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Stocks: Evidence from the Supreme Court
Ruling**

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Health Care Reform and Health Care Stocks: Evidence from the Affordable Care Act Supreme Court Ruling

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Abstract

The Patient Protection and Affordable Care Act of 2010 marked a substantial shift in U.S. health care policy. This paper creates an event study that measures the impact of the law by observing health care firm stocks in the S&P 500 when on June 28, 2012, the U.S. Supreme Court very unexpectedly did not overturn key sections of the Affordable Care Act in their landmark ruling on *NFIB v. Sebelius*. This included upholding the individual mandate, a provision requiring that Americans maintain a certain level of health insurance or face a monetary penalty. Following the upheaval, the paper finds cumulative average abnormal returns for managed care stocks of -6.7% (-\$6.9 bn in total market capitalization). The same metric was -1.2% (-\$1.5 bn) for biotechnology companies, +3.2% (+\$0.4 bn) for hospitals, +1.9% (+\$1.6 bn) for health care services, and +0.5% (+\$4.8 bn) for pharmaceutical companies. Health care equipment, distribution, and technology stocks had flat cumulative average abnormal returns over the period.

Keywords: Legislatures, and Voting Behavior; Information and Market Efficiency; Event Studies; Analysis of Health Care Markets; Industrial Policy

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“The Affordable Care Act is constitutional in part and unconstitutional in part...it is reasonable to construe what Congress has done as increasing taxes on those who have a certain amount of income, but choose to go without health insurance. Such legislation is within Congress’ power to tax.”

— Supreme Court Chief Justice John Roberts¹

“The decisions...arose from shifting coalitions, sometimes the result of one justice taking an unexpected stand...in the healthcare case, Roberts split with the conservatives and joined with the court’s four liberals to uphold President Obama’s signature law.”

— *Los Angeles Times*²

“Two networks, CNN and Fox News, were reporting the Supreme Court had struck down the centerpiece of his landmark healthcare law...Moments later...The court had in fact upheld the Patient Protection and Affordable Care Act. The TV networks had reported it wrong.”

— *Reuters*³

1 Introduction

Health care reform in the United States has recently been a major subject of national interest, potentially having major consequences for American consumers, taxpayers, and health care firms. While going through much debate, iterations, and controversy in 2009 and early 2010, the Patient Protection and Affordable Care Act was signed into law by President Barack Obama on March 23, 2010. The effort contained provisions with the intent to increase the number of Americans covered by health insurance and decrease the cost of health care with several implications for taxes and federal spending.

In particular, a key provision of the bill, named the individual mandate, requires that Americans maintain a certain level of health insurance or face a monetary penalty.

The constitutionality of the law, especially the individual mandate, was questioned in several legal proceedings between 2010 and 2011, with these cases merging into a single case, *National Federation of Independent Business v. Sebelius*, which eventually made its way in

¹Supreme Court Opinion on *National Federation of Independent Business et al. v. Sebelius*. See <http://www.supremecourt.gov/opinions/11pdf/11-393c3a2.pdf>

²<http://articles.latimes.com/2012/jul/07/nation/la-na-court-term-20120708>

³<http://www.reuters.com/article/2012/06/28/us-usa-healthcare-obama-idUSBRE85R14L20120628>

front of the Supreme Court on March 26, 2012, with Justices hearing arguments until March 28, 2012.

While many expected the Court to rule 5-4 in favor of the pursuant by ruling the individual mandate unconstitutional, on June 28, 2012, the Supreme Court made a shocking 4-5 ruling, with Chief Justice John Roberts joining the liberal side of the court, declaring that the individual mandate was constitutional as a tax despite being unconstitutional under the US Constitution's Commerce Clause.

The end result was that enforcing the individual mandate would unexpectedly remain law. In addition, the Court ruled that individual states may opt out of the Affordable Care Acts expansion of Medicaid and the federal government has limited power to terminate states' Medicaid funding. Using an event study, we assess the impact on health care firm stock prices immediately after the surprise ruling from the US Supreme Court.

The paper uses Intrade.com contract prices, speculating on whether the Individual Mandate would be declared unconstitutional by December 31, 2012, to verify that the Supreme Court verdict was in fact unexpected.

We find that upholding the health care law had both positive and negative significant abnormal returns across different sectors. The cumulative average abnormal return over June 28, 2012 and June 29, 2012 was -6.7% for managed care firms (private insurers), -1.2% for biotechnology firms, +0.5% for pharmaceutical firms, +1.9% for health care service firms, and +3.2% for health care facility and hospital firms.

The remainder of this paper proceeds as follows. Section II discusses the literature on health care reform and event studies the timeline of the Supreme Court ruling. Sections III presents the data and empirical strategy, and Section IV contains the results. Section V concludes.

2 Literature and Theory

To discern the implications of the Supreme Court ruling on the individual mandate for health care firms, we adopt the classic event study methodology developed by Fama, Fisher, Jensen, and Roll (1969).

Since then, the event study methodology has become the preferred framework for analyzing the impact of legislative initiatives, rulings, mergers, and abrupt decisions on publically traded firms.

Many popular event studies have analyzed how new information resulting from exogenous changes to political platforms and legislation can have a direct impact on stock prices (Knight 2006, Ferri 2008). Jayachandran (2006) observed the effect of an unexpected change in party Congressional control on industry stock prices by studying Senator James Jeffords 2001 decision to leave the Republican party, an abrupt decision which effectively shifted control of the U.S. Senate to the Democratic party. The paper finds that firms with Republican linkages (measured by donations) had negative abnormal returns while firms with Democratic linkages had positive abnormal returns.

The impact on health care firms resulting from changes in federal health care policies have also been analyzed in detail. Kawaura and Sumner (1995) analyze the impact of patent reform in Japan, finding that Japanese pharmaceutical companies in aggregate were significantly hurt.

Other studies have attempted to analyze the impact of national health reform in the US on health care firms. Ellison and Mullin (2001) find the Clinton health reform plan introduced between 1992-1993 had a significant negative impact on pharmaceutical company stock returns using isotonic regressions to assess the gradual impact of the proposed policies.

The other main study to analyze the impact of the Obama health reform plan is Miller and Al-Ississ (2010) who determine the market's assessment of health reform on the health care industry by examining the impact of the unexpected victory of Senator Scott Brown in the 2010 Massachusetts Special Senate election. It was widely believed that such a victory

would strip Democrats of the 60-vote majority needed to pass the healthcare overhaul bill in the Senate. Assuming that Scott Brown's surprise election decreased the probability of passing the overhaul bill, they find that the lower likelihood of health reform getting passed increased the stock prices of managed care and pharmaceutical firms.

Similarly, this paper uses the unexpected Supreme Court ruling on *NFIB v. Sebelius*, to determine the market's assessment of implementing the cleared provisions of the Affordable Care Act.

3 Data and Empirical Strategy

3.1 Background

We use the same event study methodology first developed by Fama, Fisher, Jensen, and Roll (1969) and delineated further by MacKinley (1997). This involves using a standard market model with daily returns of health care stocks during the 1000 days leading up to the Courts ruling, then determining the abnormal return during the event period by finding the difference between the actual return and what the market models parameters would predict.

Assuming that the verdict was a surprise, there are no confounding effects on health care stocks, and there is fair degree of market efficiency, the abnormal returns from the event study should describe the impact of the individual mandate on health care firm stock prices.

We predict that the Supreme Court's verdict, making the individual mandate constitutional, would decrease the stock prices of managed care firms since the mandate imposes new regulations on insurers such as adding requirements to pay out a minimum amount of proceeds from premiums and preventing insurers from charging healthy and sick individuals different premiums. Both of these would theoretically lower expected future profits. We believe this would offset the effect of a predicted increase in revenues from an additional 30 million insured individuals.

Such a relationship has been empirically observed before in Miller and Al-Ississ (2010)

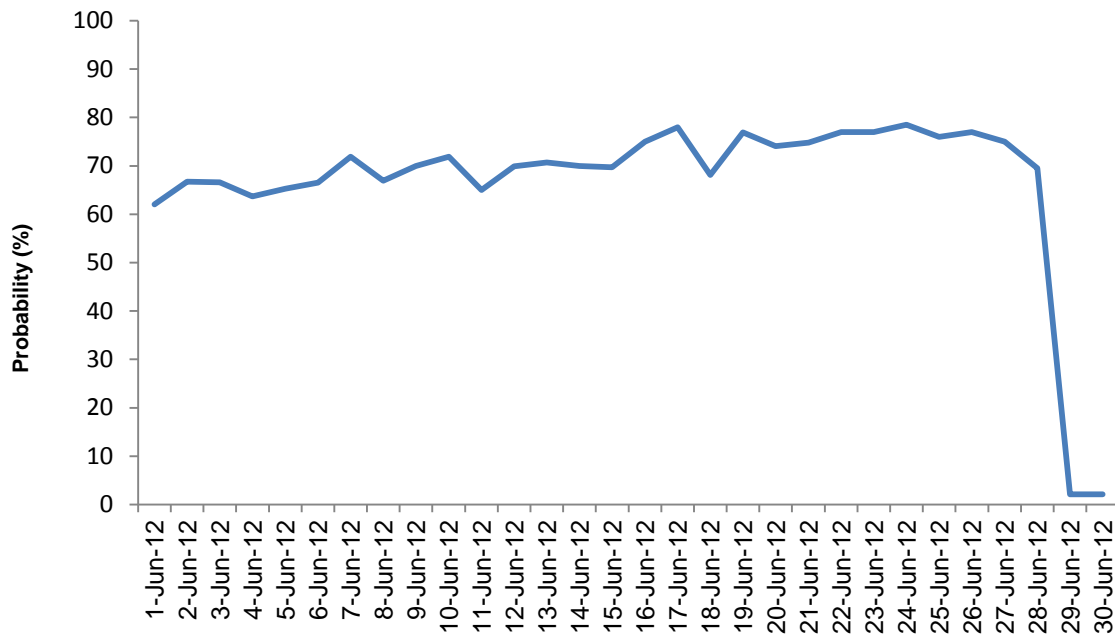
showed that the surprise election of Scott Brown (being a threat to the individual mandate) created positive abnormal returns for managed care firm and pharmaceutical sub-sectors. We believe this empirical work would support our prediction that managed care companies would experience negative abnormal returns after an event that increases the probability of the law being enacted such as the Supreme Court verdict.

3.2 Data

We begin by presenting evidence that the Supreme Court verdict was in fact unexpected. While many major news outlets in the days leading up to the date forecasted that there would most likely be a 5-4 majority (with Chief Justice Roberts siding with the conservative side of the Court) striking down the individual mandate (there was even confusion when the verdict was first released, as CNN and Fox News first reported that the individual mandate was ruled unconstitutional and struck down), Roberts surprisingly sided with the liberal side of the Court, writing the Court's opinion that the mandate is constitutional as a tax, despite not being constitutional under the Constitution's Commerce Clause.

Figure 1 shows the swing in the Intrade.com contract that has a binary payout determined by whether the US Supreme Court is to rule the individual mandate unconstitutional before midnight ET 31 Dec 2012. One benefit to the study is that it measures the markets expectations and the probability of the Supreme Court ruling the individual mandate unconstitutional. While the contract traded during the morning of June 28, 2012 nearly at a 73% probability of the event occurring, the Supreme Court opinion delivered its opinion at approximately 10:30am ET, after which point in time the contracts dropped to approximately 2% within minutes. We believe this is sound evidence that the ruling was unexpected by the market and makes the case for an event study which measures the market's response to the individual mandate surprisingly becoming law.

Figure 1: Intrade.com Contract Closing Prices for "The US Supreme Court to rule individual mandate unconstitutional before midnight ET 31 Dec 2012"



Notes: Each intrade.com contract pays \$100 to the buyer if the event does occur and \$100 to the seller if the event does not occur by December 31, 2012. In this case, the buyer would be paid \$100 if the individual mandate was ruled unconstitutional by the Supreme Court, while the seller would be paid \$100 if not by the end of the year. The floating price of the contract reveals the perceived probability of the event occurring over time. In the case of this contract, the perceived probability of the individual mandate being ruled unconstitutional went from nearly 70% to 2% in a matter of minutes after the Supreme Court ruling on June 28, 2012.

With the possibility of either President Obama or Governor Mitt Romney being elected (the latter promising to overturn the individual mandate if elected) in the 2012 federal election, there is still a strong possibility the individual mandate being overturned in the future. Therefore any abnormal returns we find, would underestimate the full impact of the individual mandate. To find a more precise estimate of the individual mandates effect on healthcare stocks, we could also take into consideration the probability of Mitt Romney being elected, which we could again use an Intrade.com contract for (at the time of the Supreme Court Ruling, Intrade.com contracts priced an Obama victory at 55.7% and a Romney victory at 42.0%). However, we would also have to use these in conjunction with the probability of a Republican or Democrat controlled House and Senate, to determine the possibility of a legislative scenario capable of overturning the individual mandate.

One other significant result of the courts opinion required that contrary to the initial law, states may opt out of the Affordable Care Acts expansion of Medicaid and the federal government has limited power to terminate states' funding. This may have consequences for several hospital companies particularly in states with Republican majority legislatures and governments that could potentially opt out of such expansions. At the same time the ruling limits the federal governments power to curb any uncooperative state's Medicaid funding, which is likely the most significant benefit coming from the verdict as it was expected that some states would lose Medicaid funding over intransigence to accept this section of the law should it remain standing. This effect of this particular section of the law being struck down should primarily benefit certain insurance companies involved in Medicaid. We predict that this would mitigate losses created by the individual mandate for insurance companies with this particular line of business.

One other potentially confounding event during the same time period is the improvement of European sovereign debt talks on Friday June 29, 2012, the day following the verdict. We believe that by examining abnormal (market-adjusted) returns we net out the any effects of the European bailout talks had on healthcare stocks during this time by subtracting our

market models expected returns.

Like Miller and Al-Ississ (2010), who analyze seven healthcare sub-industries to obtain a more granular look at the impact of the event to the healthcare industry, we classify firms into each of the ten healthcare sub-industries listed in the S&P Global Industry Classification Standard (GICS) classification which includes: Biotechnology, Health Care (HC) Distributors, HC Equipment, HC Facilities, HC Services, HC Supplies, HC Technology, Life Sciences Tools & Services, Managed HC, and Pharmaceuticals.

To allow analysts time to incorporate news of the bill into their stock price valuations, we consider an event window beginning with the day of the surprise Supreme Court ruling on June 28, 2012 and extend by one day after its announcement ending June 29, 2012. The subsequent day allows the news to circulate around the industry and among analysts about the consequences of the Affordable Care Act now becoming constitutional.

Thus the two trading day event window ranges from Thursday June 28, 2012 to Friday June 29, 2012 (inclusive).

We use Lexus/Nexus and other compilations of media and print publications between these two dates to ensure there were no other pieces of new public information that could have enhanced expectations regarding an upcoming doctor shortage reduction bill in Congress.

We also use ThomsonOne to ensure there were no other competing releases of information such as quarterly earnings reports which could have had a significant impact managed care firms individually or collectively as an industry. No 10-Q's, 10-K's or annual financial reports were released during the event window for any S&P Managed Care, Hospital, or Pharmaceutical company.

One potentially confounding event that occurred on Monday July 2, 2012 (the first business day following Friday June 29, 2012) when GlaxoSmithKline plead guilty to criminal charges and pay a \$3 billion healthcare fraud settlement, which marked the largest healthcare settlement in US history. By narrowing our event study to only June 28 and 29, we believe that we avoid any surprise that may have come from the settlement and that any

probability of a settlement was already priced into the market during these days. There is no indication of rumors spread publically on June 28 or 29 that a plea agreement would be reached the following day.

3.3 Modelling Abnormal Returns

We estimate the expected returns of each firms stock price using the following market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it} \quad (1)$$

Where R_{it} is the daily rate of return of firm i's stock price on day t, and R_{mt} is the benchmark measure of market returns at time t, which in our study is the S&P 500. ϵ_{it} is the error term for company (i) during period t, where we assume that returns are normally distributed and,

$$E(\epsilon_{it}) = 0, Var(\epsilon_{it}) = \sigma^2 \quad (2)$$

Following the classic event study methodology (Fama et. al, 1969), I estimate the market model (eq. 1) during the period beginning on the trading day prior to the first day of the event window extending back 1000 trading days. In another specification, I use a Fama-French market model, regressing individual returns on market capitalization (SMB) and book-to-market value (HML), in addition to the market benchmark return.

$$R_{it} = \alpha_i + \beta_i R_{mt} + \beta_i^{SMB} SMB_{mt} + \beta_i^{HML} HML_{mt} + \epsilon_{it} \quad (3)$$

With the resulting parameters, I extrapolate the expected return of the equities through the event window.

Now I measure the Abnormal Return (AR) of healthcare industry stocks in response to the introduction of the legislation, as the difference between the actual returns for the

equities during the event window and the fitted returns from the market model parameters.

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt} \quad (4)$$

The Average Abnormal Return is measured as the average return across the n-firm sub-industry:

$$AAR_t = \frac{1}{N} \sum_{i=1}^n AR_{it} \quad (5)$$

The Cumulative Average Abnormal Return is measured as the sum of the over the two-day event window:

$$CAAR = \sum_{t=1}^2 AAR_t \quad (6)$$

With the above returns being computed for each period, I now use the following parametric and non-parametric tests, given various distributional assumptions:

1. Parametric Traditional Tests (Binder, 1998)

In our traditional parametric tests we make the assumption that individual AR_{it} 's are independently and identically distributed and that abnormal returns are normally distributed with mean zero and variance σ^2 .

We also make the assumption that the event has an effect on the mean only, or more simply that the standard deviation of abnormal returns are constant during the event period. Using the null hypothesis for $AAR_t = 0$, we can use the following test statistic:

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

Similarly with $CAAR_t$, after computing its standard deviation from the estimate of the standard deviation of AAR_t , we use the following test statistic:

$$T_1 = \frac{(CAAR_{1,2})}{\sqrt{\sum_{t=1}^2 \sigma^2(AAR_t)}} \quad (8)$$

2. Parametric Standardized Tests (Boehmer, Musumeci, and Poulsen, 1991)

In a slightly different case where, in addition to the mean, the standard deviation of returns changes from the estimation period to the event period, we use a different method to test for significance. We define Standardized Abnormal Returns (SAR) for each firm by dividing the firms return by its standard deviation. Each firm's standard deviation is measured from our data in the estimation period prior to the event.

$$SAR_{it} = AR_{it}/\sigma_i \quad (9)$$

Testing average abnormal returns in general can be done with the following test-statistic.

$$Z_2 = \frac{\sum_{i=1}^n SAR_{it}}{\sqrt{N}} \quad (10)$$

Similarly for average cumulative abnormal returns, we can use:

$$T_2 = \frac{\frac{1}{N} \sum_{i=1}^n SCAR_{it2}}{\sqrt{\frac{1}{N(N-1)} \sum_{i=1}^n (SCAR_{it2} - \overline{SCAR})^2}} \quad (11)$$

3. Nonparametric Sign Test (Cowan, 1992)

I also use a non-parametric test that dispenses with distributional assumptions about abnormal returns. Instead I calculate,

$$Z_{sign-test} = \frac{pos - Np(+)}{\sqrt{Np(+)(1 - p(+))}} \quad (12)$$

where $p(+)$ is the tendency for the firms to have positive returns during the 1000 trading day estimation period, pos is the number of positive returns during the two day event period, and N is the number of firms in the sub-industry of interest. This statistic, by the Central Limit Theorem, should follow a normal distribution and can be used to test for significance

as such.

4. Event-time Clustering, Firm Size, and Non-synchronous Trading (Binder, 1985)

In order to account for event-time clustering, firm size, and possible non-synchronous trading in our estimates, we use a modified market model:

$$R_{it} = \alpha_i + \beta_{i1}R_{mt} + \beta_{i2}R_{m(t-1)} + \gamma_{it}D_t + \epsilon_{it} \quad (13)$$

Compared to our previous market model, this model adds a lagged market term since it is possible that contemporaneous market returns do not capture the full effect of the event. Hence the lagged market term accounts for non-synchronous trading (Binder, 1985).

Since all of the stocks being analyzed belong to the same industry, it is likely that the market model residuals will be correlated across firms, implying individual abnormal returns are not independent. Hence, we also add a dummy variable D_t , that equals one on the event days and zero otherwise, to account for event time clustering (Binder, 1996).

4 Results

4.1 Managed Care Firms

Health insurance companies were hurt significantly following the surprise Supreme Court ruling. We find average cumulative abnormal returns of -6.7% (t-statistic of -3.06) for managed care firms in the S&P 500 to be significant at the 1% level (Table 2). In market capitalization terms, this loss is equal to -\$6.9 bn in market capitalization. Notably Aetna, Coventry, and Cigna performed experienced the largest decline in their stock prices.

We believe that the economic intuition behind the losses for major healthcare insurers is that the unexpected constitutional individual mandate would decrease expected future profit margins from the more regulated channel that the law creates for all customers. This includes requiring insurance companies to pay a certain percentage of the premium they collect on

medical treatments (the medical loss ratio). Such restrictions on how the insurance industry can operate would intuitively reduce insurance company profits. It is also possible that the market expected the Supreme Court to throw out certain parts of the law that require insurance companies cover patients with pre-existing conditions and charge sick patients the same premiums as healthy patients.

While the Court's decision did in effect allow states to opt out Medicaid expansion, which is expected to fund approximately half of the newly insured individuals from the mandate, we believe that the revenue impact from this part of the decision is minimal as in such opting out states, most premiums from the newly insured would continue to be paid under the mandate, but going unsubsidized.

One other potential major cost borne to insurers from the health care law would be the moral hazard cost of increased utilization from newly insured individuals under the individual mandate. This would have a negative effect on expected future profits of managed care companies creating a negative effect on managed care stock valuations.

One potentially offsetting factor from the law is risk mitigation resulting from more insured individuals which would have a positive effect on managed care stock valuations. Our finding that cumulative average abnormal returns for managed care stocks is negative implies that the positive effects of risk mitigation on managed care stocks are outweighed by the negative effects of regulatory burden.

This paper ignores any potential benefits measured in social utility from reduced financial strain or from improved self-reported health that may result from the ruling, as this is outside the scope of this paper's objective to measure the impact on health care stocks.

UnitedHealthcare was one of only a few managed care firms to have positive abnormal returns on the day the verdict was released (0.64%) and the smallest cumulative drop in abnormal returns across the entire event period (-3.48%). This is understandably the case because of UnitedHealthcare's substantial presence in the Medicaid market through its Community Plan Medicaid business that would benefit from the Supreme Court limiting the

federal government's ability to threaten cutting state funding for Medicaid programs. We believe that this section of the ruling outweighs the potential impact of states opting out expansion which would in some sense hurt Medicaid insurers, but would be much smaller than the expected impact of having all Medicaid funding cut together for states uncooperative with the federal health care overhaul. Insurers with a higher focus on providing Medicaid coverage like Amerigroup, Molina, WellCare, and Centene (which are not included in the S&P 500) saw significant rallies and positive abnormal returns following the decision. This is further evidence supporting the rulings overall effect on insurance companies with Medicaid programs.

Over one week following the ruling, on July 8, 2012, WellPoint Inc., a managed care provider in the S&P 500, announced plans to buy Amerigroup, a Medicaid-focused insurer, with the aims to boost its presence in the market for Medicaid recipients, an expanding market given the statutes of the Affordable Care Act, but potentially mitigated by the Supreme Court's decision to allow states to opt out of Medicaid expansion. We do not believe that any rumors of this acquisition had any effect on abnormal returns during the two days after the verdict since the information was not public until over one week following the ruling. It is possible to consider whether the strategically planned acquisition was influenced by the Supreme Court ruling on Medicaid expansion (which benefitted Medicaid companies as explained above), though this is outside the scope of this paper.

4.2 Health Care Facilities and Services Firms

Hospitals and health care facility firms in the S&P 500 experienced significant positive abnormal returns of on average +3.2% (\$0.4 bn) with a standardized t-statistic of 2.20.

We believe the intuition behind this increase in valuation is that hospitals and other health care facilities benefit from more inpatient and outpatient customers after more individuals gain health insurance under the individual mandate.

This relationship of insurance and higher health care utilization has been documented by

several studies, namely The Oregon Health Insurance Experiment (Finkelstein et al. 2011), which uses a randomized experiment randomly selecting a group of low-income uninsured adults in Oregon to enter a lottery granting Medicaid insurance. The study shows that a treatment group of newly insured adults (who were otherwise uninsured) significantly increased their healthcare utilization (in particular primary and preventative care).

Any expected increase in health care utilization would have an expected positive impact on health care facilities as their revenue depends on the number of patients and in the case of hospitals, lengths of inpatient stays

One other major benefit to hospitals coming from the upheaval of the health care law may include an increase in collections from customers as insuring more individuals would likely reduce the probability of hospital inpatient bills going unpaid.

We believe that a combination of these two effects resulting from the upheaval of the law created positive abnormal returns for health care facilities.

4.3 Biotechnology and Pharmaceutical Firms

Biotechnology firms experienced significant negative cumulative abnormal returns on the day of the ruling -2.0% (with a t-statistic of -10.02). Pharmaceutical firms did not experience significant abnormal returns on the day of the ruling though some individual pharmaceutical firms did experience significant negative returns like Alexion Pharmaceuticals (-3.0%) and Perrigo (-1.82%).

We believe any significant negative abnormal returns occurred due to the unexpected survival of parts of the health law including new industry fees, Medicaid rebates, and increased Medicare Part D coverage which closes the gap in Part D coverage known as “the doughnut hole”. A Moody’s research report estimates that the Affordable Care Act will cost the drug industry about \$85 billion over 10 years, and a similar report by the consulting firm Avalere Health expects a cost of \$105 billion in fees over the period for the industry.⁴

⁴Forbes.com, “What The Supreme Court Ruling Means For Pharma”

These estimates also take into account the offsetting increase in prescription drug sales resulting from the increased demand with an additional 30 million people becoming insured from the surviving individual mandate.

On the other hand, we do also find that Pharmaceuticals rebounded and had significant positive abnormal returns on June 29, the day after the ruling (t-statistic of +3.28). Over the two day period, Pharmaceuticals had positive average cumulative returns of +0.5%, which are significant when computing the standardized test statistic (2.24). We think it is possible that it took time for the market to correctly estimate the impact on drug sales from the individual mandate, possibly taking over one day to realize that the increase in drug revenue for certain pharmaceutical firms beginning in 2014 (when the individual mandate becomes enforced) may outweigh the increased fees, discounts, and rebates they have already been paying since the law has been enacted.

4.4 Health Care Technology, Equipment, and Distributor Firms

Healthcare technology, equipment and distributor companies did not appear to experience significant cumulative abnormal returns resulting from the upheaval of the healthcare law. Hence there is no evidence from the study that the ruling significantly affected the expected future profits of such firms.

While medical device companies will have to pay a new 2.3% tax on all sales beginning in January 2013 to fund parts of the law, we argue that this part of the law was not expected to be struck down by the court and hence any effects of this tax would already be priced in to the stock prices of such firms.

<http://www.forbes.com/sites/edsilverman/2012/06/28/what-the-supreme-court-ruling-means-for-pharma/>

5 Conclusion

Using a two day event study measuring the impact on S&P 500 health care stocks when the Supreme Court unexpectedly ruled that the individual mandate was constitutional (under the provision of a tax), we find instances of both positive and negative significant abnormal returns across different healthcare sub-industries. To confirm that the ruling was truly unexpected, we use an Intrade.com contract, where buyers and sellers speculate on whether the individual mandate will be struck down by the Supreme Court, to show that contract holders placed a 70% probability (the day before the ruling) that the individual mandate would be overturned.

We find that as a result of the upheaval, over the two days following the ruling, the cumulative average abnormal return of managed care stocks was -6.7% (equal to -\$6.9 bn in market capitalization), while the same metric was -1.2% (-\$1.5 bn) for biotechnology companies. We believe this to be the case due to the elevated regulatory impediment imposed by the mandate requiring new customers to come through a more regulated channel, lowering expected future profits. We also find that health insurers companies in the Medicaid market had their losses mitigated or experienced positive abnormal returns we believe resulting from the section of the Supreme Court's opinion limiting the federal government from stripping all Medicaid funding that opt out of Medicaid expansion as part of the Affordable Care Act.

Similarly, we find that over the period, cumulative abnormal returns were 3.2% (\$0.4 bn) for hospitals and other healthcare facility companies, 1.9% (\$1.6 bn) for healthcare services, and 0.5% (\$4.8 bn) for pharmaceutical companies. We believe the intuition behind the increase in abnormal returns is that an individual mandate requiring that Americans maintain a certain level of health insurance or face a monetary penalty should increase the demand for inpatient and outpatient stay and expand the client base of hospitals and health care service companies, increasing overall revenue. In the case of pharmaceutical companies, we believe we see positive abnormal returns since an individual mandate to carry an insurance plan (likely to provide some prescription drug coverage) would increase

the demand for prescription drugs.

We also find that health care equipment, distribution, and technology stocks had relatively flat cumulative abnormal returns over the period. This suggests that there is a lack of evidence supporting that the demand for these inputs changed in response to the individual mandate.

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Table 1: S&P 500 Health Care Stocks after the Individual Mandate Supreme Court Ruling

	Symbol	Abnormal Return June 28, 2012	Abnormal Return June 29, 2012	Cum. Abnormal Return
Managed Care		-4.82%	-1.89%	-6.71%
Aetna Inc.	AET	-2.51%	-5.30%	-7.81%
CIGNA Corp.	CI	-2.50%	-3.63%	-6.13%
Coventry Health Care Inc.	CVH	-2.13%	-5.08%	-7.21%
Humana Inc.	HUM	0.17%	-5.20%	-5.03%
United Health Group Inc.	UNH	0.64%	-4.11%	-3.48%
WellPoint Inc.	WLP	-4.99%	-5.61%	-10.61%
Biotechnology		-1.97%	0.79%	-1.18%
Amgen Inc.	AMGN	-1.20%	0.61%	-0.58%
Biogen Idec Inc.	BIIB	-2.09%	1.19%	-0.90%
Celgene Corp.	CELG	-2.10%	1.48%	-0.62%
Gilead Sciences	GILD	-2.21%	0.95%	-1.27%
Life Technologies	LIFE	-2.26%	-0.30%	-2.56%
HC Distributors		0.76%	0.30%	1.06%
AmerisourceBergen Corp.	ABC	0.99%	1.69%	2.68%
Cardinal Health Inc.	CAH	1.66%	0.45%	2.11%
McKesson Corp.	MCK	1.10%	-1.23%	-0.13%
Patterson Companies	PDCO	-0.70%	0.30%	-0.41%
HC Equipment		-0.49%	0.57%	0.09%
Bard (C.R.) Inc.	BCR	1.02%	1.15%	2.18%
Becton Dickinson	BDX	-0.36%	0.99%	0.63%
Boston Scientific	BSX	-1.32%	-0.32%	-1.64%
Covidien plc	COV	-1.32%	-0.32%	-1.64%
Edwards Lifesciences	EW	-0.64%	0.47%	-0.17%
St Jude Medical	STJ	0.49%	1.09%	1.58%
Stryker Corp.	SYK	-0.83%	0.36%	-0.47%
Thermo Fisher Scientific	TMO	-0.49%	0.45%	-0.05%
Varian Medical Systems	VAR	-1.27%	0.77%	-0.50%
Zimmer Holdings	ZMH	-0.15%	1.08%	0.93%
HC Facilities		3.39%	-0.19%	3.19%
Tenet Healthcare Corp.	THC	5.52%	-3.73%	1.80%
Brookdale Senior Living*	BKD	2.19%	-0.49%	1.70%
Community Health Systems*	CYH	8.27%	-1.55%	6.72%
HealtheSouth Corp*	HLS	1.95%	-0.97%	0.98%
Health Management Asscs Inc A*	HMA	9.03%	1.05%	10.09%
Kindred Healthcare Inc*	KND	-0.93%	2.43%	1.50%
Lifepoint Hospitals*	LPNT	-2.31%	1.89%	-0.42%
HC Services		1.92%	-0.15%	1.76%
DaVita Inc.	DVA	0.01%	1.54%	1.55%
Dentsply International	XRAY	-0.53%	0.54%	0.02%
Express Scripts	ESRX	2.54%	-0.26%	2.28%
Laboratory Corp. of America Holding	LH	3.10%	-0.90%	2.20%
Quest Diagnostics	DGX	2.92%	-0.16%	2.76%
HC Technology		-0.66%	1.16%	0.50%
Agilent Technologies Inc	A	-1.41%	0.74%	-0.67%
Carefusion	CFN	-0.60%	1.58%	0.98%
Cerner	CERN	0.52%	3.72%	4.24%
Intuitive Surgical Inc.	ISRG	-1.37%	0.42%	-0.95%
Medtronic Inc.	MDT	-0.03%	0.46%	0.43%
PerkinElmer	PKI	-0.29%	0.23%	-0.07%
Waters Corporation	WAT	-1.46%	0.99%	-0.47%
Pharmaceuticals		-0.05%	0.59%	0.54%
Abbott Laboratories	ABT	0.14%	1.35%	1.49%
Alexion Pharmaceuticals	ALXN	-3.00%	0.81%	-2.19%
Allergan Inc	AGN	1.07%	-1.03%	0.04%
Baxter International Inc.	BAX	-0.85%	1.68%	0.83%
Bristol-Myers Squibb	BMJ	0.04%	1.07%	1.11%
Forest Laboratories	FRX	0.35%	0.74%	1.09%
Hospira Inc.	HSP	0.98%	0.59%	1.57%
Johnson & Johnson	JNJ	0.24%	-0.26%	-0.01%
Lilly (Eli) & Co.	LLY	0.53%	0.41%	0.95%
Merck & Co.	MRK	1.10%	0.41%	1.51%
Mylan Inc.	MYL	-0.49%	0.32%	-0.17%
Perrigo	PRGO	-1.82%	1.01%	-0.80%
Pfizer Inc.	PFE	-0.22%	0.28%	0.06%
Watson Pharmaceuticals	WPI	1.27%	0.87%	2.14%

*Stock is outside the universe of S&P 500 names, since the index only includes one hospital company (as of 7/2/2012)

Table 2: Supreme Court Individual Mandate Ruling Event Study Results and Test Statistics

	Day1	Day2	Full-period	Non-parametric
Managed Care				***-2.50
Abnormal Return	-1.89%	-4.82%	-6.71%	
Traditional t-statistic	** -2.25	***-15.25	***-3.06	
Standardized t-statistic	** -1.97	***-4.92	***-5.50	
Biotechnology				** -2.29
Abnormal Return	-1.97%	0.79%	-1.18%	
Traditional t-statistic	***-10.02	**2.56	-1.45	
Standardized t-statistic	** -2.34	**0.94	***-3.51	
Pharmaceuticals				1.50
Abnormal Return	-0.05%	0.59%	0.54%	
Traditional t-statistic	-0.14	***3.28	0.40	
Standardized t-statistic	0.10	1.40	**2.24	
HC Facilities				***2.67
Abnormal Return	3.39%	-0.19%	3.19%	
Traditional t-statistic	**2.05	-0.24	0.65	
Standardized t-statistic	***2.41	-0.05	2.20	
HC Services				*1.95
Abnormal Return	1.92%	-0.15%	1.76%	
Traditional t-statistic	***2.87	-0.67	1.11	
Standardized t-statistic	**2.71	-0.26	***3.51	
HC Distributors				***3.11
Abnormal Return	0.76%	0.30%	1.06%	
Traditional t-statistic	1.49	0.50	0.68	
Standardized t-statistic	0.77	0.34	1.24	
HC Equipment				**2.17
Abnormal Return	-0.49%	0.57%	0.09%	
Traditional t-statistic	** -1.97	***3.27	0.09	
Standardized t-statistic	-0.69	1.15	0.63	
HC Technology				***2.62
Abnormal Return	-0.66%	1.16%	0.50%	
Traditional t-statistic	** -2.26	***2.53	0.35	
Standardized t-statistic	-0.78	1.53	0.87	

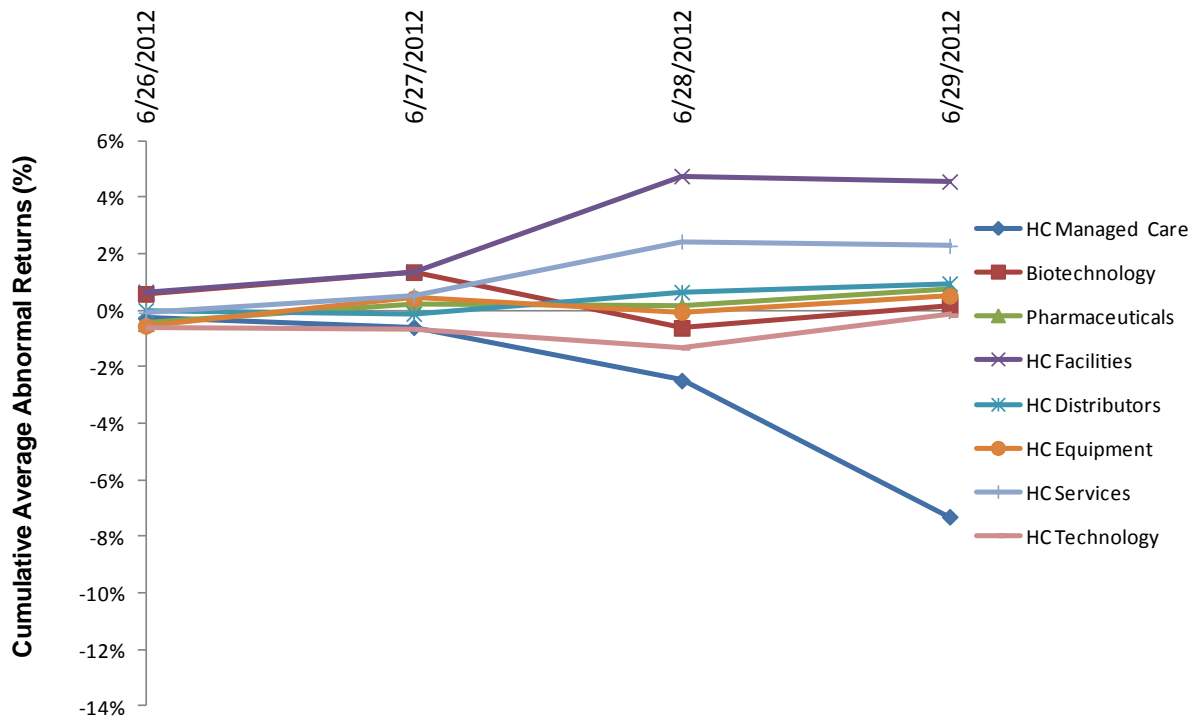
Notes: This table reports the abnormal returns and t-statistics associated with the event study following the US Supreme Court's decision on June 28 ruling that the Patient Protection and Affordable Care Act's individual mandate is constitutional as a tax. The abnormal returns are calculated by first estimating a market model to forecast returns $R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$, and then computing the difference in the actual returns and expected returns using our estimated parameters, $AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{mt}$. The associated test statistics are reported beneath, including those for the traditional and standardized tests. To the right are non-parametric test statistics. We find that there are significant negative abnormal returns for Managed Care and Biotechnology firms as well as positive abnormal returns for Healthcare Facilities (hospitals), HC Service, and Pharmaceutical firms over the two days following the ruling. ***indicates significance at the 1% level or better ** indicates significance at the 5% level or better *indicates significance at the 10% level or better.

Table 3: Robustness Results for Market-Capitalization Weighted Sub-industry Portfolios

	Day 1	Day 2	CAAR	Market	Lag Market	Event Day Dummy	Event Day Dummyx2
Managed Care	-0.042	-0.053	-0.095	1.034	0.095	-0.030	-0.060
t-statistic	***-3.69	*-1.64	** -2.06	***31.47	***2.90	**_2.31	
Biotechnology	-0.019	0.014	-0.005	0.697	-0.069	-0.005	-0.009
t-statistic	-1.15	0.86	-0.29	***34.46	***_3.42	-0.60	
Pharmaceuticals	0.003	0.010	0.014	0.502	0.127	0.002	0.004
t-statistic	0.34	0.94	1.28	***46.1	***11.7	0.46	
Health Care Facilities	0.059	0.054	0.113	1.102	0.211	0.017	0.035
t-statistic	**2.16	**1.99	***4.14	***31.86	***6.08	1.28	
Health Care Distributors	0.011	0.013	0.024	0.537	0.106	0.005	0.001
t-statistic	0.73	0.88	1.62	***26.18	***5.18	0.59	
Health Care Equipment	-0.005	0.019	0.013	0.811	0.074	-0.001	-0.002
t-statistic	-0.33	1.06	0.73	***45.16	***4.11	-0.11	
Health Care Services	1.47	1.27	2.74	0.795	-0.002	0.010	0.020
t-statistic	1.47	1.27	2.74	***36.18	-0.11	1.17	
Health Care Technology	0.001	0.011	0.013	0.432	0.037	0.003	0.005
t-statistic	0.15	1.26	1.41	***48.37	***4.14	0.74	

Notes: This table reports the abnormal returns and t-statistics associated with sub-industry market-capitalization weighted portfolios following the Affordable Care Act Supreme Court Ruling. The t-stat for single event day abnormal returns is defined as $AAR / STDEV(R_t)$ where R_t is the daily returns of the portfolio over the estimation window. The t-stat for cumulative abnormal returns (CAAR) is defined as $[(1/\sqrt{2}) * CAAR] / [STDEV(R_t) * \sqrt{2}]$

Figure 2: Cumulative Average Abnormal Returns by GICS Health Care Sub-industry



Notes: The above graph depicts the cumulative average abnormal returns of health care stocks by sub-industry in the S&P 500 after the Supreme Court released its opinion on *National Federation of Business et al. v. Sebelius* on June 28, 2012. Managed Care Stocks had significant negative cumulative abnormal returns of nearly -8% after two days while Health Care facilities and hospital firms has positive cumulative abnormal returns of nearly 4% after two days.