10/senate_poll_coakley_up_15_points/

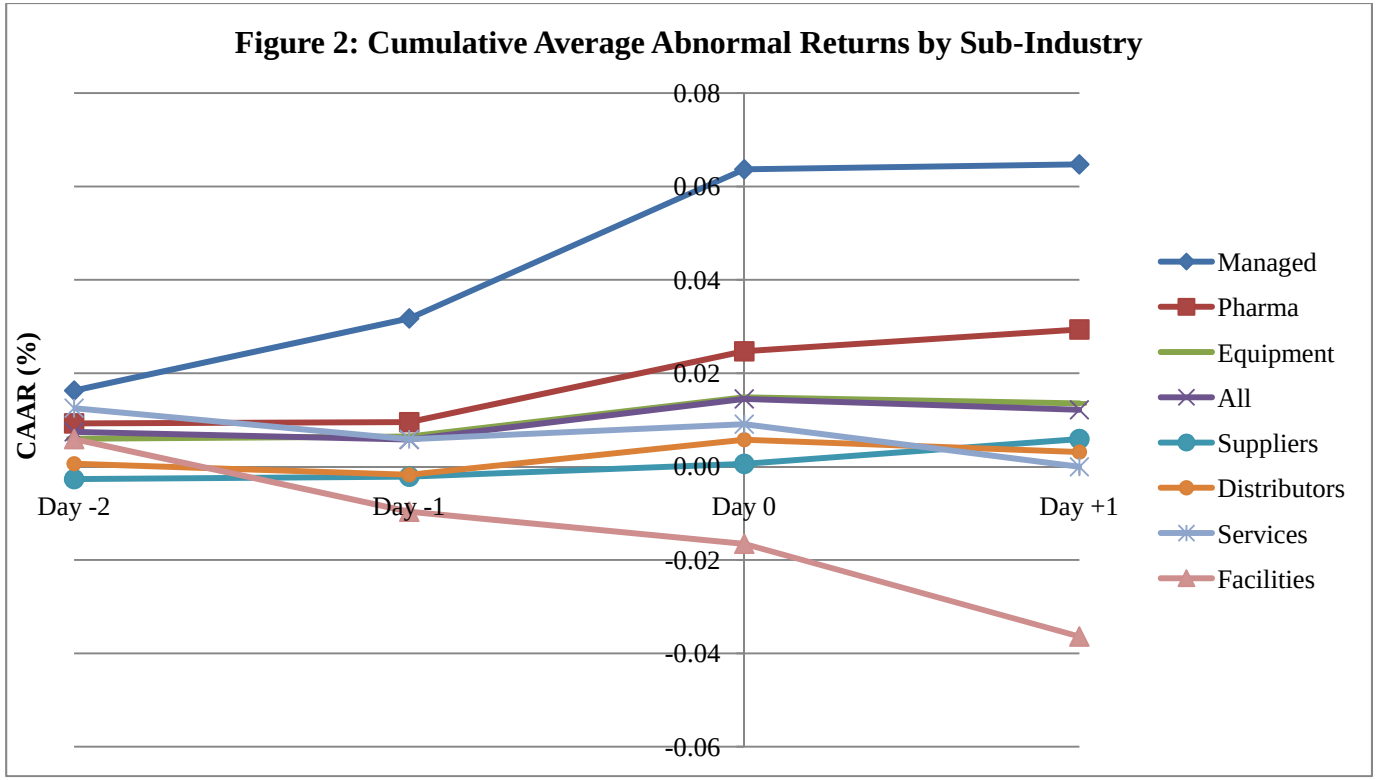
Figure 2: Cumulative Average Abnormal Returns by Sub-Industry
CAAR (%)
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
Day -2
Day -1
Day 0
Day +1
Managed
Pharma
Equipment
All
Suppliers
Distributors
Services
Facilities

Figure 3: Cumulative Average Abnormal Returns for the Market-Capitalization Weighted Portfolio

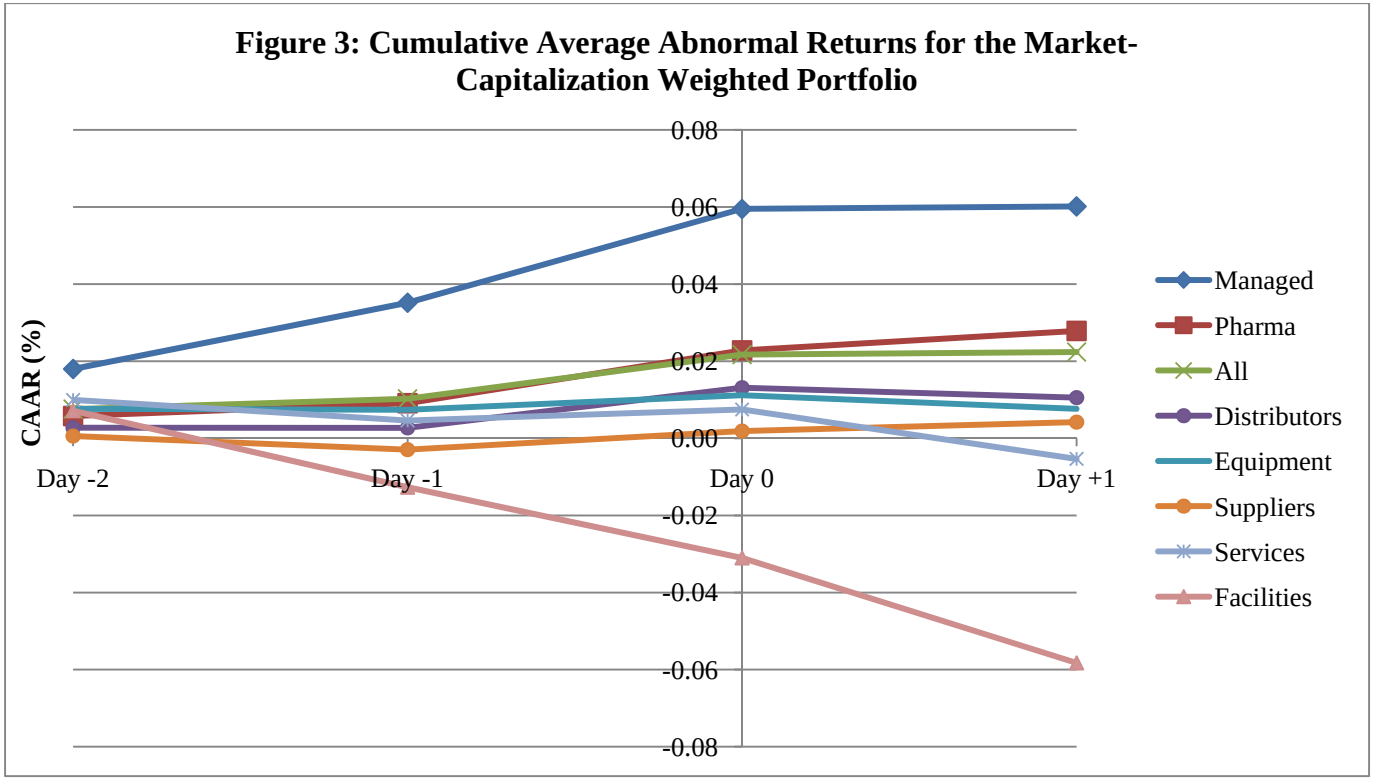

Figure 4: Cumulative Average Abnormal Returns for the Individual Managed Healthcare Firms

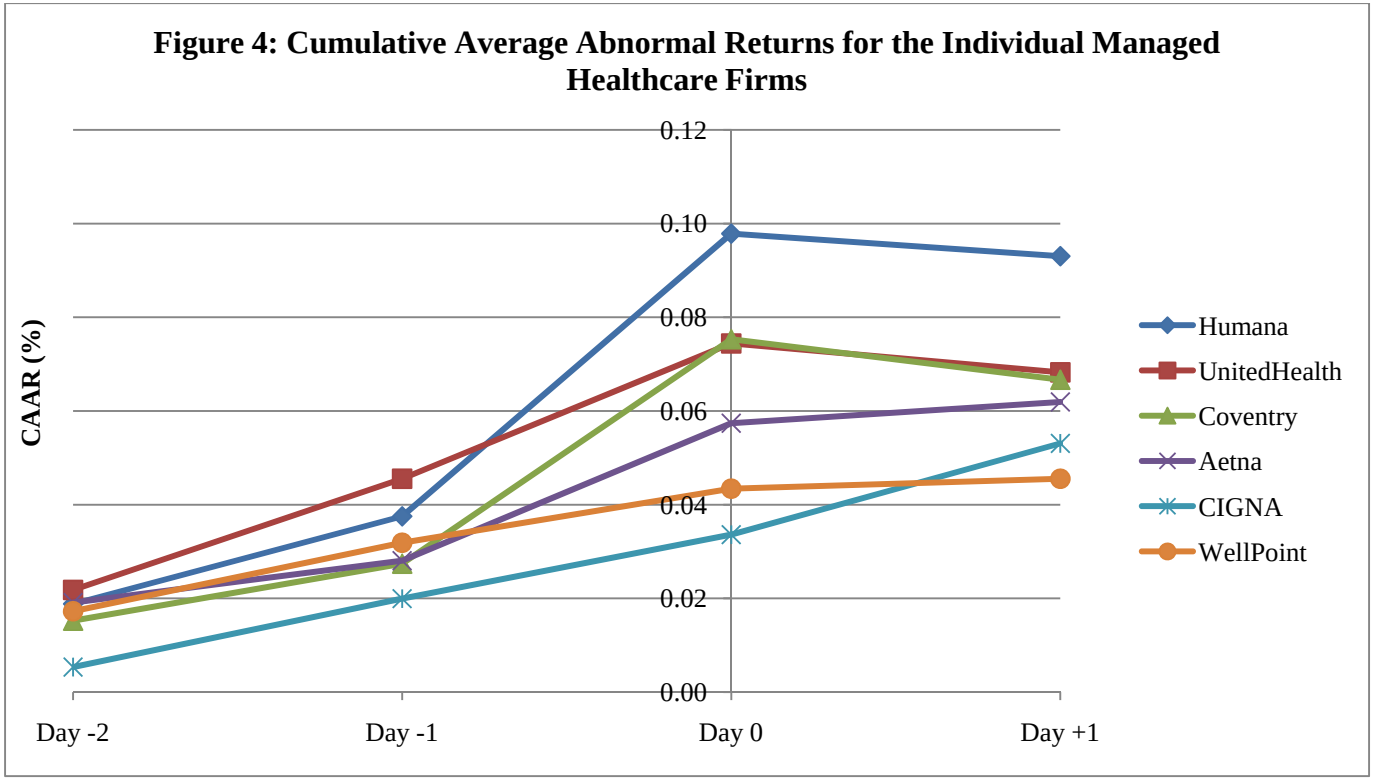

Table 1: Event Study Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	AAR				CAAR	Rank	Sign (p-value)
	Day -2	Day -1	Day 0	Day +1			
All	0.007	-0.002	0.009	-0.002	0.012		
t	4.742***	-1.117	3.801***	-1.356	3.398***	1.230	0.000***
std. t	3.211	-0.711	3.996	-1.093	3.176		
Pharma	0.009	0.000	0.015	0.005	0.029		
t	2.385**	0.073	3.430***	2.194**	4.094***	2.443**	0.000***
std. t	1.737*	0.321	3.608***	0.997	5.271***		
Managed	0.016	0.015	0.032	0.001	0.065		
t	6.901***	7.316***	4.093***	0.257	6.875***	2.366**	0.015**
std. t	1.596	1.502	2.975***	0.111	12.400***		
Facilities	0.006	-0.016	-0.007	-0.020	-0.036		
t	2.184**	-4.211***	-0.730	-3.139***	-2.976***	-1.355	0.925*
std. t	0.943	-1.938*	-0.682	-2.578***	-2.169**		
Equipment	0.006	0.000	0.008	-0.001	0.014		
t	2.423**	0.303	2.934***	-0.830	3.086***	1.050	0.010***
std. t	1.381	-0.078	1.987**	-0.377	3.375***		
Services	0.013	-0.007	0.003	-0.009	0.000		
t	2.847***	-1.938*	0.472	-1.294	-0.004	-0.160	0.843
std. t	2.189**	-1.255	0.525	-1.610	-0.063		
Distributors	0.001	-0.002	0.008	-0.003	0.003		
t	0.124	-0.886	2.883***	-2.836***	0.501	0.112	0.491
std. t	0.121	-0.352	1.098	-0.368	0.421		
Suppliers	-0.003	0.001	0.003	0.005	0.006		
t	-0.528	0.138	0.885	1.175	0.705	0.556	0.322
std. t	0.025	-0.003	0.413	0.464	1.224		

Table 2: Event Study Results for Market-Capitalization Weighted Portfolios

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	AAR				CAAR	Rank	Sign (p-value)	Dummy Regression		P_{P_Rank} (p-value)
	Day -2	Day -1	Day 0	Day +1				$\delta_{p(i)}$	4* $\delta_{p(i)}$	
All	0.008	0.003	0.011	0.001	0.022			0.006	0.022	
t	1.086	0.388	1.648*	0.099	2.663***	1.975**	0.060*	2.649***		0.023**
Pharma	0.006	0.003	0.014	0.005	0.028			0.007	0.028	
t	0.742	0.427	1.765*	0.651	3.483***	2.286**	0.058*	3.456***		0.009***
Managed	0.018	0.017	0.024	0.001	0.060			0.015	0.060	
t	0.921	0.880	1.247	0.034	3.436***	2.144**	0.068*	3.401***		0.014**
Facilities	0.007	-0.020	-0.018	-0.027	-0.058			-0.015	-0.058	
t	0.453	-1.258	-1.164	-1.729*	-2.245**	-1.865*	0.923*	-2.235**		0.971**
Equipment	0.008	0.000	0.004	-0.004	0.008			0.002	0.008	
t	0.919	-0.030	0.452	-0.424	0.907	0.555	0.721	0.900		0.297
Services	0.010	-0.005	0.003	-0.013	-0.005			-0.001	-0.005	
t	0.907	-0.485	0.259	-1.166	-0.312	-0.276	0.692	-0.310		0.607
Distributors	0.003	0.000	0.010	-0.003	0.011			0.003	0.010	
t	0.246	-0.002	0.938	-0.233	1.082	0.671	0.692	1.071		0.259
Suppliers	0.001	-0.004	0.005	0.002	0.004			0.001	0.004	
t	0.062	-0.368	0.500	0.243	0.692	0.397	0.314	0.678		0.352

Note: t-stat for AAR = AAR / AR_SD, where AR_SD is the standard deviation of the AR during the estimation window.
t-stat for CAAR = $(1/\sqrt{T} * \sum AR) \Big/ [(AR\_SD) * \sqrt{(T-1)/T}]$, where T is the event window length, AR_SD is the standard deviation of AR during the event window.

Table 3: Event Study Results For Individual Managed Care Firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	AAR				**CAAR**	**Rank**	**Sign (p-value)**	**Dummy Regression**		**P_{P_Rank} (p-value)**
	Day -2	Day -1	Day 0	Day +1				$\delta_{p(i)}$	**4*** $\delta_{p(i)}$	
AET	0.019	0.009	0.029	0.005	0.062			0.0155	0.062	
t-stat	0.760	0.356	1.166	0.180	3.229***	1.913*	0.054*	3.185***		0.027**
UNH	0.022	0.024	0.029	-0.006	0.068			0.0171	0.068	
t-stat	0.878	0.957	1.163	-0.249	2.498**	1.848*	0.307	2.481**		0.031**
HUM	0.019	0.019	0.060	-0.005	0.093			0.0233	0.093	
t-stat	0.686	0.682	2.200**	-0.176	1.982**	1.792*	0.299	1.975**		0.036**
CVH	0.015	0.012	0.048	-0.009	0.067			0.0167	0.067	
t-stat	0.537	0.427	1.685*	-0.304	1.648*	1.459	0.329	1.639		0.074*
CI	0.005	0.015	0.014	0.019	0.053			0.0133	0.053	
t-stat	0.196	0.538	0.502	0.716	5.223***	1.948*	0.063*	4.954***		0.024**
WLP	0.017	0.015	0.012	0.002	0.046			0.0114	0.046	
t-stat	0.851	0.720	0.570	0.104	3.982***	1.920*	0.063*	3.889***		0.026**

Note: t-stat for AAR = AAR / AR_SD, where AR_SD is the standard deviation of the AR during the estimation window.
t-stat for CAAR = $(1/\sqrt{T} * \sum AR) \Big/ [(AR\_SD) * \sqrt{(T-1)/T}]$, where T is the event window length, AR_SD is the standard deviation of AR during the event window.

Appendix Table 1: Companies and Their Sub-Industry Designation

#	Company	Ticker			
Distributors					
1	AmerisourceBergen Corp	ABC	43	Express Scripts Inc	ESRX
2	Cardinal Health Inc	CAH	44	HMS Holdings Corp	HMSY
3	Schein, Henry Inc	HSIC	45	Lab Corp of America Hldgs	LH
4	McKesson Corp	MCK	46	Lincare Hldgs Inc	LNCR
5	Patterson Cos Inc	PDCO	47	Mednax Inc	MD
Equipment			48	Medco Health Solutions Inc	MHS
6	Baxter Intl Inc	BAX	49	Omnicare Inc	OCR
7	Bard, C.R. Inc	BCR	50	Align Technology Inc	ALGN
8	Becton, Dickinson & Co	BDX	51	Immucor Inc	BLUD
9	Beckman Coulter Inc	BEC	52	Cooper Companies Inc	COO
10	Boston Scientific Corp	BSX	53	Haemonetics Corp	HAE
11	Edwards Lifesciences Corp	EW	54	Inverness Medical Innovations	IMA
12	Gen-Probe Inc	GPRO	55	Meridian Bioscience Inc	VIVO
13	Hologic Inc	HOLX	56	West Pharm. Services Inc	WST
14	Hospira, Inc	HSP	57	Dentsply Intl	XRAY
15	IDEXX Laboratories Inc	IDXX	**Managed Care**		
16	Intuitive Surgical Inc	ISRG	58	Aetna Inc	AET
17	Kinetic Concept	KCI	59	CIGNA Corp	CI
18	Medtronic Inc	MDT	60	Coventry Health Care Inc	CVH
19	ResMed Inc	RMD	61	Humana Inc	HUM
20	STERIS Corp	STE	62	Unitedhealth Group Inc	UNH
21	St Jude Medical Inc	STJ	63	WellPoint Inc	WLP
22	Stryker Corp	SYK	**Pharmaceuticals**		
23	Teleflex Inc	TFX	64	Abbott Laboratories	ABT
24	Thoratec Corp	THOR	65	Allergan Inc	AGN
25	Varian Medical Systems Inc	VAR	66	Auxilium Pharmaceuticals Inc	AUXL
26	Zimmer Holdings Inc	ZMH	67	Bristol-Myers Squibb	BMY
Facilities			68	Endo Pharmaceuticals Hldg	ENDP
27	Amsurg Corp	AMSG	69	Forest Laboratories	FRX
28	Brookdale Senior Living	BKD	70	Impax Laboratories Inc	IPXL
29	Community Health Systems	CYH	71	Johnson & Johnson	JNJ
30	HEALTHSOUTH Corp	HLS	72	King Pharmaceuticals Inc	KG
31	Health Management Asscs Inc A	HMA	73	Lilly, Eli & Co	LLY
32	Kindred Healthcare Inc	KND	74	Merck & Co Inc	MRK
33	Lifepoint Hospitals	LPNT	75	Medicis Pharmaceutical A	MRX
34	Psychiatric Solutions Inc	PSYS	76	Mylan Inc.	MYL
35	Tenet Healthcare	THC	77	Nektar Therapeutics	NKTR
36	Universal Health Services B	UHS	78	Pfizer Inc	PFE
Services			79	Perrigo Co	PRGO
37	Amedisys Inc	AMED	80	Par Pharmaceutical Cos.	PRX
38	Chemed Corp	CHE	81	Salix Pharmaceuticals Ltd	SLXP
39	Catalyst Health Solutions Inc	CHSI	82	ViroPharma Inc	VPHM
40	Quest Diagnostics	DGX	83	Valeant Pharmaceuticals	VRX
41	Davita Inc	DVA	84	Vivus Inc	VVUS
42	Emergency Medical Services A	EMS	85	Watson Pharmaceuticals	WPI
			86	Xenoport Inc	XNPT