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Health Care Reform and the Stock Market: Economic Impact, Growth Opportunity and Private Sector Investors

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ABSTRACT

Objective
To study the potential economic impact of the health care reform (PPACA) on business in the health care sector.

Data Sources
Financial statement data from Compustat and stock return data from CRSP.

Study Design
Firms are categorized into 12 industries including medical clinics, drug distributors, hospitals, insurers, medical product manufacturers, nursing homes, pharmaceuticals, etc. To study the PPACA's economic impact on the health care sector, we use the event study method and regression analysis to examine the excess stock returns caused by the Congress's passage of the PPACA in 2010 and the Supreme Court's upholding of the Act in 2012.

Findings
The market appears to support the Act in general and reacts positively to the health service business including hospitals, medical clinics, and specialty outpatient facilities.

Conclusions
For regulators who want to explore how to reduce the costs of public funding to health care, or for private investors who are considering entering the health care market, this result helps identify growth opportunities within the sector and the levels of interest that majority of investors have towards them.

I. INTRODUCTION

It has been widely recognized that reducing the growth of dependence on public funding in health care services is of center policy importance, with the rising cost of health care being a major concern for individuals, families, businesses, federal and state governments, and society as a whole.[1] However, enticing private investment in the health care sector that could dramatically reduce the dependence on government is still controversial.[2] This sector has been relatively insulated from the pursuit of profit that drives the rest of the U.S. economy during most of the 20th century. Today, there are more national hospital chains and pro-profit dialysis centers than there were twenty years ago.[3] Nonetheless, a comprehensive understanding of the possible impacts and consequences, both intended and unintended, on health care service firms and potential investment flows has remained elusive. This is the case, in large part, because whether companies will actually develop new strategies in response to the paradigm shift or investors will eventually deliver additional financial resources to the health care sector can only be known ex-post. Even with business survey data, however, it is difficult to evaluate the effects of long-term policy on firm and investor behavior, due to the heterogeneity, size, and uncertainly of the market.

In this paper we provide direct new evidence about what investors believe where the growth opportunities are, by taking advantage of the event study methodology to overcome the drawbacks of insufficient statistical power in small-sample survey studies. Event study is a statistical method to assess stock market responses to an economy-wide event or market shock, such as a regulatory change. The basic idea is to find the abnormal return attributable to the event being studied by adjusting for the return that stems from the price fluctuation of the market as a whole.[4] In this paper, the market shock is the Patient Protection and Affordable Care Act (henceforth referred to as the PPACA or the Act interchangeably,) which we will discuss in more detail later in this section.[5]

Health care spending in the US is projected to grow 6.2% annually from 2015 to 2021, reflecting the net result of the aging of the population, several provisions of the Affordable Care Act, and generally improving economic conditions. Such fast growth will place increasingly larger burdens on American households and the economy with each passing year. According to the Centers for Medicare and Medicaid Services (CMS 2011), total US health care spending will encompass

[1] Government spending on health care, mainly in Medicare, Medicaid, and CHIP, will represent 50 percent of total national health expenditures by 2020, according to the Centers for Medicare and Medicaid Services (CMS). At the same time, the prospects for the fiscal health of the U.S. government had turned negative. IMF predicts that U.S. government debt will equal 100% of its GDP by 2015. In 2011, all three major credit rating agencies, Fitch, Moody's, and Standard & Poor's, downgraded U.S. government debt. Beach and Tyrrell (2012) construct the Index of Dependence on Government and estimate that the dependence of health care and welfare on governmental spending grows by 13.1% in 2012.

[2] Andre and Velasquez (1988) discuss in detail the ethical implications of the growing commercialization of health care service. In a New York Times article, Porter (2013) argues that the private health care system in the U.S. delivers worse value for money than every other in the developed world. Specifically among hospitals, Sloan and Vraciu (1983) find that ownership (investor-owned versus not-for-profit) is a poor predictor of a hospital's willingness to treat low-income patients, costs to the community, and profitability. Horwitz (2005) suggests that neither the profit-making versus charitable divide (for-profit versus nonprofit and government) nor the public versus private divide (government versus nonprofit and for-profit) fully predicts medical service offerings.

[3] Robbins, Rudsenske, and Vaughan (2008) suggest that private equity investors have large amounts of equity capital to invest and they are actively pursuing opportunities in acute care services, labs, ambulatory care facilities, and clinical services that are subject to profitably increasing quality and lowering costs. They argue that that private equity is an important source of otherwise unavailable capital for innovation and represent a competitive force the change in health service markets.

[4] The logic behind the event study methodology is explained in Warren-Boulton and Dalkir (2001). Investors in financial markets bet their dollars on whether a policy will raise or lower prices of affected firms. A policy that raises market prices will benefit the firms and thus raise the prices for all their stocks. Conversely, the financial community may expect the negative impacts from the policy to be sufficiently large to drive down prices. In this case, the stock values of the affected firms fall more as the impacts are perceived more negative. Thus, evidence from financial markets can be used to predict what market believes who what firms will be benefited or harmed when the policy have been adopted but before being enacted.

[5] Specifically, there are two market shocks: the first one is the passage of PPACA in the congress on March 21, 2010, and the second one is the Supreme Court's decision to uphold PPACA on June 28, 2012.

19.6% of GDP by 2021, up from 17.9% in 2011 and 14.1% in 2001. The financial crisis of 2007-2009 has dampened funding for health care research and threatened the public financing to health service providers. Public health depends upon state financing to function and state and municipal services, commitments and other expenditures will continue to contract if we are remaining in the recession for too long; eventually governmental support for public health could become improbably. With soaring health care costs and the consequent additional burden on state finances, federal and state governments must actively encourage private-sector investment to relieve excessive dependence on public finances, improve the quality of treatment, and promote competition within the health care sector. The question is how to incentivize private sector investment.

For private sector investors, the growth potential of the sector is attractive; however, they will only commit investment towards a particular industry within the health care sector if the government can facilitate growth by identifying regulatory issues, removing outdated policies, developing new initiatives for this industry. In this paper we ask an intriguing research question: How can we identify the potential policy impacts or consequences? Specifically, we examine the reactions of financial market to the passage of the PPACA in the Congress and the Supreme Court's decision to uphold the Act, to see whether this health care reform strikes a chord with private sector investors.

Private Health care Sector

The private health care sector is very diverse, representing a broad range of for-profit businesses and not-for-profit organizations. Although it remains fragmented, rapid consolidation has occurred in recent years, resulting in the emergence of a more corporate health care sector. Investors and financial institutions, which should constitute the major financing sources for the health sector, often have limited knowledge of the opportunities and risks pertinent to the sector. As a result, health care organizations, particularly small and medium enterprises, have limited access to financing to expand and improve their operations.

The private health sector is growing steadily, even in the face of the broader economic downturn. For example in 2007, more than $1.2 trillion, or 54% of the total U.S. health care expenditures, was through private sector spending.[6] Altarum Institute (2011) reports that private sector health care employment in January 2011 reached an all-time high of 10.7% of the total employment in the United States, a 1% increase since the start of the recession in December 2007 when the employment share was at 9.5%. Across the country, people increasingly rely on private health care organizations to address their health needs.[7] This trend will continue due to the fundamentals that drive demand: population growth, increasing life expectancy, growing disease burdens, and patients' demand for treatment. However on the provider side, there are differences in the financing of health care providers and remuneration of doctors. For example, hospitals continue to consume the large portion of the health care dollar, according to Beallor (2002), but many private health care organizations such as ambulatory and community based health care providers remain underfinanced and constrained from achieving their full potential. As a result, the private health sector offers attractive returns to investors, and the challenge is to identify the growth opportunities within this sector.

[6] See Turner (2009).

[7] Back in the 1990s, Thorpe (1997) report that municipalities were busy converting the governance of their public hospitals from public to private. The number of public hospitals has decreased from 31% of all community hospital beds in 1980 to fewer than 27% of all beds by 1994. In Washington D.C., the District government shifted from directly providing health care to purchasing health care services from private providers, according to Meyer, Bovbjerg, Ormond, and Lagomarsino (2010), by closing down the General Hospital in 2001 and creating an insurance-like program that allows residents to access participating private health care providers.

While the health sector is diverse and growing, it is important for prospective investors to examine growth in the private health sector and specifically where it is occurring. The purpose of this paper aims to reveal growth potentials and to identify investment opportunities by examining the financial market reactions to the adoption of 2010 health care reform and its upholding by the Supreme Court in 2012.

Patient Protection and Affordable Care Act

Health care reform in the United States has a long history, of which the most recent results were two federal statutes enacted in 2010: the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act of 2010, which amended the PPACA. PPACA became law with President Obama's signature on March 23, 2010. On June 28, 2012, the U.S. Supreme Court preserved the individual mandate and upheld the constitutionality of the Act in a 5-4 ruling, with the notable exception that states can now opt out of Medicaid expansion. It represents the most significant transformation of the American health care system since Medicare and Medicaid. It is argued that Act will fundamentally change nearly every aspect of health care, from insurance to the final delivery of care. It is interesting to study how the stock market reacts to this lengthy and complex legislation related to the health care sector because the divisive and heated debates have led to massive confusion about the impact of the Act.

The PPACA introduces a comprehensive system of mandated health insurance with reforms designed to eliminate some of the worst practices of the insurance companies, such as pre-condition screening, large premium loadings, and annual coverage caps. It also encourages price competition by the creation of a web based health insurance exchange where consumers can compare prices and purchase plans. The system preserves private insurance and private health care providers and provides more subsidies to enable the poor to buy insurance, however, with the cost of regulatory burdens, potentially higher taxes down the road. Manchikanti, Caraway, Parr, Fellows and Hirsch (2010) suggest that the key issue is to control the drug and durable medical supply costs going forward.

The impact of this Act to the key players in this private health care sector could be mixed. On the one hand, private insurers could suffer from increased market competition. On the other hand, the number of customers purchasing health insurance from private insurers might increase due to the universal health mandate. The perceived major impact on hospitals and practicing physicians is the growing authority in association with further discounts in physician reimbursement. Physicians and hospitals may see reimbursement reduction by growing regulation; however, the number of patients visiting hospitals and clinics might increase simply because everyone will be insured under the mandate.[8] To test the hypothesis whether this Act will potentially benefit or harm the health care providers, insurers, pharmaceuticals, and other private companies in the health care sector, and to identify which industry within the sector will benefit from it, this paper examines the financial market's response to the passage and the upholding of the Act. If the stock price of a health care company in an efficient financial market reflects the collective judgment of investors, in other words, the long-term value or the growth potential of the company as suggested by the efficient market hypothesis in the finance literature, the price should rise with these two events if investors believe the company will eventually benefit from it.[9]

8 Kaiser Family Foundation (2010) provides a summary of the law, and changes made to the law by subsequent legislation, with focus on provisions to expand coverage, control health care costs, and improve health care delivery system.
9 See Fama (1970) for the Efficient Market Hypothesis.

The remainder of the paper is organized as follows. Section II reviews the relevant prior research. Section III presents the sample data and the empirical methodology. Section IV evaluates the results. Section V concludes.

II. RELATED LITERATURE

The last serious attempt of health care system reform was the Clinton Health Security Plan in 1993.[10] The resulting legislation of PPACA is a complex stew of changes in reforming the financing and improving delivery, and provisions that differ in the degree to which they are government-led or market-oriented. One of the most contentious points of debate about this Act was the role of regulation to the market.[11] Enthoven and Singer (1995) argue that health care coverage based on avoidance of risk does not encourage competition and that only competition will motivate physicians to offer high-quality care to patients, and hence market-based reforms are necessary. Herzlinger (2007) suggests the consumer-driven health care as one type of market-driven approach by allowing consumers to choose the innovators with their dollars, and the innovators take risks to satisfy consumers. These attempts reflect a faith that the market will work itself out for the benefit of the consumer when the system is restructured to encourage competition. PPACA does seem to inject competition into the system.

Critics of market-based reforms contend that this approach transforms professional ethics into commercial ethics, which places the interests of the seller, in this case the physician, the pharmaceutical, the insurer, etc., over and above the interests of patients and society at large (see Berenson and Cassel 2009.) Enthoven and Singer (1995) propose a system of incentives that encourages all actors to minimize costs without sacrificing quality care, rather than a free market, because a health care system is driven purely by market forces.[12]

However, it would be difficult to avoid disruption and uncertainties in the process of enacting reforms due to the massive scale of the health care delivery system. In a study of the economic impact of environmental regulation on firm innovation, Jaffe and Palmer (1997) present three distinct variants of the so-called Porter (1991) Hypothesis. Lanoie, Laurent-Lucchetti, Johnstone and Ambec (2011) provide empirical evidence that environmental regulation stimulates environmental innovations in a long run. Hinings and Greenwood (1988) claim that the inability to maneuver the uncertainties of implementing strategic change is a major obstacle for achieving intended outcomes. More recently, Hinings, Casebeer, Reay, Golden-Biddle, Pablo and Greenwood (2003) argue that change is more difficult the greater the degree of loose coupling between health care systems, organizations, and professions. However, the complexity of the health care delivery system also poses an opportunity for both old and new market players to innovate new products and services. (Ferlie, Pettigrew, Ashburner and Fitzgerald 1996)

Passage of health care reform was itself an unexpected event, given the variety of political and organizational forces arrayed against it. Steinmo and Watts (1995) suggest that existing institutional structure might be biased against comprehensive health insurance, whereas Barer (1995) argue that public health insurance is inefficient. Many existing papers have identified (or assumed) the health care reform as an exogenous shock to report the economic effects on insurance coverage (Cantor, Monheit, DeLia, and Lloyd 2012), Medicare Advantage plan and enrollment (Afendulis, Landrum, and Chernew 2012), and flexible spending accounts (Cardon, Moore, and Showalter 2012). Different to the previous studies, this paper examines the excess returns caused by the passage of the PPACA on March 22, 2010, and the Supreme Court's

[10] See Schroeder (1993) for more discussions about the 1993 health care reform proposed by President Bill Clinton.
[11] Blumenthal (1996) asks for the "competitive revolution" of health care, in terms of the ownership and financing of health care organizations.
[12] The Secure Choice plan in Luft's (2008) is an attempt.

decision to uphold the Act on June 28, 2012. This so-called "event study" method has been used widely in economics, finance, and accounting literature to estimate the impacts of monetary policy (see Dale 1993, Thornton 1998, and Thornton and Garfinkel 1995,) foreign exchange policy (for example, Catte, Galli and Rebecchini 1994, Dominguez and Frankel 1993, and Fatum and Hutchison 2003,) and tax policy as in Berger (1993), Cutler (1988), and Gilligan and Krehbiel (1988). The motivation of applying event study in policy research is that if the financial market is efficiency (Efficient Market Hypothesis), then stock prices represent rational assessments of fundamental values. The large event study literature rests on this premise. In the context of this paper, the hypothesis of market efficiency will help reveal some of the difficulties and opportunities faced by the health care sector. To our knowledge, this is the first paper to comprehensively examine the financial market's reaction to this health care reform. An important feature of the study is the comparison of investors' reactions in different industries of the health care sector.

III. METHOD AND DATA

We use the market model of Fama, Fisher, Jensen and Roll (1969) to measure these firms' stock returns. [13] To capture the effect of the event on stock *i*, we control for the normal relation between the return on stock *i* during the day *t*, R_{it}, and the return on a broad stock market index, the CRSP market portfolio, during day *t*, R_{mt}.

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

The coefficient $\beta_i = \mathrm{cov}(R_i, R_m) / \mathrm{var}(R_m)$ is the share of the return that can not be fully diversified. The excess return is then the residual, ε_{it}. This residual from the market model is used as an estimator of the abnormal return for stock *i* during the event day. This method removes the effects of economy wide factors from the return on firm *i*'s stock, leaving the portion of the return attributable to firm specific information, i.e., the error term in equation (1), which contains the effect of the passage of the health reform policy. The event date (*t*) is March 22, 2010, and the event window includes the day prior to the event date: (-1,0). We estimate the coefficient (β_i) using the returns from 255 days to 46 days prior the event date. The event period is purposely excluded from the period used to estimate the market model parameters; because Ball and Brown (1968) point out that if it is included, the coefficient estimates are biased as the disturbances which contain the effects of the event and related occurrences are not mean zero.

The estimator of the average abnormal return on day *i*, AAR_t, is defined as

$$AAR_t = \sum_{i=1}^{N_t} \frac{AR_{it}}{N_t} \quad (2)$$

where AR_{it} is the estimator of the abnormal return for stock *i* and is N_t the number of firms in the sample on the event date *t*. The estimates of the average abnormal returns are summed across days to measure the average cumulative effect on the sample securities of company specific information reaching the market from day t_1, to day t_2, where $t_1 = -30$ and $t_2 = +30$ as defined earlier. That is $CAR_{(t1,t2)}$, the estimator of the cumulative average abnormal return, is given by

$$CAR_{(t_1,t_2)} = \sum_{t=t_1}^{t_2} AAR_t \quad (3)$$

[13] Kothari and Warner (2007) provide a comprehensive survey on event study econometrics. Campbell, Lo, and MacKinlay (1996) have a careful and broad outline of key research design issues in event study.

As a robustness check, we also use the market-adjusted return to calculate the *CAR*. The market-adjusted return subtracts R_{mt} from R_{it}. This method is simpler than estimating market model abnormal returns because it is done in one step, rather than two. That is, when the market model is used, parameters are estimated in the first step and abnormal returns are estimated during the event period in the second step. When the market-adjusted return is used, no statistical parameters are estimated. However, its abnormal return estimators have considerably greater variance than the market model disturbances according to Chandra, Moriarity and Willinger (1990), and the abnormal return estimates are generally biased.

To test the hypothesis that the market price response to the passage of PPACA is smaller for stocks with sophisticated institutional holdings, we run the following cross-sectional regression:

$$CAR = \beta_0 + \beta_1 Log(Asset) + \beta_2 M2B + \beta_3 Leverage + \beta_4 Capex + \beta_5 PPS + \beta_6 RoA + \beta_7 R\&D + \beta_8 IO + \beta_9 HealthcareFocusedIO + FE(Time) + FE(Industry) + \varepsilon \quad (4)$$

where CAR is the cumulative abnormal return in the event widow (-1,0), M2B is market to book value, Capex is capital expenditure, PPS is pay-for-performance sensitivities for all employees, RoA is return on asset, R&D is research and development expenses divided by total asset, IO is the stock ownership by large financial institutions, and Health careFocusedIO is the ownership by financial institutions only investing in health care-related stocks. We conduct OLS regressions with and without the fixed effects of time and industry and use clustered robust standard errors to estimate the t-statistics for coefficients. To control for the outliners, we also run median regression using the same set of control variables.

The firm sample includes all U.S. health care-related companies in Compustat/CRSP databases. These companies include medical clinics, drug wholesalers and retailers, hospitals, insurers, medical product manufacturers, nursing homes, pharmaceuticals, etc. See the Section B of Table 1 for the complete list of SIC codes.

Table 1. Summary Statistics and Standard Industrial Classification (SIC) Codes

Section A. Variable Definition and Summary Statistics

Variable	Name	Definition	Mean	Standard Deviation
lat	Log Asset	log(total asset)	5.80	2.29
m2b	Market to Book	(price x shares)/book equity	3.31	3.19
lev	Leverage	total asset/book equity	2.21	1.78
capx	Capital Expenditure	capital expenditure	0.0256	0.0263
pps	Pay-for-performance sensitivities	(employee stock+options)/total shares outstanding	0.146	0.0954
roa	Return on Asset	net income / total asset	-0.0736	0.313
rd	R&D	research & development expense / total asset	0.105	0.1676
ch	Cash	cash / total asset	0.317	0.271
lio	Large Institutional Ownership	Stock ownership by top-quartile institutions[14]	0.453	0.329
hio	Health care-specialized Institution Ownership	Stock ownership by top-quartile health care-specialized institutions[15]	0.102	0.101

[14] Financial institutions are ranked by the market values of stock holdings.
[15] Financial institutions are ranking by the market value of investments in health care sector based on the SIC codes in Section B.

Section B. 4-digit SIC Codes

The Standard Industrial Classification Codes that appear in a company's disseminated EDGAR filings indicate the company's type of business. Industrial companies of the following 4-digit SIC codes are included in the sample.

4-digit SIC Code	Industry Name
2833	MEDICINAL CHEMICALS & BOTANICAL PRODUCTS
2834	PHARMACEUTICAL PREPARATIONS
3841	SURGICAL & MEDICAL INSTRUMENTS & APPARATUS
3842	ORTHOPEDIC, PROSTHETIC & SURGICAL APPLIANCES & SUPPLIES
3844	X-RAY APPARATUS & TUBES & RELATED IRRADIATION APPARATUS
3845	ELECTROMEDICAL & ELECTROTHERAPEUTIC APPARATUS
3851	OPHTHALMIC GOODS
5122	WHOLESALE-DRUGS, PROPRIETARIES & DRUGGISTS' SUNDRIES
5912	RETAIL-DRUG STORES AND PROPRIETARY STORES
6321	ACCIDENT & HEALTH INSURANCE
6324	HOSPITAL & MEDICAL SERVICE PLANS
8011	SERVICES-OFFICES & CLINICS OF DOCTORS OF MEDICINE
8050	SERVICES-NURSING & PERSONAL CARE FACILITIES
8051	SERVICES-SKILLED NURSING CARE FACILITIES
8060	SERVICES-HOSPITALS
8062	SERVICES-GENERAL MEDICAL & SURGICAL HOSPITALS
8071	SERVICES-MEDICAL LABORATORIES
8082	SERVICES-HOME HEALTH CARE SERVICES
8090	SERVICES-MISC HEALTH & ALLIED SERVICES
8093	SERVICES-SPECIALTY OUTPATIENT FACILITIES

Section C. 3-digit SIC Codes

This table lists the three-digit SIC codes after combining some sub-industries of the 4-digit SIC codes.

3-digit SIC Code	Industry Name	Number of Firms
283	MEDICINAL CHEMICALS, BOTANICAL PRODUCTS & PHARMACEUTICAL PREPARATIONS	156
384	MEDICAL INSTRUMENTS & APPARATUS	99
385	OPHTHALMIC GOODS	5
512	WHOLESALE-DRUGS, PROPRIETARIES & DRUGGISTS' SUNDRIES	10
591	RETAIL-DRUG STORES AND PROPRIETARY STORES	5
632	ACCIDENT/HEALTH INSURANCE & HOSPITAL/MEDICAL SERVICE PLANS	21
801	OFFICES & CLINICS OF DOCTORS OF MEDICINE	5
805	NURSING & PERSONAL CARE FACILITIES	5
806	HOSPITALS	11
807	MEDICAL LABORATORIES	9
808	HOME HEALTH CARE SERVICES	9
809	MISC HEALTH, ALLIED SERVICES & SPECIALTY OUTPATIENT FACILITIES	16
TOTAL		351

Due to the fact that the number of companies is small in some sub-industries, we combine the sub-industries of four-digit SIC codes and create 12 industries using three-digit SIC codes. The final sample has 351 firms in total with the majority being pharmaceuticals and medical product manufacturers. The number of firms in each three-digit SIC industry is shown in the Section C of Table 1.

IV. RESULTS

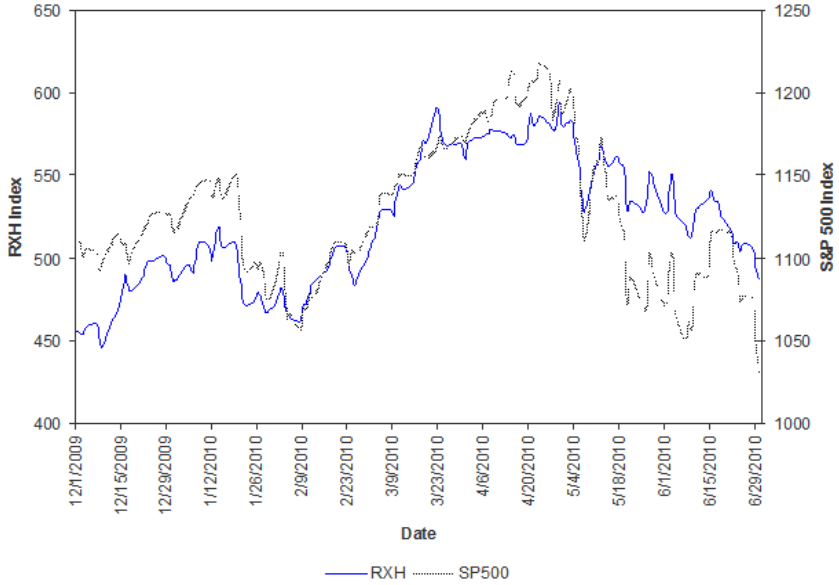
As shown in Figure 1, the stock market appears to view the passage of PPACA as good news to the U.S. health care sector, based on the evidence of the over-performance of the Morgan Stanley Health care Providers (RXH) index relative to the S&P 500 index. On March 22, 2010, one day after PPACA was passed the House of Representatives and one day prior to being signed into law by President Barack Obama, the RXH index increased +3.2% whereas the S&P 500 index increased only 0.5%. The abnormal return between the health care sector and the overall

market was 3.3%. On the day before the passage, this return differential is only 0.2%. The abnormal return of RXH relative to S&P 500 was 3.6% on June 28, 2012 when the Supreme Court upheld the Act, comparing to 1.9% on the day before the court decision. To study from investors' perspective what industries would benefit more than the others from this new policy, we construct 12 sub-industries using three-digit SIC codes as described in the previous data section.

Figure 1. Stock market reaction to the passage and upholding of PPACA

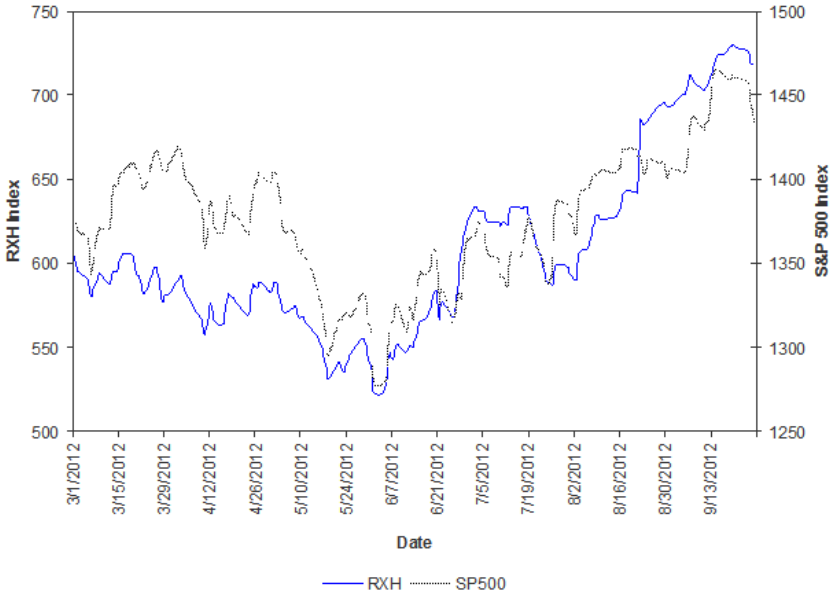
Section A. The passage of the Patient Protection and Affordable Care Act on March 21, 2010.

The scale on the left axis is for the Morgan Stanley Health care Providers Index (RXH), an equal dollar weighted index designed to measure the performance of companies involved in the business of hospital management and medical/nursing services. It was established with a base value of 200.00 on December 16, 1994. To ensure that each component stock continues to represent approximately equal weight in the index, Morgan Stanley makes adjustments annually based on closing prices on the third Friday in December. The scale on the right axis is for the Standard & Poor's 500 Index (S&P 500), a stock market index based on the common stock prices of 500 top publicly traded American companies, as determined by the Standard & Poor's. It is commonly considered as the representation of the U.S. financial market and the economy.



Section B. The upholding of the Patient Protection and Affordable Care Act on June 28, 2012.

The scale on the left axis is for the Morgan Stanley Health care Providers Index (RXH), an equal dollar weighted index designed to measure the performance of companies involved in the business of hospital management and medical/nursing services. It was established with a base value of 200.00 on December 16, 1994. To ensure that each component stock continues to represent approximately equal weight in the index, Morgan Stanley makes adjustments annually based on closing prices on the third Friday in December. The scale on the right axis is for the Standard & Poor's 500 Index (S&P 500), a stock market index based on the common stock prices of 500 top publicly traded American companies, as determined by the Standard & Poor's. It is commonly considered as the representation of the U.S. financial market and the economy.



The mean cumulative abnormal returns (CARs) are estimated for an event window of two days (-1, 0), the day before the event and the day on the event. The CARs of the event windows measure the stock market's reactions of whether the passage and upholding of the act benefits or harms health care-related companies in terms of stock returns. The reason that we have such a narrow event window is due to the concerns of market information dilution. The longer of the event window, the more likely the CARs will be diluted from other economic and business events during that long period. The mean cumulative abnormal returns of 12 industries on the days when the Act was passed by the congress on March 21, 2010 and upheld by the Supreme Court on June 28, 2012 are reported in Table 2.

Table 2. Cumulative abnormal returns (CARs) on the passage and upholding of PPACA

The Patient Protection and Affordable Care Act (PPACA) was passed by the House of Representatives on Sunday, March 21, 2010, by a vote of 219–212, with 34 Democrats and all 178 Republicans voting against the bill. The US Supreme Court upheld the Act on June 28, 2012. In this table the cumulative abnormal returns (CARs) are calculated for a (-1,0) event window, which is from 1 day prior the event date through the event date. Firms are categorized to 12 industries using the three-digit Standard Industrial Classification Codes (SIC). ***, ** and * indicate statistical significant level of 1%, 5% and 10% respectively.

Industry	SIC	Congress' Passage	Supreme Court's Upholding
MEDICINAL CHEMICALS, BOTANICAL PRODUCTS & PHARMACEUTICAL PREPARATIONS	283	0.21%	-0.40%
MEDICAL INSTRUMENTS & APPARATUS	384	0.15%	0.21%
OPHTHALMIC GOODS	385	-1.65%	-2.31%
WHOLESALE-DRUGS, PROPRIETARIES & DRUGGISTS' SUNDRIES	512	-0.81%	0.29%
RETAIL-DRUG STORES AND PROPRIETARY	591	0.55%	1.45%

STORES			
ACCIDENT/HEALTH INSURANCE & HOSPITAL/MEDICAL SERVICE PLANS	632	1.25%	0.17%
OFFICES & CLINICS OF DOCTORS OF MEDICINE	801	3.14%**	0.72%
NURSING & PERSONAL CARE FACILITIES	805	0.71%	0.59%
HOSPITALS	806	5.46%***	4.62%***
MEDICAL LABORATORIES	807	-0.26%	-0.91%
HOME HEALTH CARE SERVICES	808	0.07%	-0.84%
MISC HEALTH, ALLIED SERVICES & SPECIALTY OUTPATIENT FACILITIES	809	1.20%	2.04%**

The CARs of the 2-day event window are significantly positive for hospitals on both event days, and the CARs str also significant for doctor clinics on the passage day and specialty outpatient facilities on the upholding day. To control for the heterogeneity among firms and industries we conduct cross-sectional regression analysis using the variables that reflect the financial and operational characteristics on the individual firm level and the industry level. Specifically we pool the data of two events into one dataset and regress the firms' cumulative abnormal returns (CAR) on size (total asset), growth premium (market-to-book), leverage (asset-to-equity), capital investment (capital expenditure), and management incentive (pay-for-performance sensitivity) with industry and year fixed effects. The CARs are for the 2-day event window: from the day prior to the event date through the event day. The columns (1) and (2) of Table 3 report the coefficient estimates for this specification with and without the industry and year fixed-effects. The significant coefficients of the industry dummy variables suggest that the magnitude of the abnormal return is relatively larger and more positive for hospitals and specialty outpatient facilities, but more negative for medical instrument manufacturers, wholesale drug distributers, medical laboratories, and home care providers.

Table 3. Determinants of CARs on the passage and upholding of PPACA

The Patient Protection and Affordable Care Act (PPACA) was passed by the House of Representatives on Sunday, March 21, 2010, by a vote of 219–212, with 34 Democrats and all 178 Republicans voting against the bill. The US Supreme Court upheld the Act on June 28, 2012. The dependent variable is the cumulative abnormal return (CAR) on both dates. CARs are calculated for a (-1,0) event window, which is from 1 day prior the event date through the event date. t-test based on clustered robust standard errors is shown in the parenthesis with ***, ** and * indicating its statistical significant level of 1%, 5% and 10% respectively.

Dependent variable: CAR (-1,0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log (Total Asset)	0.0454 (0.314)	0.0280 (0.208)	-0.0546 (-0.629)	-0.0656 (-0.849)	-0.00525 (-0.0432)	-0.00889 (-0.0758)	-0.0587 (-0.669)	-0.0669 (-0.854)
Market-to-Book	-0.156*** (-3.319)	-0.201** (-2.667)	-0.118* (-1.908)	-0.166* (-1.964)	-0.111 (-1.688)	-0.157 (-1.782)	-0.105 (-1.589)	-0.156* (-1.796)
Leverage	0.209 (1.332)	0.374 (1.679)	0.232 (1.633)	0.401* (1.847)	0.191 (1.259)	0.354 (1.587)	0.220 (1.558)	0.392* (1.803)
Capital Expenditure	-1.689 (-0.334)	3.305 (0.486)	-3.393 (-0.639)	1.492 (0.213)	-3.180 (-0.622)	1.590 (0.232)	-3.736 (-0.710)	1.155 (0.165)
Pay-for-performance Sensitivity	1.159 (0.552)	1.317 (0.644)	1.223 (0.527)	1.373 (0.611)	1.669 (0.733)	1.735 (0.780)	1.433 (0.625)	1.496 (0.671)
Return-on-Asset			1.665 (1.333)	1.601 (1.259)			1.367 (1.164)	1.428 (1.169)
R&D-to-Asset					-2.461 (-1.446)	-1.958 (-1.258)	-1.070* (-2.141)	-0.609 (-1.061)
Medical Instrument Dummy	-0.405*** (-7.079)		-0.410*** (-7.668)		-0.603*** (-4.904)		-0.495*** (-7.999)	
Ophthalmic Goods Dummy	-1.316*** (-8.991)		-1.445*** (-6.270)		-1.589*** (-4.741)		-1.541*** (-5.760)	
Wholesale Druggist Dummy	-1.065*** (-4.068)		-1.106*** (-4.454)		-1.288*** (-3.993)		-1.195*** (-4.832)	
Retail Drug Store Dummy	-0.0331 (-0.347)		-0.0338 (-0.365)		-0.242 (-1.122)		-0.125 (-1.366)	
Insurer Dummy	-0.590 (-1.268)		-0.457 (-1.102)		-0.703 (-1.475)		-0.530 (-1.320)	
Doctor Clinics Dummy	0.00537 (0.0323)		-0.0984 (-0.460)		-0.344 (-1.049)		-0.232 (-0.981)	
Nursing Facilities Dummy	0.0631 (0.196)		0.0776 (0.260)		-0.159 (-0.852)		-0.0217 (-0.0870)	
Hospitals Dummy	5.560*** (16.16)		5.590*** (17.77)		5.389*** (17.96)		5.510*** (19.33)	
Medical Lab Dummy	-0.672*** (-3.392)		-0.822*** (-9.091)		-1.012*** (-11.30)		-0.943*** (-13.28)	
Home Health care Dummy	-2.025*** (-10.92)		-2.066*** (-12.37)		-2.319*** (-13.22)		-2.186*** (-16.00)	
Specialty Outpatient Dummy	0.515*** (3.971)		0.481*** (5.015)		0.202 (1.498)		0.351*** (5.980)	
Year 2012 Dummy	-0.725*** (-5.016)		-0.720*** (-4.595)		-0.711*** (-4.768)		-0.715*** (-4.605)	
Constant	0.595 (0.528)	-0.0548 (-0.0469)	1.168 (1.366)	0.479 (0.544)	1.147 (1.322)	0.262 (0.247)	1.305 (1.569)	0.520 (0.580)
N	671	671	671	671	671	671	671	671
R-square	0.085	0.027	0.092	0.035	0.089	0.031	0.093	0.035

The columns (3) and (4) include a new independent variable (return-on-asset) that measures the firm's profitability. The columns (5) and (6) include another independent variable (R&D-to-

asset) to address the concerns that investors are more likely to be interested in the firms with more research and development potentials. Finally, the columns (7) and (8) include both variables. These specifications with the two new independent variables leave all other coefficient estimates essentially unaffected. Overall, investors were overwhelmingly in favor of this health care reform as shown in the aforementioned results during both the events of passage in 2010 and upholding of the Act in 2012, and the biggest winner is the health care providers, mainly the hospitals.

V. CONCLUSIONS

We conclude by noting that estimating the economic impact of health care policy on the health care sector is complicated by the limitation of the event study method. The fair value of a publically-traded company's stock can be affected by numerous other variables; however, we believe that narrowing the event-window to (-1,0) around the event date (the passage and upholding of the PPACA) mitigates the concern of omitted variable bias. The motivation of applying the event study method in this research is that if the financial market is efficient, then stock price changes represent rational assessments of some of the difficulties and opportunities faced by the health care sector. The empirical results show that financial investors appear to view the passage and upholding of the Act as good news to the hospitals, medical clinics, and specialty outpatient facilities. This might suggest that most growth opportunities exist in these areas of health care services. Furthermore, the magnitude of the abnormal returns is greater for firms with higher financial leverage and management incentive pays, but smaller for those with larger assets and R&D investment.

For investors and financial institutions who are considering entering the health care market or those who want to expand their health care sector investment, this paper reveals what the general market believes where the growth opportunities are within the sector and the levels of interest that majority of institutional investors have towards them.

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