Does Sector Reform Help or Hinder the Healthcare Industry?
Evidence from National Federation of Independent Business v. Sebelius

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Abstract

The consequences of the Patient Protection and Affordable Care Act (PPACA) for different subsectors of the Healthcare industry have been extensively debated since its passage. Using an event-study framework with daily closing stock prices around the time of the ruling’s release, this study exploits the unpredictable Supreme Court ruling in National Federation of Independent Business v. Sebelius to estimate its impact on individual subsectors of the Healthcare industry. Regression estimates find that the decision’s release is associated with abnormal losses of five percent per dollar invested in managed care firms and abnormal losses of one percent for pharmaceutical companies. The Health Care (HC) Facilities, HC Technology, and HC Equipment subsectors all experienced abnormal gains of one percent, while firms in HC Services experienced abnormal gains of six percent. Insurance providers participating in Medicare Advantage and Medicaid Managed Care experienced abnormal losses of four and three percent respectively. However, assigning the Supreme Court ruling an overall positive or negative healthcare industry impact is an unwise oversimplification, because controlling for firm market capitalization causes the observed impact to change direction entirely. This implies large and small firms in different healthcare industry subsectors had contrasting reactions to the ruling.
I. Introduction

On March 23, 2010, President Obama signed into law the Patient Protection and Affordable Care Act. This controversial reform intensified political polarization in Washington, D.C. and in state capitols across the country where the bill was favored by Democrats and staunchly opposed by Republicans. The Supreme Court undertook three separate lawsuits concerning the PPACA in an effort to settle the national debate. The court’s controversial ruling, released on June 28, 2012 exactly three months after arguments concluded, stated that the PPACA’s individual mandate to obtain healthcare insurance and outlined expansion of Medicaid were both legally valid. However, the ruling also stipulated that states should retain the right to accept or reject the Medicaid expansion without jeopardizing current Medicaid funding. Thus, while the individual mandate applies to all states, those rejecting the Medicaid expansion no longer forfeit preexisting federal funding. Nonetheless, many states remain skeptical of the federal government’s promise to financially support the expansion. As of March 2014, 21 states have decided against Medicaid expansion, while 26 states are moving forward with coverage expansions and three states remain undecided.¹

Although this ruling likely had potent implications for the Healthcare industry, upon initial examination, its impact is ambiguous. The duality of the Supreme Court decision, coupled with the multifaceted nature of health care, may affect different subsectors of the Healthcare industry in a variety of ways. Briefly, healthcare facilities and their equipment providers stood to gain from the upheld individual mandate and optional Medicaid expansion. Both aspects of the ruling theoretically increased the number of people with insurance, slashing uncompensated

¹ http://www.advisory.com/daily-briefing/resources/primers/medicaidmap
hospital treatment costs and boosting hospital attendance by insured individuals.\(^2\) When hospitals provide more compensated care, their equipment providers are sure to benefit as well. However, the ruling may have had more ambiguous effects on private insurance companies and pharmaceutical corporations. The individual mandate and Medicaid expansion cause private and public insurance programs to compete for the same growing constituency of uninsured individuals formerly ineligible for Medicaid.\(^3\) Additionally, Medicaid Managed Care and Medicaid Part D provide private insurance and pharmaceutical companies with financial investments in the public insurance sector, creating a convoluted situation difficult to reconcile on theory alone.

This study exploits the Supreme Court ruling within an event-study framework and employs regression analysis to estimate how financial markets viewed the Supreme Court ruling in different subsectors of the Healthcare industry. To measure the market performance of individual firms, I calculate abnormal returns per day per firm and then construct each firm’s cumulative abnormal return (CAR), which measures a firm’s performance during a specified event window around the ruling’s release. One CAR value per firm per event window is regressed on market sector dummy variables to measure the market performances of various industries.

There is a considerable precedent for event studies such as this measuring the financial impact of an unexpected event on different market sectors. Nobel laureate Eugene Fama and Kenneth French constructed a model known as the Fama-French Three Factor Model to facilitate asset pricing. Fama in particular is considered the progenitor of this brand of event study. He authored a publication (1969) that stipulated new information causes shareholders to

\(^2\) The Medicaid expansion will not be implemented in all states, so, in rejecting states, the individual mandate alone will theoretically have the same effect of increasing the number of insured people.

\(^3\) The “crowd-out” phenomenon common in public insurance expansions will be considered later.
immediately reevaluate future expected cash flows, thus deriving the crucial event study assumption that markets are “informationally” efficient.

Armed with this model and similar permutations, many economists have conducted event studies examining the impact of political events on particular industries. For example, Knight (2004) analyzed the impact of George W. Bush’s first presidential election victory on sectors of firms he dubbed “Bush-favored” and “Gore-favored”. Bush-favored firms, such as those in the tobacco industry, enjoyed gains of nine percent under the favorable Bush administration, while alternative energy firms and Microsoft competitors experienced drops in worth of over ten percent under the same administration. In a similar study, Ferri (2008) exploited the unexpected nature of President Bush’s 2004 presidential election victory to assess its impact on U.S. equity values. He found the election caused percentage increases in equity market indices for almost all industry groups. Ferri used these results to hypothesize elections can substantially influence share prices in unforeseen ways.

Although event studies have predominantly measured the impact of political events on asset prices, several economists have deviated from this trend, instead examining the impact of events directly related to a particular industry on asset prices in that industry itself. Harvard University faculty member Friedman (2009) estimated the impact of the legislative passage of Medicare Part D on pharmaceutical company profits by examining stock prices. He found that firms producing medications with high Medicare market shares experienced sharp profit increases following the bill’s passage. In what is undoubtedly the closest variant of this study, Miller (2011) employed an identical event study model to estimate the impact of Scott Brown’s surprise Senate election on healthcare subsector returns. The Republican Brown campaigned on a promise to prevent the PPACA’s further revision by Democrats in the Senate. His election
provided a crucial vote that broke the filibuster-proof Democratic Senate majority, and was thus thought to seriously hinder the PPACA. Miller found Brown’s election coincided with abnormal gains of six percent and three percent in the Managed Care and Pharmaceutical industries respectively, while health care facilities experienced abnormal losses of four percent. Miller also discovered that insurance companies participating in Medicare Advantage experienced abnormal gains of five percent, while firms affiliated with Medicaid Managed Care experienced abnormal losses of six percent. Miller’s study served as the primary inspiration for this analysis of the Supreme Court decision and its elicited healthcare industry market response.

This study finds that, following the Supreme Court ruling, managed care firms experienced abnormal losses of five percent for each dollar invested, while pharmaceutical firms experienced abnormal losses of approximately one percent per dollar invested. Firms in the HC Facilities, HC Equipment, and HC Technology subsectors all experienced abnormal gains of approximately one percent, while HC Services firms experienced a six percent abnormal return. Insurance firms participating in Medicare Advantage and Medicaid Managed Care are also shown to experience abnormal losses of four and three percent respectively. Because the ruling had unequal effects on different subsectors, assigning an overall impact to the entire Healthcare industry is both difficult and misleading. In fact, regressions reveal that abnormal losses in the relatively large Managed Care and Pharmaceutical industries outweigh the abnormal gains in almost all other healthcare subsectors, leaving the overall impact of the ruling on healthcare negative. However, without controlling for firm share of market capitalization, the overall impact on the Healthcare industry is positive, illustrating the inconsistency of healthcare sector-wide analysis. To verify model robustness, regressions focusing on shorter event windows...
demonstrate that the directions of healthcare subsector abnormal returns are generally consistent following the ruling’s release.

This paper proceeds as follows: Section II details the Supreme Court case and its theoretical implications, Section III describes the dataset, and Section IV presents the empirical model. Section V contains basic results, and Section VI provides intuitive explanations for coefficient estimates before Section VII concludes. All referenced figures and tables can be found in the Appendix.

II. Health Care Reform and National Federation of Independent Business v. Sebelius

A. Supreme Court Case Background

After the PPACA received congressional and presidential approval, many private firms filed suit in federal court claiming the law exceeded Congress’ legislative power. A total of 28 states challenged the legality of the PPACA, filing joint and separate lawsuits claiming the individual mandate was unconstitutional. Florida joined 25 other states in filing suit against the United States Department of Health and Human Services in the case Florida et al. v. U.S. Department of Health and Human Services. Judge Roger Vinson ruled that the individual mandate was unconstitutional, as such a mandate exceeded Congress’ power to regulate interstate commerce. The 11th Circuit Court of Appeals later upheld Judge Vinson’s decision, but also ruled that the individual mandate portion of the bill could be cleaved from the remainder, which could then be enacted without legal issue.4 Many concurrent regional cases simultaneously received disparate rulings, creating a growing sense of public uncertainty regarding the law’s constitutionality.

4 http://online.wsj.com/news/articles/SB10001424053111904006104576504383685080762
Eventually, on November 14, 2011, the Supreme Court granted certiorari to portions of three cases appealing the ruling from the 11th Circuit Court of Appeals. One appeal came from states in the case *Florida et al. v. U.S. Department of Health and Human Services*, another came from the federal government in the case *U.S. Department of Health and Human Services. v. Florida*, and a final appeal came from a private interest group in the case *National Federation of Independent Business v. Sebelius*. These three cases were thus rolled into one case entitled *National Federation of Independent Business v. Sebelius* that would serve as the landmark Supreme Court case determining the constitutionality of the PPACA.

Oral arguments were heard for two hours a day over three days from March 26 to March 28, 2012. The first day’s arguments centered on whether the Tax Anti-Injunction Act, which forbids hearing cases protesting tax collection immediately after legislative passage, barred a ruling before the PPACA was fully implemented in 2014. Neither party desired to adopt this position, which was ultimately argued by a private lawyer serving as amicus curiae. The second round of arguments addressed arguably the most crucial issue within the case, the individual mandate’s constitutionality. The final day’s arguments discussed the Medicaid expansion’s coercive nature and the issue of severability, or whether the individual mandate clauses could be severed from the rest of bill, which would be allowed to remain intact.5, 6

The Supreme Court ruling was released three months later on June 28, 2012. The majority opinion held that the Tax Anti-Injunction Act did not apply to this particular case, because the PPACA document itself defines the individual mandate as enforcing a “penalty” and not a “tax”. Although this implies Supreme Court judges may still consider the individual mandate as a form of taxation in a broader sense, the case was no longer susceptible to

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6 http://www.supremecourt.gov/docket/PPACA.aspx
cancelation under the Tax Anti-Injunction Act specifically. A 5-4 ruling dubbed the individual mandate a valid expression of Congress’ tax-related powers. A majority of the court also ruled that the expansion of Medicaid was unconstitutionally coercive, with different factions proposing various solutions. Dissenting Justices Scalia, Kennedy, Thomas, and Alito viewed the entire bill, including the expansion of Medicaid, as unconstitutional. Justices Sotomayor and Ginsburg, on the other hand, would have upheld the bill in its entirety, with the Medicaid expansion costing nonparticipant states all preexisting federal funding. Finally Chief Justice Roberts, joined by Justices Breyer and Kagan, ruled that the individual mandate was not unconstitutional, but that the Medicaid expansion required revision. They determined that states must be permitted to choose whether or not to accept the expansion without forfeiting all preexisting Medicaid funding. Thus the unconstitutionally punitive notion of Medicaid funding forfeiture was eliminated from the PPACA, granting states the right to reject the expansion without penalty. The individual mandate survived the case intact and valid to all states.\(^7\)

The ruling was made public at 10:00 AM EDT. Although the case received extensive media coverage, President Obama initially received inaccurate reports from CNN and Fox News claiming the individual mandate had been ruled unconstitutional.\(^8\) Despite its reputation as a leaky, gossiping town, Washington, D.C., the rest of the country, and the President himself seemed genuinely surprised by the outcome. The unexpected nature of the decision is a key ingredient for this study. The ruling was, in fact, such a surprise that multiple news stories emerged claiming Chief Justice Roberts had changed his opinion shortly before the final vote. He initially favored striking down the individual mandate as unconstitutional. However, pundits and academics state that his general philosophy of judicial restraint may have caused him to

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\(^7\) See [http://www.supremecourt.gov/opinions/11pdf/11-393c3a2.pdf](http://www.supremecourt.gov/opinions/11pdf/11-393c3a2.pdf) for the complete court document.

reconsider, as he resisted desperate attempts from his conservative colleagues to convert him back to his original stance.\(^9\)

The ruling did little to curb the rising tide of political polarization in Washington, D.C. and states across the country. President Obama was quick to praise the court’s decision, while conservatives vowed to repeal the PPACA by whatever means necessary. The division of states accepting and rejecting Medicaid expansion is drawn along heavily partisan lines.\(^10\) Democratic states generally accept the expansion, while Republican strongholds decline with skepticism. The ruling’s market effects, therefore, may exhibit regional variation. Firm location is unfortunately uncontrolled in the employed regression model. However, individual subsectors of the Healthcare industry will likely exhibit a variety of responses to the survival of the individual mandate and the elimination of coercive Medicaid expansion.

### B. Empirical Hypothesis

The duality of the Supreme Court ruling renders hypothesizing its broad economic ramifications a daunting task. Nonetheless, many prominent members of the media published articles interpreting the ruling shortly following its announcement. An editorial by economist Stephen Moore for the Wall Street Journal considered the ruling “an absurd and extraordinarily dangerous interpretation” of the Constitution that would cause unilateral economic decline in states accepting unsustainable federal funding.\(^11\) Concurrently, another Wall Street Journal article praised Justice Roberts’ controversial decision to partially rewrite the PPACA in order to save it from unconstitutionality, claiming the legislation would benefit the healthcare industry

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and consumers alike. Meanwhile, an editorial in the New York Times expressed ambivalence over the ruling, admitting uncertainty regarding its economic consequences and focusing instead on inevitable Republican resistance. On the Washington Post’s popular “Fact Checker” blog, Glenn Kessler downplayed the gravity of the PPACA as a massive tax increase, indicating the law’s tax ramifications would be comparable to those of President Clinton’s 1993 tax hike.

Despite the media’s broad interpretation of the ruling, innocuously predicting its effects on specific healthcare subsectors may prove a useful exercise when later deciphering regression results. The following reasoning does not contain every conceivable piece of relevant information, but it provides broad predictions and inferences nonetheless.

One must first consider how a particular healthcare subsector is affected by the optional Medicaid expansion and the individual mandate, because the two events may elicit compounding or divergent market responses from the same industry. For example, the Managed Care industry predominantly contains health insurance providers. These insurers stand to gain customers from the PPACA’s implementation. The individual mandate will compel the previously uninsured to seek coverage, augmenting commercial insurance client bases. All the while, several major insurance companies provide care for public insurance recipients through Medicaid Managed Care, meaning they may benefit from the Medicaid expansion as well. However, Medicaid expansion may draw some privately insured citizens away in favor of the newly available public option as chronicled by Gruber and Simon (2008). They estimate that, despite measures aimed at reducing crowd-out, half of previous Medicaid expansion beneficiaries previously had private

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12 http://online.wsj.com/news/articles/SB100014244527023040584045774944000059173634
15 Gruber and Simon found that this phenomenon, known as “crowd-out”, has occurred following several large Medicaid expansions that took extreme measures to prevent it. Enforced waiting periods, like those outlined by the PPACA, have shown little promise curbing crowd-out in these previous Medicaid expansions.
insurance and were not intended coverage recipients. If the crowd-out effect is large enough, the theoretical deluge of new customers from the individual mandate may never come, leaving private insurance companies with less private insurance business and more Medicaid Managed Care revenue. Because commercial insurance profit per client exceeds federal capitations paid to firms participating in Medicaid Managed Care, insurance company profit decreases when crowd-out is large.\(^\text{16}\) If crowd-out is not large, the individual mandate will bolster commercial insurance client bases while Medicaid Managed Care business rises as well, increasing managed care firm profit. The Supreme Court ruling’s impact on managed care firms is thus tied to the magnitude of crowd-out.

The Pharmaceutical industry may exhibit a similar trend. The individual mandate could entice the previously uninsured to purchase prescription medication through physician visits covered by their new insurance. On the other hand, the Medicaid expansion may be undesirable for drug companies if they receive less compensation per prescription from public insurance than private insurance. Pharmaceutical companies participating in drug rebate programs may fall under this description, because they provide rebates to federal and state governments in exchange for Medicaid and Medicare including their medications.\(^\text{17}\) However, if Medicaid expansions increase the number of people purchasing medication sufficiently, the decrease in profit per capita may be offset. Therefore, the fate of pharmaceutical companies is somewhat tied to that of managed care firms. On the other hand, hospitals and other health care facilities will likely gain from the Supreme Court ruling, because most hospitals absorb significant amounts of uncompensated charity care. In 2011, hospitals reportedly absorbed $41.1 billion in unpaid care


\(^{17}\) http://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Benefits/Prescription-Drugs/Medicaid-Drug-Rebate-Program.html
costs that are currently rising while the number of hospitals simultaneously falls.\textsuperscript{18} These facilities will treat more insured patients due to the individual mandate and Medicaid expansion, boosting their revenues.\textsuperscript{19}

The effects on other healthcare subsectors supporting these facilities are easier to predict. The Health Care Equipment and Supplies industries, alongside their counterparts in biotechnology and technology, indirectly support care facilities. These subsectors receive compensation from hospitals purchasing their products, and since hospital compensation should increase from the ruling, facility-supporting subsectors should also benefit. Health care supplies and equipment manufacturers, for example, provide their goods to public and private hospitals alike, and do not differentiate between the privately and publicly insured to the extent that pharmaceutical firms do. They can therefore be expected to gain from the Supreme Court ruling that increases the number of insured people to a varying degree. As long as at least some of the formerly uninsured receive coverage and crowd-out is not universal, the bill essentially acts as a unilateral client increase for firms with minimal contact with the insurance industry.

Hypothesizing the ruling’s impact on firms participating in Medicare Advantage and Medicaid Managed Care may prove more difficult. Firms participating in Medicare Advantage may lose from the ruling if the volume of seniors eligible for Medicare and Medicaid increases substantially. The new dual eligible population may begin patronizing firms participating only in Medicaid Managed Care, decreasing Medicare Advantage firm revenue. However, there are currently only 9 million dual eligible seniors, so this effect could be minimal.\textsuperscript{20} At first glance, firms linked with Medicaid Managed Care should gain from the program’s widening threshold of

\textsuperscript{18} http://www.forbes.com/sites/brucejapsen/2013/01/07/unpaid-hospital-bills-rise-to-41-billion-annually/
\textsuperscript{19} Both private and public health care facilities are included in the HC Facilities subsector. The individual mandate and Medicaid expansion should therefore have a unilateral impact of decreasing uncompensated care and increasing profits. Even if crowd-out occurs, certainly some of the previously uninsured will receive coverage and increase compensated health care facility use.
\textsuperscript{20} http://kff.org/tag/dual-eligible/
eligibility. However, these firms receive capitations from the federal government that are smaller than commercial premiums. They will theoretically lose privately insured clients and gain managed care patients as inevitable crowd-out ensues. Increased federal capitations may not cover the revenue lost from commercial insurance premiums, causing overall profit to drop. Firms participating in Medicaid Managed Care may also have initially calculated expected revenues by assuming the Medicaid expansion would occur in all states. The ruling, however, seriously cut these expected revenues by permitting states to decline the expansion. Therefore, Medicaid Managed Care firms could potentially lose from the Supreme Court ruling.

III. Data Description

This study employs daily return data describing 3,512 firms in the S&P Total Market Index. Daily firm returns, overall portfolio returns, Fama-French model parameters, and risk free interest rates are all obtained from the Center for Research in Security Prices (CRSP) database. Data availability restrictions require the daily return on three month Treasury Bills to substitute for the risk free interest rate, a decent approximation by most accounts. Firm closing bids and volumes of shares outstanding are also downloaded for market capitalization calculations.

To obtain as many observations as possible, I use almost the entire CRSP database of firms. The database’s firm list is merged with a total constituent manifest from the S&P Total Market Index website, eliminating firms registered in CRSP but not in the index and vice versa. Constituent manifests describing the Healthcare, Industrial, Consumer Staple, and Financial sectors of the S&P Total Market Index are also available online and merged with the CRSP firm list, identifying firms as belonging to broad market sectors. A total of 3,165 firms are unclassifiable, meaning they do not belong to any available constituent list on the S&P Total

21 http://www.princeton.edu/~achaney/tmve/wiki100k/docs/Risk-free_interest_rate.html
Market Index website. Merging the Healthcare industry constituent manifest with the firms listed in the CRSP database identifies 217 firms as healthcare players.

In order to observe the impact of the Supreme Court ruling on subsectors of the Healthcare industry, further classification amongst identified healthcare firms is necessary. The specific characteristics of each firm are manually researched on Yahoo Finance to ascertain its place amongst subsectors within the Healthcare industry. Each of the 217 firms classified as healthcare industry members are thus partitioned into the more specific industries of Health Care (HC) Distributors, HC Technology, Biotechnology, Managed Care, Pharmaceuticals, HC Equipment, HC Facilities, and HC Supplies. Managed Care and HC Facilities contain insurers and hospitals respectively. Research laboratories are classified as HC Facilities as well. Some firms are also labeled as participating in the Medicaid Managed Care or Medicare Advantage programs. Searching these keywords in Google Finance provides lists of firms belonging to these two categories.

Because the Supreme Court ruling was publicized on June 28, 2012, a seven-day event window ranging from June 26 to July 2 presumably contains a majority of the ruling’s immediate market effects. However, the event window is effectively only five days long, because markets were closed for weekend days June 30 and July 1, leaving no data available. The event window’s effective five-day length is motivated by Miller’s study that observed fluctuations in speculative markets to ascertain the perceivable beginning of reactionary activity to Brown’s election. Without access to these subscription-based markets, this study assumes Miller’s event window is of appropriate size. The length of the event window can be shortened to observe only immediate market reactions, and to test for reaction consistency throughout the window as well.
IV. Empirical Model

This study employs a regression-based event study model in tandem with the Fama-French Three Factor model to analyze the impact of the Supreme Court ruling on healthcare industry returns. The Fama-French model predicts individual firm-level returns on any given day, incorporating two risk factors and the difference between firm and overall market returns into the estimation. These two risk factors influence equity returns, where one addresses return discrepancies between firms with small and large market capitalization and the other addresses return discrepancies between firms with high and low book-to-market value. The former is termed the “SMB” or “small minus big” factor, while the latter is the “HML” or “high minus low” factor. These factors vary by day and are available on the CRSP database. The SMB term usurps effects related to the historic excess return on portfolios containing small market capitalization stocks compared to those investing in large market capitalization firms. The HML term captures the historic excess return of high book-to-market stocks over that of low book-to-market stocks.

The model involves a series of estimations that ultimately derives the regression of interest. First, an equation linking the two differences between firm return and the risk free interest rate and market return and the risk free interest rate takes the following form:

\[ R_{it} - R_{ft} = \alpha_i + \beta_{3i}(R_{mt} - R_{ft}) + \beta_{5i} \cdot SMB_i + \beta_{6i} \cdot HML_i + \epsilon_{it} \]  

Eq. (1)

where \( R_{it} \) is the daily total return rate for firm \( (i) \) on day \( (t) \), \( R_{mt} \) is the total return to the S&P 500 Index on day \( (t) \), \( R_{ft} \) is the risk free interest rate as approximated by the return on three month Treasury Bills on day \( (t) \), \( SMB_i \) is the Fama-French “small minus big” factor on day \( (t) \), \( HML_i \) is the Fama-French “high minus low” factor on day \( (t) \), and \( \epsilon_{it} \) is the error term for firm \( (i) \) on day \( (t) \).
The coefficient estimates from the ordinary least squares of Eq. (1) are then used to compute the abnormal return \( (AR) \) of firm \( (i) \) on day \( (t) \) via Eq. (2).

\[
AR_{it} = \left( R_{it} - R_{ft} \right) - \left( \hat{\alpha}_i + \hat{\beta}_1 \left( R_{mt} - R_{ft} \right) + \hat{\beta}_2 \cdot SMB_i + \hat{\beta}_3 \cdot HML_i \right)
\]

Eq. (2)

Having now computed one abnormal return per day per firm, a firm’s daily cumulative abnormal return can be computed via the following expression:

\[
CAR_t = \left[ \prod_{t=1}^{T} \left( 1 + AR_{it} \right) \right] - 1
\]

Eq. (3)

Thus, each firm can have a total of five CAR values, one for every possible event window length ranging from one day to five days. Regressions of the following form:

\[
CAR_t = \alpha_1 + \sum_{j}^{J} \beta_j D_{ji} + \sum_{k}^{K} \gamma_k x_{ik} + \epsilon_i
\]

Eq. (4)

employ CAR values characterizing the entire five-day event window. CAR values for event windows shorter than four days are graphed only and not used in regressions. In Eq. (4), \( D_{ji} \) are a series of sector- or subsector-level dummy variables describing firm \( (i) \), while \( x_{ik} \) are a series of individual level controls and \( \epsilon_i \) is a firm-specific error term.

Because the regression in Eq. (4) examines individual firms, regression coefficient estimates should be interpreted as the market impact of the Supreme Court ruling on a randomly chosen firm. This regression does, however, leave firm size uncontrolled. Return data for small firms can exhibit excessive noise. Therefore, to avoid the contamination of regression coefficient estimates by these fluctuations, efforts to control for firm size were undertaken. In addition to running Eq. (4) as described, regressions of the same form are weighted by individual firm share of overall market capitalization. Market capitalization is the product of a firm’s volume of shares outstanding and closing bid, meaning it is basically the value of a company’s publicly held stock.
These values for different firms can be summed by day to obtain a daily overall market capitalization value, which can then divide individual firm values to create dimensionless firm shares of market capitalization. Regressions can be weighted by raw market capitalization or by share of market capitalization interchangeably.

Although each firm does have one share of market capitalization value per day, the values for each firm over the entire event window are quite similar. Therefore, share of market capitalization values are averaged over the entire event window for each firm and then used as regression weights. These regressions that control for firm size produce coefficients reflecting the impact of the Supreme Court decision on an average dollar invested in the stock market, rather than in an average firm.

Despite controlling for firm size, there remain a number of assumptions that must hold in order for Eq. (4) to produce unbiased results reflecting the direct impact of the Supreme Court decision on stock prices. The most obvious of these is the efficient market hypothesis which claims that markets are “informationally” efficient, acting on information immediately after receiving it. More specifically for this study, the Supreme Court ruling must have been unknown to the public prior to its public revelation. Therefore, traders could not incorporate the ruling into valuations before it was made public on June 28. Another critical assumption relates to other industry trends, namely that no other major events with the potential to impact abnormal returns occurred during the event window. The final assumption states that the Supreme Court decision must have affected health care reform only, and not other uncontrolled legislative or market events, especially those capable of influencing health care reform.

The efficient market hypothesis appears to be an accurate assumption. A highly publicized event like this landmark case was certainly followed by investors and traders alike.
Upon the revelation of the ruling to the public, traders would have immediately begun shedding or hoarding stocks perceived to lose or benefit from the decision respectively. The ruling was a surprise to investors, stock traders, and the whole nation as well. Therefore, the assumption that predictions did not influence share prices prior to the ruling’s announcement also appears sound. It does, however, remain difficult to control for secular market trends, considering the inherent diversity of firms and industries present in the S&P Total Market Index.

Additionally, although the Supreme Court ruling may have primarily influenced stock prices for firms directly or tangentially related to the Healthcare industry, it may have had cascading consequences as well. Other market sectors associated with healthcare firms could bet on the ruling and act accordingly in the stock market. Any informed owner of healthcare industry stock could buy or short sell shares in anticipation of the ruling. The interconnected nature of firms renders the probability that the Supreme Court ruling only affected healthcare firms relatively low, but such activity is both difficult to control and minimal in other market sectors.

V. Results

Figures 1 and 2 depict CAR trends by event window day for different large market sectors and healthcare subsectors respectively. Figure 1 demonstrates that, following the revelation of the ruling to the public, the Healthcare industry’s CAR continued growing before plateauing two days after the release. However, the graph appears to form a linear trend between two days before the ruling and one day after, a concerning development indicating the ruling may have had no impact on healthcare stocks or that the ruling was accurately foreseen. If the latter is true, this bodes poorly for this event study which adamantly requires the ruling be

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22 As previously discussed, President Obama himself initially received inaccurate information from Fox News and CNN claiming the individual mandate had been ruled unconstitutional.
unexpected. However, this upward trend is also misleading, because the Healthcare sector is comprised of multiple subsectors that may have reacted differently to the ruling’s release, rendering the steady healthcare curve in Figure 1 a coincidental amalgamation unworthy of skepticism at this point. These CAR values also do not account for firm size, unrealistically considering CAR values from all firms with equal weighting. On the other hand, should healthcare subsector CAR trends in Figure 2 exhibit similar tendencies to the Healthcare industry curve in Figure 1, this study’s findings will be dubious.

Figure 2 displays CAR values by day for different subsectors of the Healthcare industry, which, as suspected, boast a variety of responses to the ruling. Only Healthcare subsectors with significant CAR changes during the event window are graphed. Managed care CAR dramatically drops following the announcement, while the HC Facilities and Biotechnology industries experienced steady gains. Other industries, such as the Technology industry, experienced mild gains from the ruling’s release. The variety of subsector responses present in Figure 2, and their manifestation between the day before the ruling (Day -1) and the day of the ruling’s announcement (Day 0), somewhat assuages the fears generated by Figure 1.

Figure 3 graphs the CAR values of the same large sectors of the economy as Figure 1, but the CAR values have now been weighted by firm share of total market capitalization. This effectively controls for firm size. This graph starkly contrasts with its earlier counterpart in Figure 1. The Healthcare industry curve now appears completely flat prior to ruling’s announcement and declines shortly thereafter. The clear trend discontinuity before and after the ruling’s release indicates the ruling came as a surprise to investors. Although the healthcare curves in Figures 1 and 3 appear irreconcilable, characteristics from Figure 2 can help explain the discrepancy. Because the CAR values of only the Pharmaceutical and Managed Care
industries are negative after Day 0 in Figure 1, it is likely these two industries possess disproportionately large shares of market capitalization. This provides their negative CAR values with greater influence when all healthcare CAR values are weighted by market capitalization. Figure 4 confirms these suspicions. The Pharmaceutical industry’s share of market capitalization is much larger than those of other subsectors of the Healthcare industry. The Managed Care industry also possesses an abnormally large share of market capitalization. These characteristics, coupled with the two subsectors’ negative CAR values in Figure 2, drag the entire weighted healthcare industry curve down when controlling for firm size. While this trend in Figure 3 is more accurate than its counterpart in Figure 1, it should still be interrupted with caution. As demonstrated in Figure 2, healthcare subsectors have already been shown to react differently to the ruling’s announcement, so classifying the ruling as detrimental to the Healthcare industry from Figure 3 alone is an oversimplification. The true value of Figure 3 stems from the flat Healthcare and Overall Market curves between Day -2 and Day -1. Controlling for firm size, market activity was relatively uneventful and without preexisting trends prior to the ruling’s release, implying abnormal market activity thereafter is purely reactionary to the ruling.

In Figure 5, the most heavily weighted healthcare subsectors, pharmaceuticals and managed care, have the most negative CAR values. Most other subsectors exhibit little change throughout the event window. The HC Services industry is one exception, experiencing significant gains after the ruling’s announcement. HC Technology also maintains a relatively stable, positive CAR throughout the event window. Unsurprisingly, these industries possess miniscule shares of market capitalization as shown in Figure 4, so they have little influence on the overall healthcare industry curve in Figure 3.
Table 1 presents results from both free and weighted regressions of five-day CAR values on different market sector and healthcare subsector dummy variables. Column (1) regresses firm CAR values on covariates identifying healthcare and financial firms only, while Column (2) controls for more broad sectors of the economy. Both reveal positive abnormal returns of one percent in healthcare industry stocks during the event window. Unfortunately, the Financial and Consumer Staples sectors experienced significant changes as well, indicating the ruling may have affected other industries. However, both of these significant abnormal returns are less than one percent, indicating they may result from random fluctuations. Column (3) regresses firm CAR values on dummy variables indicating healthcare industry subsectors, again controlling for broad sectors of the economy. Managed care firms experienced abnormal losses, while firms involved in the HC Services, HC Equipment, Biotechnology, and HC Facilities industries all experienced positive abnormal returns.

Columns (4) through (6) involve the same regressands and covariates as the earlier respective regressions, but are now weighted by firm shares of market capitalization. Controlling for other sectors of the economy, the coefficient estimates in Column (5) confirm the phenomenon seen in Figures 1 and 3. The coefficient estimate on the Healthcare industry is now negative, dragged down by the large shares of market capitalization in the Pharmaceutical and Managed Care industries. If pressed, one must consider the negative estimates in Columns (4) and (5) more accurate than those in Columns (1) and (2), because firm size is now controlled. The regression results in Column (6) show a statistically significant abnormal loss in the Pharmaceutical industry of one percent and abnormal gains of one percent for HC Technology firms. Managed care firms experienced abnormal losses of five percent, while HC Services firms experienced abnormal gains of six percent. All other significant subsector coefficient estimates
go the same direction as before in Column (3), aside from HC Equipment, which is no longer statistically significant. All control sectors also have statistically significant coefficient estimates, though they are small in magnitude. Coefficient estimates will be interpreted in the following section.

To examine the robustness of these results, I run the same six regressions again, this time with CAR values for a shorter four-day event window to check for sign and magnitude consistency. If the market effects of the ruling are steady, the signs on coefficient estimates should be the same for a four-day event window as they are for a five-day event window. The magnitudes of the estimates, however, should be somewhat smaller given the shorter window length and presumption of direction consistency. The regression results are presented in Table 2. In Columns (1) through (3), statistically significant coefficient estimates are of the same sign as their counterparts in Table 1 and of generally smaller magnitudes as well. Weighted regressions in Columns (4) through (6) are also consistent with earlier weighted regression results. The Managed Care and Pharmaceutical fields remain the only healthcare subsectors with statistically significant negative abnormal returns during the event window, while others remain positive.

The effects of the Supreme Court ruling on firms affiliated with Medicaid Managed Care and Medicare Advantage are also of interest. Regressions in Table 3 delve into this relationship, regressing five-day CAR values on covariates identifying firms as participants in Medicaid Managed Care and Medicare Advantage. Firms involved with Medicare Advantage experienced negative abnormal returns of four percent, while those linked with Medicaid Managed Care experienced abnormal losses of three percent.
VI. Discussion and Interpretation

The signs of statistically significant coefficient estimates in Columns (3) and (6) of Tables 1 and 2 are consistent across corresponding regressions and covariates. This is an encouraging result, because weights and window lengths should not change the direction of healthcare subsector abnormal returns. This consistency simplifies interpreting CAR trends following the ruling’s announcement. The magnitudes of corresponding coefficient estimates are slightly larger in Table 1 than Table 2, indicating the orientation of healthcare subsector reactions to the ruling were consistent at least two days after the ruling’s announcement.

The coefficient estimates on overall healthcare sector covariates warrant little interpretation, because they are simply the amalgamation of the fluctuations of many different subsectors. The healthcare coefficient estimates in Columns (1) and (2) of Tables 1 and 2 are positive because more sectors, and therefore more firms, are experiencing abnormal gains than losses. Because these regressions are not weighted, the fact that the subsectors with declining CAR values have much larger market capitalizations is of no consequence. When controlling for firm size, the surprise Supreme Court ruling had a significant negative impact of less than one percent on the Healthcare industry, as shown in Columns (4) and (5) of Table 1. This one percent decline is a combination of weighted subsector coefficient estimates, the most powerful of which are the negative managed care and pharmaceutical trends.

Covariates in Columns (3) and (6) of Tables 1 and 2 corroborate that the Managed Care and Pharmaceutical industries stand to lose from the Supreme Court ruling. Investors and private insurance companies expect Medicaid expansions will draw clients away from the private market in favor of the public option, decreasing profits via Gruber and Simon’s inevitable crowd-out. Despite the waiting period, these people see no incentive to continue paying for private insurance
once the more affordable public option becomes available to them. Insurance companies therefore believe that the individual mandate will not translate into enough new clients to compensate for those leaving for Medicaid. In addition to crowd-out, investors may theorize the individual mandate will cause the formerly uninsured to enroll in expanded Medicaid and largely neglect private options advertised in exchanges.23

The Pharmaceutical industry experiences abnormal losses of approximately one percent as a result of the ruling. Upon initial examination this may seem bizarre, as the individual mandate and Medicaid expansion will provide some of the previously uninsured with opportunities to obtain prescription drugs via covered physician visits. More business should therefore create more profit for pharmaceutical companies. However, the PPACA also states that pharmaceutical firms must generate $80 billion in savings over the next decade in return for a pledge of no future federal regulations. The bill also contains clauses eliminating over-the-counter drug reimbursements to firms using certain payment structures. Rebates to Medicaid participants will increase as well.24 These effects must, to investors, override the positive development of a larger insured population to create an overall negative impact on the Pharmaceutical industry. Also, overall pharmaceutical profits could still fall if crowd-out ensues and dwindling private insurance medication payments dwarf their public insurance counterparts by a sufficient amount.

The coefficient estimates in Columns (3) and (6) of Tables 1 and 2 also indicate that HC Facilities, HC Supplies, HC Equipment, Biotechnology, and HC Technology stand to gain from the ruling. All of these subsectors are intricately linked with health care practice, since hospitals

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23 This reasoning applies to states accepting Medicaid expansions where crowd-out is possible. In states not expanding Medicaid, a majority of the uninsured population may be expected to pay penalties rather than obtain private insurance, meaning the individual mandate will not augment private insurance client bases or profits.

24 http://content.time.com/time/politics/article/0,8599,1915139,00.html
require technology, equipment, and supplies. The individual mandate, and Medicaid expansion where applicable, will lead to the coverage of formerly uninsured recipients of hospital charity care. Once this demographic receives some form of coverage, hospitals will receive larger amounts of compensation for previously uncompensated care. To accommodate a larger insured population, facilities will require the increased purchase of healthcare services, equipment, and supplies. Because studies have demonstrated a natural human propensity to abuse free medical insurance, investors may also believe that expanded Medicaid will cause all hospital equipment and technology to experience more frequent use per person. These supplies and equipment will require replacements to the delight of equipment manufacturers.

Ideally, the coefficient estimates for control sectors would all be statistically insignificant. This would indicate that the Supreme Court ruling’s announcement was the only piece of noteworthy news during the event window. While some control sector coefficient estimates are statistically significant, they are never larger than one percent with the exception of the Consumer Staples sector. Therefore, these statistically significant abnormal returns may be mood-related spillover from the gains of many healthcare subsectors. Small firms also exhibit notoriously noisy return data, which could occasionally accumulate to produce statistically significant results.

The coefficient estimates generated by regressions with Medicaid Managed Care and Medicare Advantage covariates are less intuitive upon initial examination. Table 3 shows the Supreme Court ruling caused abnormal losses of three percent for Medicaid Managed Care firms. Insurance providers involved with Medicaid Managed Care would prefer Medicaid expansion in all states, not in approving states only. These companies originally expected the

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25 Baicker (2013) monitored physician visits and preventative care usage following the expansion of Medicaid in Portland, Oregon. She found coverage recipients frequently patronized services they formerly paid out-of-pocket or avoided outright. Her findings corroborate those of the famous RAND health experiment.
Medicaid expansion to occur everywhere, and the Supreme Court’s ruling, which permitted states to choose whether or not to accept the expansion, diminished expected profits severely.\textsuperscript{26} Heavily Republican states are rejecting the Medicaid expansion on grounds that the federal government cannot be trusted to continue funding the program’s rising costs into the distant future. These states are essentially lost expected revenue for firms participating in Medicaid Managed Care, causing CAR values to decline.

Explaining the observed abnormal losses of four percent to Medicare Advantage firms is more difficult. Medicare and Medicaid serve different demographics, and are generally not competitors for the same patients. However, low-income elderly populations are dual eligible. If this population grows by a sufficient amount in states accepting Medicaid expansion, it may explain the three to four percent loss for Medicare Advantage firms. Investors in private firms accepting Medicare Advantage patients will anticipate a loss in clientele when more senior citizens become dual eligible and patronize firms associated with Medicaid Managed Care instead. Insurance providers participating in both public programs will lose as well, because Medicaid typically compensates care providers 33\% less than Medicare.\textsuperscript{27}

VII. Conclusion

This study examines the impact of the Supreme Court ruling in the case \textit{National Federation of Independent Business v. Sebelius} on different facets of the Healthcare industry. Under the realistic assumption that the ruling was unknown to the public prior to its release on June 28, 2012, a model regressing CAR values during an arbitrary event window on healthcare

\textsuperscript{26} Theoretically, insurance companies participating in Medicaid Managed Care favor unilateral Medicaid expansion because it helps them corner more of the market as well. If universal Medicaid expansion is struck down, insurance companies participating in Medicaid Managed Care must compete with all insurance companies to insure people responding to the individual mandate. If the expansion is upheld, managed care firms face much less competition amongst the smaller number of firms participating in Medicaid Managed Care.

\textsuperscript{27} http://kaiserfamilyfoundation.files.wordpress.com/2013/01/8398.pdf
subsector covariates estimated the effect of the judicial decision on various industries. It remains plausible that other uncontrolled events during this event window influenced stock prices and thus regression estimates. However, regressions revealed that abnormal returns to controlled sectors of the economy were moderate. Given the extensive media coverage surrounding the ruling’s release, it remains likely that the announcement was, at the very least, the most influential piece of news on June 28, 2012 concerning healthcare. This paper relies heavily on the efficient market hypothesis, which generally applies, and also highlights the diversity of market responses to significant events. Not only did various subsectors of the Healthcare industry react differently to the ruling’s announcement, but these divergent responses also generate different overall healthcare sector movements when weighted evenly or by shares of market capitalization.

Firms in the Managed Care and Pharmaceutical subsectors of the Healthcare industry are shown to consistently experience abnormal losses following the announcement of the Supreme Court decision. Although firms in both industries stand to gain from the upheld individual mandate, both also fear the expansion of Medicaid in accepting states will create strong crowd-out as privately insured populations take advantage of newfound Medicaid eligibility. It should be noted that both of these industries contain a substantially larger share of market capitalization than all other subsectors, meaning weighted regressions reveal the overall impact of the ruling to be negative for healthcare. In practice, the sign or magnitude of the ruling’s effect on the entire Healthcare industry should be deemphasized in favor of examining subsector-to-subsector outcomes. Almost all other healthcare subsectors are shown to gain from the ruling. Many of these subsectors benefit from the individual mandate and are less affected by the expansion of Medicaid in some states, meaning their profit gradients across insurance types are relatively
small due to limited insurance interactions. They may also occasionally perform uncompensated services, or fundamentally benefit from a larger insured population.

These effects, however, should not be viewed as changes to net societal welfare. This study only captures the immediate impact of the Supreme Court ruling on various subsectors within the Healthcare industry, using a rather small dataset as well. It does not capture the deadweight loss generated by increased political polarization in Washington, D.C., nor does it account for the geographic distribution of the dataset’s observed firms amongst states that are accepting or rejecting Medicaid expansions. Several years from now when the PPACA has been regionally implemented long enough to generate extensive data, it will remain very difficult to ascertain the bill’s net impact. Many researchers may attempt to exploit the state-by-state variation in Medicaid expansion to generate difference-in-differences models. Unfortunately, states denying and accepting the expansion are drawn along heavily partisan lines, meaning the two camps may also contain divergent preexisting healthcare trends that could be difficult to reconcile. Nevertheless, studies such as this will continue examining the PPACA and its holistic impact, many likely uncovering the same nuanced truths discovered here. Health care reform cannot be said to definitively condemn the private sector to extinction, nor can it be said to exclusively benefit the preexisting infrastructure. Per this study’s findings, health care reform actually generates benefits and losses in different subsectors of the healthcare industry that vary by insurance compensation and interaction.
VIII. References


IX. Appendix

Figure 1. Equally weighted CAR by event window day for the entire market, as well as the Healthcare, Industrial, Consumer Staples, and Financial sectors of the economy.

Figure 2. Equally weighted CAR by event window day for the entire market and different subsectors of the Healthcare industry.
Figure 3. Value weighted CAR by event window day for the entire market, as well as the Healthcare, Industrial, Consumer Staples, and Financial sectors of the economy. Note the flat Healthcare and Overall Market curves between Day -2 and Day -1 before the ruling’s announcement.

Figure 4. Shares of total market capitalization for each healthcare subsector.
Figure 5. Value weighted CAR by event window day for the entire market and different subsectors of the Healthcare industry.
### Table 1: Main Results

5 Day Event Window

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**Note:** Columns (1) to (3) contain estimates from equally weighted regressions of individual firm CAR on a variety of sector and healthcare subsector covariates over the five-day event window. Columns (4) to (6) contain estimates from regressions weighted by individual firm shares of total market capitalization. Covariates are dummy variables for firms classified in broad market sectors and healthcare specific subsectors. Coefficients, if multiplied by 100, represent abnormal returns in percent changes over the entire five-day event window. Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Table 2: Main Results (Continued)

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**Note:** Columns (1) to (3) contain estimates from equally weighted regressions of individual firm CAR on a variety of sector and healthcare subsector covariates over the four-day event window. Columns (4) to (6) contain estimates from regressions weighted by individual firm shares of total market capitalization. Covariates are dummy variables for firms classified in broad market sectors and healthcare specific subsectors. Coefficients, if multiplied by 100, represent abnormal returns in percent changes over the entire four-day event window. Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Table 3: Impact on Firms Participating in Government Programs

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Note: Columns (1) and (2) contain coefficient estimates from equally weighted and value weighted regressions of individual firm CAR on listed covariates over the five-day event window respectively. The covariates "Medicare Advantage" and "Medicaid Managed Care" are dummy variables for firms affiliated with the two government programs according to descriptions on Google Finance. Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.