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Public Company Health Insurers and Medical Loss Ratios: An Event Study of Dates Associated with the Affordable Care Act

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Public Company Health Insurers and Medical Loss Ratios: An Event Study of Dates

Associated with the Affordable Care Act

DISSERTATION

Submitted to

George Fox University

Graduate Faculty of the College of Business

In Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF BUSINESS ADMINISTRATION

by

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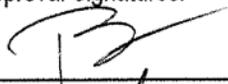
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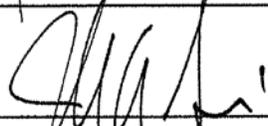
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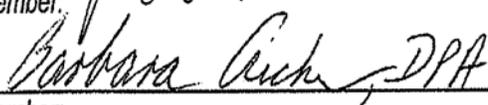
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Public Company Health Insurers and Medical Loss Ratios: An Event Study of Dates Associated with the Affordable Care Act
Rachelle Quinn

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Abstract

The Affordable Care Act (ACA) has proved to be a contentious regulatory and political topic. Although key features were established within the law the complexity of the new provisions and political opposition resulted in a series of federal and state governmental process changes, rule clarifications, and legal challenges. One component of the ACA is the introduction of a federal Medical Loss Ratio (MLR), which requires insurers to spend specified percentages of their premium revenue dollars on medical services and quality improvement actions. If thresholds are not met, insurers must refund premiums to their members, potentially removing millions of dollars from their operating income in any given year. This research uses event study methodology to examine share price fluctuations for publicly traded health insurers to understand the relationship between legislative and regulatory events associated with the establishment of the ACA and the federal MLR requirements. Regulatory developments in aggregate were found to be associated with slightly positive changes in share prices. Legislative events in aggregate were not associated with a significant change in share prices for publicly traded health insurers. Upon closer investigation, the initial draft of ACA legislation produced by the HELP Committee and sent to the Congressional Budget Office on June 9, 2009, including federal MLR requirements, was associated with a significant negative change in share prices for publicly traded health insurers.

Keywords: Affordable Care Act, Medical Loss Ratio, event study, health insurance

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They say it takes a village. I don't think they were referring to the dissertation process, but it certainly applies here.

To my Committee: Proverbs 19:20 states, "Listen to advice and accept instruction, and at the end you will be counted among the wise." Thank you for providing your insight and advice – and for investing in me as a scholar and as an individual.

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To Laurel & Bridget: I hope that you see that if I can do this, you can accomplish your goals – whatever they are. Break any large task into small, bite sized pieces, and you'll get there eventually!

To Jim: Thank you for your patience with my crazy dream – having your support has meant everything. I couldn't ask for a better husband, father, or best friend.

But above all, thanks be to God. Colossians 3:17: "Whatever you do, whether in word or deed, do it all in the name of Lord Jesus, giving thanks to God the Father through him."

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Chapter 1: Introduction

Five years ago, we declared that in America, quality, affordable health care is not a privilege, it is a right. And I'll never stop working to protect that right for those who already have it, and extend it to those who don't, so that all of us can experience the blessings of life, liberty, and the pursuit of happiness in this country we love. (President Barack Obama, 2015)

Today is an anniversary most Americans would rather forget. Five years ago, ObamaCare was forced on the American people after being sold on a series of lies. President Obama and his fellow Democrats broke their promise to make health care more affordable... ObamaCare has been a burden for families and small businesses, and as rates continue to rise, that burden is not going away. (Republican National Chairman Reince Priebus, 2015)

The Affordable Care Act (ACA or the Act) has proved to be a contentious regulatory and political topic. The Act has been frequently discussed in popular media, political debates, and family living rooms across the country as citizens attempt to understand the implications of the 955-page Act (Patient Protection and Affordable Care Act, 2010). Signed into law by President Obama on March 23, 2010, the Act has far-reaching implications for health care insurers, providers, employers, and taxpayers.

Although key features were established within the law itself (United States Department of Health and Human Services, 2014) the complexity of the new provisions and political

opposition has resulted in a series of federal and state governmental process changes, rule clarifications, and legal challenges (Kaiser Family Foundation, 2014).

One often-overlooked component of the ACA is the introduction of the federal Medical Loss Ratio (MLR) (Kaiser Family Foundation, 2012), which requires insurers to spend specified percentages of their premium revenue dollars on medical services and quality improvement actions. If thresholds are not met, insurers must refund premiums to their members (Centers for Medicare and Medicaid Services, 2014a), potentially removing millions of dollars from their operating income in any given year. These requirements effectively limit the amount of administrative and advertising costs that an insurer may incur, and also limits their profitability. In response, several for-profit health insurance companies have exited this line of business (Ungar, 2011a). MLR calculation requirements are complex and resulted in several regulatory clarifications and developments subsequent to the passage of the ACA. The MLR is intended to manage premium and claims costs; as a result, this inherently will limit profitability for insurers. One would expect financial markets to monitor these requirements closely, and for share prices to respond to regulatory publications. This study attempts to understand whether this monitoring of regulatory actions and subsequent share price fluctuations occurred.

While the popular press has provided a play-by-play analysis of ongoing events, academic literature has produced relatively little analysis of the Act and the MLR and the specific implications for publicly traded health insurers as it relates to their share prices. As a result, there is a significant amount of rhetoric but an absence of fact-based reporting and analysis regarding market response to ACA developments in general, and MLR developments in particular. Share prices are an important indicator of the

sentiment of financial markets regarding the financial condition and long term viability of firms. By analyzing changes in share prices that occur around specific ACA legislative and regulatory developments, this study will create an academically-based, financially-focused, play-by-play analysis of the ACA, and the MLR specifically, for public company health insurers.

There are many ways that history will assess the ACA – how did it impact quality of care? Access to care? Cost to companies through employee fringe benefit costs? Cost to individuals? Cost to society as a whole? Profitability of healthcare industry participants, including insurers, care providers, and pharmaceutical companies? The answers to many of these questions are complex and require data that is not currently available, given the timing of this study. However, share prices of publicly traded companies are available on an immediate basis and provide an indicator of market sentiment. Through analyzing share prices, we may understand what the market *thinks* the cost, access, and profitability implications will be. While market opinion may deviate from actual outcomes, this initial “temperature check” of the ACA and specifically the MLR can still provide valuable insights.

Through this analysis, we will be able to answer the following questions:

1. What is the relationship between legislative developments related to the establishment of the Affordable Care Act and changes in share prices of publicly traded health insurers?

2. What is the relationship between regulatory events related to the establishment of the federal Medical Loss Ratio and changes in share prices of publicly traded health insurers?

Statement of the Research Problem

The Affordable Care Act is arguably the most important political, legislative, and regulatory development for the healthcare industry within the last fifty years. The Act has significantly increased the access to health insurance for the previously uninsured (Health Affairs, 2016); estimates of the newly insured range from 7.0 million to 16.4 million (Blumenthal, Abrams, & Nuzum, 2015). In addition to the improvements in individual access and the need to support the care to these newly insured, the ACA has operationally impacted the industry through requirements to track and report performance metrics (Hader, 2015). Changes in payment methodology for healthcare insurers has increased the focus on quality outcomes rather than simply measuring services provided (Patient Protection and Affordable Care Act, 2010), with additional operational implications for insurers and providers. Given the nature and extent of these changes, understanding market responses is an important element of assessing the overall Act. The ACA has many potentially far-reaching implications, but the introduction of the MLR is of interest for one specific reason: it effectively limits the profitability of for-profit companies through political, legislative, regulatory, and judicial actions. The research questions that this paper addresses are if and how the financial markets reacted to these changes.

Assessing the ACA: Who Cares?

Public Company Health Insurers. There are several well-established and publicly traded health insurance companies that are counted in the largest publicly traded companies in the United States. At the onset of the ACA, these include Anthem Inc. (ticker ANTM), Humana Inc. (HUM), Cigna Corp. (CI), Aetna (AET), and United Health Group, Inc. (UNH), among others. These five companies are actively traded on the New York Stock Exchange (NYSE) and are members of the Standard and Poor's 500 (S&P 500). In addition, there are 11 other health insurers that are publicly traded on the NYSE, based on established North American Industry Classification System (NAICS) or Standard Industrial Classification (SIC) codes. Combined, these 16 publicly traded health insurers had a market capitalization at December 31, 2015 in excess of \$336.7 billion – an amount approximately three and a half times larger than the federal government's spending for the Department of Education in fiscal year 2015 (Executive Office of the President of the United States, 2016). Of the ten largest health insurance groups by direct premiums written, all but four are publicly traded (Insurance Information Institute, 2016). The size and reach of public insurers is such that their financial viability is extremely relevant to the United States healthcare industry. Through evaluating changes in their share prices, we can better understand the relationship between the ACA and MLR requirements and their financial condition.

Employers. Legislative and regulatory changes arising from the ACA are also extremely financially relevant to individual employers outside of the healthcare industry. According to an analysis based on data from the United States Bureau of Labor Statistics, the employer provided benefit with the largest average cost is health insurance, approximating 27.3% of total employer benefit costs on average (Schildkraut, Baker, Cho & Reuss, 2015). For the period from 2010 through 2014, annual increases in healthcare spending were 3.2% in comparison to a 5.6% rate experienced from 2000 through 2010 (Congressional Budget Office, 2015). Assessing the impact of the ACA on the cost of overall healthcare is challenging due to the fact that its implementation coincided with an economic recession in the United States and may thus reflect normal fluctuations in spending patterns (Herring & Trish, 2015). Regardless, given the significance of healthcare spending by individuals, governmental agencies, and employers, there is high interest in the financial impact of the ACA (Herring & Trish, 2015). In particular, one way for insurers to manage their Medical Loss Ratios and prevent rebates to policyholders is by reducing premiums. Thus, understanding trends in MLRs is relevant to employers negotiating premium rates for their employees.

Not-for-Profit Healthcare Organizations. This study also has important implications for not-for-profit healthcare organizations considering their financing options, which frequently include the issuance of publicly traded bonds; understanding the capital market response to ACA events may give an indication of overall market sentiment. Research has shown the decision-making process to be similar among healthcare industry not-for-profit organizations and for-profit organizations in regards to capital structure decisions (McCue & Ozcan, 1992; Wedig, Sloan, Hassan & Morrissey, 1988). Further, many not-for-profits are participants in for-profit efforts, such as joint ventures and partnerships (Gray, 1993). There is also an argument that not-for-profit healthcare organizations are responsible for providing a form of return on investment similar to their for-profit counterparts (Sloan, Valvona, Hassan, & Morrissey, 1988). Thus, while this study is limited to public company insurers, it is relevant to not-for-profit organizations as well as they are also subject to MLR requirements and similar in many ways to their for-profit counterparts.

How to Assess the ACA

In assessing the overall effect of the ACA in three broad categories (access, cost, and quality of care) Blumenthal, Abrams, and Nuzum (2015) examine the data and conclude that while the improvements to access to care as a result of the Act are clear, whether the Act has yet played a significant role in decreasing healthcare costs is uncertain. While there are some positive early indicators of improvements in quality, the authors are hesitant to conclude about the overall impact of the ACA in this area, stating

If it is premature to draw conclusions about the cost effects of the ACA, it is doubly so for the quality effects of the law. The reductions in hospital-acquired conditions and Medicare readmissions since the enactment of the ACA are unprecedented and encouraging, but here again, the causes of these favorable trends are uncertain. It may be some time before we can assess the quality effects of this major new legislation. (p. 2458)

As a result, it is difficult to assess the impact of the ACA on overall healthcare cost and too early to assess its impact on quality of care. Share prices fluctuations are one measure that may be evaluated contemporaneously. This “early indicator” of the financial evaluation of the ACA by market participants can offer valuable information that will provide one piece of the puzzle to individuals attempting to gauge the overall effect of the ACA. In sum: we cannot yet assess the overall cost implications or impact on quality of care, but we can measure what the market thinks about the ACA and the MLR.

Relevance of Changes in Share Prices

Given that the focus of this study is fluctuations in share prices, it is important to address the question of why share prices are important. The reaction of the overall financial markets to the ACA and MLR represent an important consideration for those publicly traded organizations as they consider their business response to market changes and capital financing options. The business implications of changes in share prices are extremely complex and nuanced. Certain of these implications include access to the capital market, the ability to attract and reward employees, stability of capital and surplus

from a regulatory perspective, and the ability to gauge the opinions of shareholders (as owners of a company) regarding the direction and actions of an organization.

Share price fluctuations impact an organization's ability to access capital on the financial market; in the case of insurance companies, this capital can be used to expand geographically or within targeted market segments and mitigate risk from this expansion through an increased capital and surplus equity base. Further, funds accessed through capital markets may be used to meet physical, technological, or regulatory infrastructure needs, as well as support increased levels of working capital.

Share prices have been linked to capital structure, influencing the relationship of debt to equity within firms (Faulkender & Petersen, 2006); the ability to issue new shares at favorable prices provides an organization flexibility to determine whether they would like to dilute company ownership or assume additional debt. Of particular interest for regulated insurance companies is the level of capital and surplus, driving the calculation of Risk Based Capital metrics that are used by regulatory agencies to assess the solvency of insurers.

Growth in share prices provides for opportunities to attract and reward employees. Stock options, which allow employees of publicly traded firms to take advantage of increases in share prices of their employer, are frequently used as a means to incentivize employees. The National Center for Employee Ownership estimated that in 2010, 36% of employees working for public companies owned stock or held stock options for their employer. These employees thus have a personal financial interest in the response of the stock market to their employer's value. The use of stock options also has a favorable

impact on firm performance, particularly when granted at the executive level (Aboody, Johnson, & Kasznik, 2010). Thus, employees (or potential employees) may have a keen interest in monitoring the share price of their employer as it has personal financial implications.

Share prices may also be used as a barometer to gauge shareholder sentiment. Shareholders, as the owners of a corporation, demonstrate their opinion regarding the financial solvency and profitability of organizations in part through their decisions to purchase or sell stock. An increase in stock prices reflects a higher level of demand in stock ownership. Low share price may result in executive turnover (Maury, 2006) or Board of Director changes (Fischer, Gramlich, Miller, & White, 2009; Maury, 2006;). Understanding share price changes that are associated with specific regulatory or legislative events may provide important information about the perception of shareholders regarding those targeted events and public health insurers.

In short, share prices have many potential ramifications for publicly traded companies, and in the case of the ACA and MLR, for publicly traded health insurers in particular. Understanding the market response to specific events and actions assists not only individual firms but also their investors in assessing risks and opportunities. In the case of publicly traded health insurers, as regulated entities with a strong focus on monitoring and forecasting capital and surplus, this is particularly relevant. Thus, a thorough analysis of the ACA and the MLR, and a potential relationship to changes in share prices of publicly traded insurers, is merited.

A Unique Legislative Process

The Act was unusual in that it is representative of ad hoc legislating, in which the House of Representatives and the United States Senate passed two separate pieces of legislation: The Patient Protection and Affordable Care Act, and the Health Care and Education Reconciliation Act of 2010. (Throughout this analysis, these will be collectively referred to as the Act or the ACA.) As outlined by Cannan (2013), President Obama outlined principles and objectives for the House and Senate to incorporate into a health care bill, and both legislative bodies proceeded to work on their separate forms of legislation in 2009. This resulted in a significant amount of uncertainty and administrative processing required to move the rules through multiple Committees and legislative bodies (termed “ping-ponging” through the House and Senate). At each stage of the legislative process, a “temperature check” of the market can be taken – as the ACA legislatively progressed, how did the market assess likelihood of passage and what was the relationship to changes in share prices of insurers? This study attempts to answer these questions. Certain event dates used in this study relate to legislative developments that made passage of the ACA appear more or less likely. The current potential period of evaluation for publicly traded health insurers thus encompasses activity from President Obama’s election in November 2008 to the ACA’s five year anniversary in March 2015.

Research Questions

The purpose of this study is to answer important questions for the Affordable Care Act and in particular the MLR: what is their relationship to the share prices of publicly traded health insurers? Specifically:

1. What is the relationship between legislative developments related to the establishment of the Affordable Care Act and changes in share prices of publicly traded health insurers?
2. What is the relationship between regulatory events related to the establishment of the federal Medical Loss Ratio and changes in share prices of publicly traded health insurers?

Share prices have ramifications for organization's access to capital, their ability to attract and reward employees, and also serve as a barometer of shareholder (owner) opinions. Share prices may also be evaluated contemporaneously and do not have the inherent data lag that exists when measuring access and overall quality and cost of healthcare. The relationship between events and share prices will be measured using event study methodology to evaluate key announcements and clarifications associated with the Accountable Care Act and the Medical Loss Ratio requirements. Each event will be assessed to determine if it had a measurable relationship to the changes in closing daily stock price of United States publicly traded health insurers, controlling for overall market performance. Through this analysis, overall trends of market perception of the ACA and MLR provisions will become apparent. Events will be categorized as legislative or regulatory, and evaluated in a three-day event window for the period before and after an event.

Binder (1985) identifies several factors that make regulatory event studies more challenging than other types of event studies, such as those used to evaluate company announcements. Specifically, regulatory events frequently lack a well-defined announcement, given that the legislative and administrative processes are time intensive

in nature. Binder (1985) also states that regulatory announcements are more likely to be anticipated in advance of their official publication date, and are likely to impact multiple companies within an industry. Given these acknowledged challenges, specific care will be taken to incorporate the findings of Binder (1985), Mulherin (2007), and Lamdin (2001) as they apply to using event study methodology for regulatory events.

To answer the research questions, closing share prices of 16 United States publicly traded health insurers will be assessed and a Cumulative Average Abnormal Return (CAAR) will be calculated to determine if there were abnormal stock returns in the periods in which events associated with the Affordable Care Act occurred. All selected insurers have been actively traded on the New York Stock Exchange (NYSE) during the period from November 4, 2008 (the date of President Obama's initial election) through March 23, 2015, the five-year anniversary of the ACA. These results will be considered in light of the Efficient Market Hypothesis, which provides insights into how financial markets incorporate information into share prices.

The following specific hypotheses will be evaluated:

H1: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for legislative events.

H2: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for regulatory events.

Definitions of Terms

In order to proceed with the remainder of this analysis, it is important for the reader to have an understanding of certain terms relevant to the Affordable Care Act, the companies selected for analysis, and efficient market theory.

NAICS and SIC Codes. In 1997, the North American Industry Classification System (NAICS) replaced the Standard Industrial Classification System (SIC) as a means to classify and organize businesses within the United States. Developed by the Office of Management and Budget, industry classifications are established based on economic significance and with a production-focus, grouping organizations based on the processes they use to produce goods and services (Office of Management and Budget, 2002). Organizations are classified based on their primary business activity as represented by production costs or capital investment; alternatively, revenue or employment may also be used. NAICS codes are six digits, with the most recent classification relating to 2012 (United States Census, 2015). The Securities and Exchange Commission (SEC) continues to use SIC codes (Securities and Exchange Commission, 2015) and thus both classification systems are relevant considerations for the purposes of selection of companies within this study.

Medical Loss Ratio. As discussed previously, one component of the ACA relates to a required Medical Loss Ratio calculation that became effective in 2012 (Centers for Medicare and Medicaid Services, 2014a). This calculation is performed by insurers for specific lines of business (for example, individual, small and large group) to measure the ratio of insurance premium revenue to medical claims expense and certain quality improvement expenses. Should this ratio fall below 80% for individual and small groups,

or 85% for large groups, insurers must issue rebates to the individual policyholders.

Given the complexity of the requirements, a series of technical appendices, corrections, and clarifications were issued by the Centers for Medicare and Medicaid Services (CMS) from December 1, 2010 continuing through its implementation (Centers for Medicare and Medicaid Services, 2015).

Efficient Capital Markets. An important underlying assumption of the event study method relates to how capital markets respond to information. Fama's 1970 foundational work in this area supported three categories of market efficiency and how share prices reflect information. These three categories include strong form markets, which are assumed to reflect both private and public information, semi-strong form markets, which reflect all publicly available information, and weak form markets, which assumes that market pricing reflects only historical information. An understanding of these three assumptions on market pricing is relevant given that event study methodology seeks to understand how share prices relate to events; should a capital market prove to be weak in form, this methodology would be invalidated. The work of Fama (1970) and as updated by Fama (1991), and other researchers in a wide variety of geographic and industry-specific markets, uphold the concept of an efficient capital market. This will be discussed in more depth in Chapter 2.

Delimitations

Given the scope of the timeline involved in this analysis and the overall intention to focus on United States publicly traded insurers, there are some clear delimitations imposed upon this analysis. Specifically, this study excludes the potential impact on non-

United States insurers that may be incidentally affected by the ACA, such as insurers of Canadian or Mexican members who are visiting the United States. Private and not-for-profit insurers are also excluded from this study, as they do not have readily available share prices for consideration. However, evaluation of the impact of the ACA on these organizations represents a valuable field for future study.

The relationship of events associated with the ACA and capital debt pricing is excluded from this analysis given the variables associated with interest rate and company-specific risks. Since researchers have recognized that there might be value in assessing the impact of events on publicly traded debt (Peterson, 1989), this may be an opportunity for a future area of study. In a similar manner, stock option pricing is excluded from this analysis. Finally, as this is a quantitative analysis that is focused exclusively on share prices, the qualitative impact of the ACA on the employees and members of the health insurers is outside of this examination.

This study is not intended to assess the relationship between the ACA and cost to employers in the form of fringe benefits, individuals or society as a whole; further, it is not intended to address the strategic implications of the ACA as an outcome of changes in share prices. Merger and acquisition activity, participation in various lines of business, and executive or Board turnover may reasonably result from changes introduced by the ACA and share price fluctuations, and may prove to be opportunities for future study. However, they are outside of the scope of this research.

Assumptions & Limitations

Many of the limitations underlying this study relate to responses to the inherent challenges in using event study methodology to evaluate regulatory and legislative events, which assume efficient capital markets. As outlined previously, these include assessing when information was first made available to the market, the likelihood of the anticipation of regulatory events, and whether the regulatory events were associated with share price fluctuations that are significant for individual firms versus to an industry as a whole (Binder, 1985). Mulherin (2007) acknowledges the standard challenges in quantitative studies of endogeneity (variables that relate to one another and create a circular effect), confounding events (events outside of measured variables that are creating changes in share prices), and data imprecision. However, he also calls out the lengthy and noisy nature of the regulatory process as proving problematic for the use of event study methodology when evaluating regulatory events. Doyle (1985) specifically evaluates the impact of agency rulings on the share prices of firms with positive results; given that agency rulings are potentially more opaque to financial markets (assuming a semi-strong form of market efficiency), the use of event study methodology was upheld.

Confounding variables represent a challenge for event studies in general, and for those addressing legislative, or regulatory studies in particular (Larker, Ormazabel, & Taylor, 2011). While steps can be taken to identify and assess confounding variables, it is impossible to perform an exhaustive search. This research will perform certain procedures through review of market drivers, but this remains a significant limitation. Specifically, a technique utilized by Larcker et al., (2011) will be utilized. This approach includes identification of obvious confounding variables through a review of the Wall

Street Journal business financial markets section for the subsequent day to understand what were identified as the key drivers of overall market fluctuations. This is not considered a complete search for confounding variables but is a method intended to identify significant items that would require the research approach to be adjusted.

Examples of potential confounding variables would include events that would potentially have an impact on healthcare industry participants that are more significant than other financial market participants. Examples could include such items as outbreaks of diseases, shortages of key pharmaceuticals, new or revised healthcare regulations not within the scope of this study, events specific to individual companies within the insurer portfolio unrelated to the ACA, etc.

Event studies also commonly pose challenges with assumptions made by the researcher, including event windows, selection of market indices, and an appropriate selection of companies to evaluate. Like many quantitative studies, the challenges of confounding variables and clustering of events must be addressed. Accordingly, special care will be taken in determining event dates, estimation windows, the selection of a market index, and other underlying assumptions, to be discussed more fully in Chapter 3. Many of the event dates will relate to regulatory agency announcements and clarifications and the use of the event study methodology is supported in these instances.

Additionally, since this analysis is limited to the identified publicly traded healthcare companies within the United States based on their shared NAIC or SIC code, limited extensions of these conclusions can be made to other for-profit or not-for-profit healthcare entities. Potentially significant differences in size, geographic coverage, and

policyholder concentrations may exist and make comparison to other organizations inaccurate.

As Reynolds (2008) demonstrated in her analysis of the Byrd Amendment and United States anti-dumping laws, market response to new regulation does not necessarily demonstrate or reflect the true financial effect of regulation on organizations. While the markets may initially favorably or unfavorably respond to the provisions and developments associated with the ACA, the eventual financial and operational impact on the organizations evaluated may differ from the initial market response. Accordingly, this paper does not seek to understand the overall impact of the ACA on publicly traded insurers but simply is an assessment of the financial market's initial response to their requirements.

Significance of Study

As ACA and MLR developments have been continuously unfolding since President Obama's election and the Act's eventual passage in 2010 and through the ACA's fifth anniversary, academic literature has yet to fully evaluate its impact on publicly traded health insurers. While play-by-play journalism is featured in popular newspapers and editorials abound online and in print, pure academic analysis is still in the process of catching up. Additionally, literature regarding the role of government institutions and regulatory events on an international scale is not directly applicable to the United States. The traditional United States healthcare model is unlike that used by other first-world countries (Pink, Brown, Studer, Reiter, & Leatt, 2006). This event study will

assist in understanding the United States' financial market's response to ACA events and the MLR requirements in particular, and will be of use to those both seeking an understanding of the historical ramifications of the ACA as well as considering potential implications of future regulatory clarifications associated with the Act. These implications will be grounded in an understanding of market theory, to allow the reader to understand how publicly traded health insurers may navigate and consider the implications of financial market response.

As discussed previously, share prices play a critical role for public companies in many ways, including access to capital, ability to attract and reward employees, providing stability in capital and surplus, and as a reflection of shareholder opinion. Isolating events associated with the ACA and their relationship to changes in share prices thus provide important information to these constituents as they assess the political, regulatory, and legislative components of the Act. Additionally, researchers are attempting to assess the overall impact of the Act but recognize that data lags and confounding events complicate this assessment. Understanding the relationship to changes in share prices of directly affected firms can be done on a more timely basis and also provide valuable insights about the intended and unintended consequences of this Act.

Researcher Perspective

As an employee of a not-for-profit health insurer during the implementation of certain ACA provisions, I have witnessed the significant financial impact of these

regulatory events on my employer. The combination of additional taxes, MLR requirements, and the uncertainty of offsetting revenue streams such as reinsurance, risk corridor, and risk adjustment payments have led me to question how the financial markets will react to these issues for my employer's publicly traded insurance competitors. While my personal beliefs represent a bias towards the provision of not-for-profit healthcare, the use of valid quantitative measurements in this study will prevent subjective bias from impacting the overall results.

In particular, I personally question the application and impact of MLR requirements on public insurers – this essentially transforms these companies into not-for-profit organizations, or limited-profit organizations. Is the government essentially affirming the role and importance of not-for-profit healthcare organizations? Has the financial market fully grasped the implications of these changes? These are questions I seek to answer and better understand through the course of this study.

Chapter 1 Overview

As discussed previously, the intention of this chapter was to introduce the research problem and questions at hand, as well as define key terms, delimitations and assumptions. With this information providing the foundation of the issue, Chapter 2 will link the research questions to relevant academic and popular press literature.

Chapter 2: Literature Review

Academic literature has struggled to assess and evaluate the implications of the Act in a timely manner. As a result, literature considered in this review will include relevant articles from both academic journals and the popular press.

Evaluating the ACA

The ACA has served to increase access to health insurance (Health Affairs, 2016), required new reporting of performance metrics (Hader, 2015), and introduced new payment methodologies (Patient Protection and Affordable Care Act, 2010). The combination of these and other factors introduced by the ACA creates a changing landscape for the healthcare industry. Popular business articles currently address the business responses of insurers to the ACA provisions; for example, recent publications have addressed insurer's strategic tactics to reach the newly insured (Nussbaum, 2013), including the opening of retail health insurance storefronts, as well as how the insurers plan to manage their costs in the new MLR environment, in part through focusing on wellness activities and behavior-change programs (Goldman, 2011). Much has been made of insurers' cancellation of plans that pre-dated the ACA requirement. While insurers and their members had the option to continue their non-ACA compliant plans under the "keep your plan" provisions, due to a changing business landscape many

insurers, including Humana, opted to terminate legacy plans, much to consumers' dismay (Radnofsky & Mathews, 2014).

A perceived lack of health insurance options on public exchanges in some markets is also drawing concern, with the identified driver of the lack of competition directly resulting from public company motivations. Wendell Potter, an industry watchdog, is quoted as saying, "This is brand new and insurers are really risk adverse. They don't know how the market will behave, so the for-profit companies in particular are going to be sitting this out. Shareholders have no patience for this kind of uncertainty" (Jayne & Paul, 2014). This viewpoint aligns with the actions taken by Aetna and United Health Group, who initially opted to limit their participation in the new healthcare exchanges. Insurers have also drawn criticism from their fierce opposition to the ACA; from 2008 to 2010, the five insurers with the highest market capitalization included within this analysis (Aetna, Cigna, Humana, WellPoint/Anthem, and United Health Group) spent approximately \$50 million in Congressional lobbying efforts (Fraser, 2014). Articles incorporated interviews with for-profit insurance company representatives and highlighted their comments regarding the ACA and its expected negative impact on consumers and on the healthcare industry (Angell, 2013; Lawrence, 2013; Weixel, 2014).

As the Supreme Court ruled in 2012 on the legality of the "individual mandate", a provision requiring all individuals to have health insurance or pay a tax, Aetna, Humana and United Health Group were quick to issue press releases in advance of the ruling to announce that regardless of the ruling, they would retain certain popular provisions established by the ACA, including no copays on preventative health services, levels of

dependent coverage, and elimination of lifetime healthcare limits (Zigmond, 2012).

These responses were well documented in the popular press. Proactive announcements such as these may serve to mitigate the volatility in share prices surrounding such significant ACA developments, however, analysis has not yet been performed to broadly assess market response to these insurer actions. These actions do indicate the strategic analysis that the insurers are undergoing as they attempt to navigate the uncertainty created by the ACA and its ongoing regulatory developments.

For-Profit vs. Not-for-Profit

The provisions of the ACA also served to resurface an ongoing debate regarding the role of for-profit companies within the healthcare industry. As discussed previously, the new MLR requirements are one element of this debate. Rhetoric on this topic is frequently passionate and divisive:

Investors and the companies themselves view expenditures to cover medical procedures as financial losses... This is the fatal flaw. Many of those charged to fund medical care are incentivized by corporate and fiscal law to find ways to deny coverage... This places the company in a position to maintain a medical loss ratio in keeping with shareholder and investor expectations, not to mention mammoth executive compensation linked to stock performance. (Maher, 2012, p. 15)

Colombo (2006) questions, “Is tax exemption... ‘buying’ charity care for the poor, and would withdrawal of exemption negatively impact health care for the uninsured poor?” (p. 623)

Indeed, there are inherently different incentives for health insurers that are otherwise comparable except for their for-profit status. “As distinct legal forms, nonprofit and for profit ownership leads to different mixes of monetary and nonpecuniary incentives for administrators and staffs, different sources of capital, and different influences on governance” (Schlesinger & Gray, 2006, p. 288). Whether this translates into differences at an operational level, including quality, price, and overall community benefit, is a separate question, and one that has been analyzed in numerous studies predating the ACA (Rosenau & Linder, 2003; Schlesinger, Gray & Bradley, 1996; Schlesiner, Mitchell & Gray, 2003).

Certain of these studies address Health Maintenance Organizations (HMO’s) directly: Schlesiner et al. (2003) found that nonprofit HMO’s surpass their for-profit counterparts only in the areas of redistributive programs, such as general philanthropy, medical research, and wider community programs, while for-profit insurers are better at assisting their members with information asymmetries such as understanding healthcare options. This is consistent with Schlesinger, Gray, & Bradley (1996) study results, which found that non-profit insurers are more “community oriented” but in other areas differences between the two ownership structures are less significant. Schlesinger, Mitchell, & Gray (2004) further evaluated the American public perception of for-profit versus not-for-profit HMO’s, finding that the majority of individuals believe nonprofit

health plans and hospitals to be more trustworthy and fair, but of lower quality than their for-profit equivalents.

Other studies have focused their efforts on healthcare providers, such as hospitals; Rosenau & Linder's 2003 meta-analysis of 149 studies comparing for-profit and not-for-profit hospitals incorporated specific performance criteria of access, quality, cost efficiency, and charity care within the community. Of the studies analyzed, non-profits were found to be superior approximately 59% of the time, with for-profits reporting better results in only 12% of cases. The remaining 29% demonstrated inconclusive results. Accordingly, while there continue to be debates about market-generated incentives, access to capital, impact to the overall community, etc., academic literature has demonstrated that non-profits are able to compete successfully with their for-profit counterparts in a variety of areas.

Insurance Alternatives

While the ACA has obvious implications for many healthcare organizations, as discussed previously, there are certain elements, including the MLR, that do not apply to all healthcare organizations. In light of the religious controversy regarding the ACA's required contraceptive coverage, as well as the costs associated with ACA-compliant plans, alternatives to traditional insurance have appeared in the market. Health Care Sharing Ministries (HCSMs) serve as "a health care cost sharing arrangement among persons of similar and sincerely held beliefs" (Boyd, 2013, p. 220). These HCSMs receive no funding from grants or government sources and are not regulated as insurance

companies by the state or federal government as they do not assume any risk for medical claims, nor do they guarantee payment of bills. The Alliance of Health Care Sharing Ministries reports that as of fall 2014, over 300,000 individuals participated in a HCSM; by doing so, they were exempt from the individual mandate. Literature exists that analyzes the legal categorization of these organizations outside of insurance company law (Eastman, 2010), the tax law governing such organizations (Roane, 2014), and whether the organizations represent a valid option for individuals seeking health coverage (Boyd, 2013). These HCSMs are not required to report on their MLRs nor are they subject to premium rebate requirements (Centers for Medicare and Medicaid Services, 2015).

A second alternative to large, traditional insurers are nonprofit, member-owned health insurance cooperative entities that operate within state exchanges. The federal government originally provided up to \$3.8 billion in start-up loans to create these co-op entities, and existing health insurance companies, state and local governments were prohibited from establishing such a co-op (Giaimo, 2013). Literature discusses the history of these cooperative ventures (Grey, 2009), and provides a case study analysis of one Wisconsin cooperative (Giaimo, 2013). Outside of academic literature, much debate has occurred regarding the potential value of these co-ops (Pear & Harris, 2009), and potential pitfalls that would make them ineffective (Hilzenrath & MacGillis, 2009). Opportunities exist for quantitative study of the effectiveness of the cooperative entities, their impact on publicly traded health insurers, and further case study analysis of their performance as their first year of operations within exchanges in 2014 ended. However, the limited information available indicates that these traditional insurer alternatives might have been viewed as posing a strategic threat and thus impacted the share prices of

publicly traded insurers, particularly given their initial government funding. These co-op entities are subject to MLR reporting requirements and rebates (Centers for Medicare and Medicaid Services, 2015). More recent history has shown that these co-ops have proved unsuccessful, as through July 2016 only a third of them are still operating (Meyer, 2016). This is due in part to the challenges inherently facing smaller carriers as they compete against larger, more established rival competitors (Hayes, 2016); however, at the onset of the ACA these future difficulties may have not been as well appreciated.

The Use of Medical Loss Ratio Calculations

The introduction of a consistent, nation-wide MLR requirement has a direct impact on insurers effective January 1, 2011 and has been a much-discussed component of the ACA-related literature. An insurer's Medical Loss Ratio reflects how much of premium revenue is spent on paying healthcare claims of the plan's enrollees or spent on certain allowable expenses such as fraud reduction. For example, a MLR requirement of 85%, such as that used for large commercial plans, would require that claims and allowable expenses must be no less than 85% of premiums on a rolling three year average; anything less than that limit must be refunded to policyholders. This effectively limits the profitability of insurers.

The ramifications of issuing premium rebates to policyholders must not be underestimated. The administrative effort, as well as the potential confusion of policyholders and the negative implications of rebates (i.e., overcharging of premiums), are all challenging outcomes of rebates. However, for a for-profit insurer, rebates also

mean that money is not available to shareholders in the form of dividends or other return on investment.

There is debate within the healthcare academic community as to whether the MLR is an effective tool to use to analyze and evaluate insurance company performance: Robinson (1997) states, “Some view a low medical loss ratio as an indicator of health plan efficiency, solvency, and creditworthiness. Others denounce a low ratio as proof of quality shading, risk skimming, and profit mongering” (p. 176). Thus, Robinson clearly articulates the mixed reaction to MLR results, which alternatively may be perceived as positive or negative by markets. Karaca-Mandic, Abraham, & Simon (2015) refer to the use of MLR regulation as demonstrating a “presumed market failure [of] insurer market power as reflected by excessive profits” (p. 56), which is corrected via the issuance of policyholder rebates. This viewpoint is supported by their analysis of 2001 – 2009 insurer data, which demonstrates that in areas with one significant insurer competing in the marketplace, those insurers with monopoly power have lower MLRs.

Robinson (1997) also provides an example of instances in which organizational structure and the level of integration significantly impact ratio results. Given the differences between HMO entities and traditional network insurers, which both must measure and report MLR results, this represents a very real risk of legal structure and cost accounting driving different ratio calculations. In Turnbull & Kane’s 1999 evaluation of the accounting and actuarial methods of five HMO organizations, they found significant differences among organizations; when standardized, these differences would have reduced MLR’s between 0.2% and 4.4% - a level that would potentially impact MLR rebate payments had the ACA been in effect.

Changes Associated with Medical Loss Ratios

Comparison of pre-ACA state MLRs, which differed between jurisdictions, generally found that states that had MLR's were much less restrictive than the new federal MLR; these ranged from 60 – 75% at the state level in comparison to the federal level of 80 – 85%. The federal ratio calculation provides for the inclusion of quality improvement expenditure activities as well as taxes and fees within the calculation, while state MLRs typically do not (Harrington, 2013). States also may differ in the definition of a small group versus large group that is used to categorize MLR calculations, although these must be standardized to the federal MLR criteria by 2016 (Fontenot, 2014).

Outside of comparisons of the historical state MLR requirements to the new federal requirements, much conjecture has occurred within literature as to its eventual consequences for insurers. Harrington (2013) stated that the new MLR requirements will result in consolidation and market concentration, as insurers' profits are limited and the inherent statistical volatility of claims experience makes it difficult for them to accurately forecast premium needs. Using National Health Expenditure data, Harrington calculated the MLRs for not-for-profit and for-profit insurers for the years 1965 – 2010, finding that on average, insurers' MLR ratios were 87.7%. In some years the average dropped well below 85%, while in others it was in excess of 90%. This volatility demonstrates the challenges that insurers will face in maintaining a consistent MLR in line with federal requirements while maintaining sufficient reserves to weather high claim years. Similarly, Abraham and Karaca-Mandic (2011) evaluated 2009 financial data and estimated that 29% of insurers would have a MLR in at least one line of business fall below the established thresholds and be potentially subject to rebates. This estimated

impact was predicted to be largest in nine specific states, representing areas of the country in which insurance company profits were the largest. Ungar (2011b) predicted,

The medical loss ratio will, ultimately, lead to the death of large parts of the private, for-profit health insurance industry. Why? Because there is absolutely no way for-profit health insurers are going to be able to learn how to get by and still make a profit while being forced to spend at least 80 percent of their receipts providing their customers with the coverage for which they paid.

McCue, Hall, and Xinliang (2013) evaluated the changes arising between 2010 and 2011 in insurers' key financial ratios to identify the impact of the federal MLR requirements that went into effect January 1, 2011. The authors found that the most significant changes occurred in the individual market by for-profit insurers, where the companies increased their MLR by 7%, primarily through decreased administrative costs. These results were confirmed by Abraham, Karaca-Mandic, & Simon (2014) who performed an analysis over the same 2010 – 2011 period with similar results. McCue & Hall (2015) then analyzed the 2011 – 2012 period, noting that MLR rates continued to rise in the second year of the ACA's requirements, with for-profit companies reporting the highest rates of increase.

The premium rebate results for each year are also closely watched, with \$1.1 billion, \$504 million, and \$332 million in rebate checks issued in 2011, 2012, and 2013, respectively (Centers for Medicare and Medicaid Services, 2014b), with analysis and reporting on the large payers occurring in popular media (Herman, 2014). Despite the significant number of individuals receiving rebate checks (6.8 million Americans in

2013, according to the Centers for Medicare and Medicaid Services, 2014b), there remains a lack of understanding about the MLR and its role within the ACA. The Kaiser Family Foundation (2012) found that only 37% and 35% of Americans surveyed in 2010 and 2012, respectively, recognize the medical loss ratio as a component of the ACA.

Relatively little attention has been devoted to understanding the securities market responses to ACA provisions. Research performed by Day, Himmelstein, Broder, & Woolhandler (2015) represents perhaps the closest attempt at evaluating factors outside of MLR calculations; their analysis reviewed publicly traded health insurers' administrative cost activity and SEC filings for the three years prior to the ACA and the three years subsequent to the ACA, concluding there were no significant changes in loss ratios between the periods analyzed. These results are inconsistent with those reported by Abraham et al. (2014) and McCue et al. (2013), due potentially to the differences in the periods analyzed and the specific companies selected for analysis.

Constitutionality of Medical Loss Ratios

Within legal academic literature, there is a discussion and debate as to the constitutionality of the MLR thresholds (Epstein & Stannard, 2012). The authors accuse the ACA, through establishment of MLR's, turning insurers into de facto public utilities. If true, the Act would represent an unconstitutional taking. Dissenting researchers contest this viewpoint and state that there are important differences between public utilities and insurers through the lens of the ACA, such as public utilities' monopoly power (Cordner, 2015). Regardless of one's position on the constitutionality of the ACA, Epstein &

Stannard's arguments represent the level of general dissension and discussion regarding the ACA and the MLR in particular.

Summary - Literature Related to the ACA

A significant amount of historical analysis has been conducted on the differences between for-profit and not-for-profit healthcare entities. These discussions have been highlighted by changes resulting from the ACA that impact both for-profit and not-for-profit organizations, in potentially different ways. In summary, literature has compared the federal and state MLR's, predicted the outcome of the MLR requirements and its impacts on insurers, and evaluated its actual implications in financial performance for those companies, as well as highlighted a lack of understanding by the general public of these significant ACA developments. Literature has also evaluated the MLR calculations immediately prior to and following the ACA. Conspicuously absent from the MLR discussion is the evaluation of market response to these developments for for-profit insurers.

Efficient Market Hypothesis

With the previously discussed insurance industry and regulatory considerations in mind, it is appropriate to next move to the topic of financial markets, and how markets incorporate and react to information. Specifically, the Efficient Market Hypothesis (EMH) addresses the extent to which share prices reflect information. Event studies at their very core are tests of market efficiency, evaluating the impact of information, the

speed at which the information is absorbed into share prices, and the level of bias of the market reaction (Kothari, 2001). Thus, an overview of the literature regarding market efficiency is in order. This section will summarize EMH, as well as the separate but related Random Walk Theory (RWT). This discussion will also briefly address the Chaos and Noise Theories.

The Efficient Market Hypothesis is largely credited to Fama (1970), who was awarded the 2013 Nobel Memorial Prize in Economics for his contributions to the study of asset pricing. As stated previously, EMH addresses the level to which share prices fully reflect information – whether that information is publicly or privately available. Fama introduces three categories of market efficiency. The weak form category assumes that current share prices reflect only past events and information; the semi-strong category assumes that share prices reflect only publicly available information, and the strong form category assumes that share prices reflect all information, public and private (Fama, 1970). These categories address the overall informational efficiency of the market, assuming that the market “rapidly, if not instantaneously, digests all information as it becomes available” (Fama, 1970, p. 388) within the confines of each categories’ definition. Stated another way, Malkiel (2003) defines market efficiency simply as markets in which investors cannot earn above-average returns without accompanying above-average risks. Alternatively, efficient markets are described as being rational, reflecting a fair game, and unbeatable (Statman, 2011).

Fama (1970) recognized that the weak and strong form categories are largely conceptual in nature and the semi-strong form category is most likely to be found in real-world markets. The underlying hypothesis of this study is based on this foundation: that

the financial markets reflected only the publicly available information prior to the release of information arising from the regulatory or legislative process. As a result, with the release of new information, financial markets react, and if the information is deemed relevant and to effect the public company insurers, share prices will adjust.

Beaver (1998), as summarized by Nichols & Wahlen (2004), provides three theoretical links between earnings and share prices that explain how the EMH incorporates earning information to set share prices: “1. current period earnings provides information to predict future periods’ earnings, which 2. provide information to develop expectations about dividends in future periods, which 3. provide information to determine share value” (Nichols & Wahlen, 2004, p. 263). Thus, stock prices are simply the result of information flows (Ball & Brown, 2014). In this manner, there are many similarities between the incorporation of earnings information into share prices and the incorporation of public announcements into share prices – both represent information that must be digested by market participants, and decisions made on the basis of that information.

A “Mountain of Presumptions”

Given the nature of market theory and the challenges posed by creating an appropriate environment for testing, Findlay & Williams (2000) state that, “the entire chain of logic supporting the efficient market position has always been based on a mountain of presumptions” (p. 181). The EMH is conceptually supported by a frictionless market – one in which there are no transaction costs for security trades, there is no cost to market participants to obtain information, and all individuals agree on the implications of

current information (Fama, 1970). However, these conditions are not easily replicated in a real-world market and thus concessions must be made in order to test EMH. This includes the revision of the criteria regarding the cost of obtaining information; Jensen (1978) revises this criteria to state that prices will reflect information as long as the marginal benefits of acting on information outweigh the marginal costs. The challenge in creating an environment to test the EMH is also reflected in the joint hypothesis problem: “Some model of market equilibrium, however simple, is required. This is the rub in tests of market efficiency. Any test is simultaneously a test of efficiency and of assumptions about the characteristics of market equilibrium.” (Fama, 1976, p. 137) These challenges result in the need to thoughtfully craft an event study calculation, and are applicable in the case of this research as well. Factors such as confounding variables, endogeneity, and cross-sectional dependence will be discussed in conjunction with the method in Chapter 3.

Another important underlying assumption of EMH is that participants in the market are rational spectators, a concept introduced by Milton Friedman (1953). A rational market participant will purchase shares when they are viewed as too low, and sell when they are perceived as too high. This shared “buy low, sell high” philosophy for all market participants will allow the true price of shares to emerge through a series of transactions. This process, also termed price convergence or price discovery, is one aspect of market theory that has led to criticism of EMH, which will be discussed in a further section. While an understanding of the assumptions related to market participants is relevant, it is important to note that the reactions of participants are not necessarily reflective of the true impact of that information; this is consistent with the findings of

Reynolds (2008) in her analysis of the impact of anti-dumping laws. The intent of this study is to understand how market participants react, whether they are in fact rational or irrational, and regardless of whether their interpretation of new information is accurate or inaccurate.

Without Judgments

EMH does not make underlying judgments about whether share prices are “right” or “wrong”, as the accuracy of share prices is addressed through the concept of fundamental efficiency. Fundamental efficiency refers to the question of whether competitive financial markets produce the correct price for investors, which may represent the present value of discounted future cash flows (Gilson & Kraakman, 2014). Markets may be efficient even if errors in share price valuation occur, if market participants are irrational, or if share prices are volatile: “As long as stock markets exist, the collective judgment of investors will sometimes make mistakes” (Malkiel, 2003, p. 80). Prices may thus reflect a bubble or in fact reflect an under-valuation of a company’s assets and future prospects. Additionally, EMH does not address whether the market’s reaction to information is of a “correct” magnitude or even directionally accurate: Fama (1998) found that investors were equally likely to underreact to information as they were to overreact, as evidenced by reversals in share prices after a triggering event. This tendency, termed “post earnings announcement drift” has also been identified by other researchers, including Ball and Brown (1968). As discussed further in Chapter 3, the event study methodology requires the selection of an event window, reflecting dates surrounding a triggering event that are used to measure and evaluate share price changes

associated with the release of information. To the extent that post event announcement drift occurs within this window, this study will incorporate this phenomenon. However, the intention of this study is not to examine the occurrence of a post event announcement drift.

Gilson and Kraakman (2014) argue that in real world markets, it is impossible to measure fundamental efficiency (i.e., the ability to receive the “correct” price) but that increasing the informational efficiency of markets will ultimately increase the overall fundamental efficiency as well. As the natural interconnectedness of financial markets increases, due to factors such as global trade, higher levels of sophistication in financial instruments, and economic strategies of sovereign nations, it is evident that informational efficiency is an important component of share valuation (International Monetary Fund, 2010). Research relating to the financial crisis of 2008 has attributed the lack of fundamental efficiency in share prices (errors in security valuation) to data gaps that represent an absence of informational efficiency (Gehrig & Haas, 2014; International Monetary Fund, 2010).

The intention of this study is not to assess the fundamental efficiency of the share prices of publicly traded health insurers, as discussed in the Limitations section. This is due in part to the inherent challenges in measuring fundamental efficiency in the context of evolving legislation and regulation, as well as the unique contextual assessment of information for each insurer. There even remains argument about what defines fundamental value; while Campbell and Shiller (1988) find that a company’s earnings act as a natural proxy for their share’s fundamental value, the present value of expected future dividends may also be used to define share price (Feltham & Ohlson, 1999;

Zhang, 2000). Changes in share prices are thus assumed to reflect changes in future dividend distributions. With the debate about defining fundamental value, challenges in measuring fundamental efficiency, and lack of clarity about what the “right” answer is for the interpretation of share prices, this study will focus on understanding rather than judging the accuracy of market participants’ reactions to information associated with the ACA and the MLR.

Evidence from Market Efficiency Tests

The landmark Ball and Brown (1968) and Beaver (1968) studies, based to a large extent on EMH and event study methodology, allowed researchers to understand the impact of the announcement of annual earnings on share prices. These findings have upheld the concept of EMH, as the majority of information content in earnings releases are anticipated by the financial markets before their release (Ball & Brown, 1968; Beaver, 1968).

Research has also evaluated the extent to which the EMH facilitates the consideration of competitor companies’ earnings announcement into overall share performance for that industry. Firth (1976) demonstrates that earning announcements are efficiently absorbed into close competitor share prices as surrogates for the performance of those companies. This reveals that the form of information leading to changes within share prices through an efficient market may vary widely; from publicly available competitor price information, to private information provided in investor meetings that is apparently leaked and reflected in share prices (Rose, 2003). This supports the use of a

portfolio of companies within an industry to assess the relationship between changes in share prices and an announcement, which is the approach used by this study, as discussed further in Chapter 3.

Efficient Market Hypothesis and Current Market Events

Academic literature has widely discussed EMH given the volatility in financial markets within the last several decades and the increasing speed of information availability. “The ‘information superhighway’, 401(k) investment decisions in the hands of average citizens, the widespread availability of online trading, computerized high frequency trading, the 24-hour availability of news, and the dependence on a global economy have all added information variables... more quasi-rational investors have entered the financial decision-making arena” (Bell, 2012, p. 55). These changes are so potentially significant that recent researchers have questioned whether the underlying concepts of the EMH still hold true. In particular, the velocity and quality of information has increased significantly and been the subject of articles, as follows.

Drake, Guest, and Twedt (2014) evaluated approximately 111,000 earnings-related business press articles between 2000 and 2010, finding that the increased levels of information dissemination by the media have increased the market’s ability to reflect data within share prices via increased likelihood to accurately reflect events within share prices. Similarly, Bertone, Paeglis, and Ravi (2015) evaluated volatility in share prices between 1998 and 2010 (comparing share prices of companies within the Dow Jones Industrial Average and its index fund), noting a significant increase in operational market

efficiency, consistent with the strong or semi-strong forms of market efficiency. The increased levels of information availability and the ability of researchers and analysts to use share price data to perform mathematical modeling and utilize technological tools also means that any information available on apparent price variations or market opportunities are quickly exploited, and thus absorbed into share prices and eliminated as a profitable investing strategy (Malkiel, 2003). Examples of these publicized and exploited pricing gaps include low Monday returns (Cross, 1973, French, 1980; Gibbons & Hess, 1981), as well as increased prices the day preceding a holiday (Ariel, 1990). The information dissemination and the response of the markets to these seasonal variations supports EMH. Thus, it is reasonable to expect that the financial markets would also react to information associated with the ACA and MLR.

Bell (2012) provides some additional perspective regarding the impact on financial markets from the increase in the velocity of information, describing the current environment as being “informationally hyperefficient” and leading to increased volatility in share prices. As information develops second by second, and investors react to each new piece of information, share prices are more likely to fluctuate rapidly. Challenges regarding information reliability (given the increase in data sources), volume (from trades driven by computer algorithms and high frequency trading), and distortion may occur in an efficient market and increase market volatility.

Random Walk Theory

Closely related to the weak form of EMH is the Random Walk Theory (RWT). The RWT expands the concept of share prices reflecting all historical events to assert that future price changes will be unrelated to current pricing or historical events. Described another way, the “stock market has no memory” (Malkiel, 2003, p. 61). This concept, articulated in market theory publications in the 1960’s and 1970’s (Cootner, 1964), has been largely rejected through more recent tests (Lo & MacKinlay, 1999; Lo, Mamaysky & Wang, 2000). However, Bradshaw, Drake, Myers & Myers (2012) have found that the RWT is more accurate than market analysts in many cases, particularly over longer time horizons, for companies of a smaller size and with a shorter history. Despite these situation-specific instances in which the RWT is upheld, recent literature has demonstrated that the RWT is generally inconsistent with actual market activity and stock performance (Lo & MacKinlay, 1999; Lo et al., 2000). Thus, the rejection of the RWT rejects the weak form of theoretical market efficiency and supports this study’s theoretical underpinnings of semi-strong market efficiency.

Alternatives to the Efficient Market Hypothesis

EMH is not without its critics. These criticisms have led to the development of alternative or complementary theories about how markets function and how market participants interact. One key discussion point relates to the issue of incentives and the apparent discrepancy between the current infrastructure supporting financial market activity and EMH. For example, Grossman and Stiglitz (1980) recognize that if strong form EMH does exist and prices already reflect information, there is no incentive for

market participants to acquire new information as it is already reflected in prices – i.e., a trader would have no incentive to read through House or Senate Committee drafts to educate him or herself on upcoming regulatory changes for insurers. This would also prevent any trader from having a long-term informational advantage. Additionally, with the combination of RWT and EMH, no trader would benefit from performing technical analysis, in which past share prices are analyzed to predict future share prices (Malkiel, 2003). This is clearly inconsistent with the fact that significant effort continues to be invested by analysts and others in these efforts, which causes one to conclude that some degree of market inefficiency must remain (Gilson & Kraakman, 2014).

The existence of irrational investors, and the attempts of rational investors to price arbitrage the results of irrational investors' actions, may explain the financial market infrastructure. Shiller (1984), a co-recipient of the 2013 Nobel Memorial Prize in Economic Science for his work on asset pricing, addressed the topic of irrational investors. A fundamental theory underlying EMH is that market participants are rational in nature, seeking to “buy low, sell high”. The field of behavioral finance addresses whether this theory of rationality holds true, and Shiller was a pioneer in this field. Shiller (1984) argues that subjective views of investors translate to trading activities that do not necessarily relate to the true fundamental value of stocks. This results in extended waves of irrational optimism (creating bubbles) or pessimism (creating recessions or depressions) that differ from the prices that would result if all investors were rational. These market theories are upheld by the work of Kogan et al. (2006), who demonstrated that even if they are relatively small market participants, irrational investors may significantly impact market prices. As stated by Lee (2001), “the best evidence in favor

of the long-term viability of noise traders [irrational investors] is the continued existence of active professional arbitrageurs” (p. 238).

These concepts have been formalized into what is termed Noise Theory, as economists use the term “noise” to describe irrational behavior that interferes with market efficiency. Noise theory does not seek to explain why the irrational behavior, or noise, is occurring, but rather evaluates the overall market impact of those behaviors. Market prices thus arise from a complex process that combines the actions of rational and irrational investors, incorporating information from a variety of sources, and frequently results in price deviation from true fundamental value. Noise trading is used to explain high levels of trading volumes, the existence of professional investment advisors, and deviations from fundamental value that occur in instances such as bubbles (Lee, 2001). The concept of Noise Theory is relevant to this study in that it specifically recognizes and accepts the fact that the share prices are the result of a combination of factors, both rational and irrational. Thus, when share prices are evaluated in light of events associated with the Affordable Care Act, the market reaction is not reflecting only the actions of rational investors, making thoughtful and reasoned decisions in response to information. When considering political events, such as the election of President Obama, this is particularly relevant, as political biases may color the responses of market participants. Components of the ACA, such as the MLR, thus are assessed by individuals with varying levels of expertise in healthcare regulations and may react rationally or irrationally.

Somewhat related to Noise Theory is that of Chaos Theory, which also is based on the premise that prices are determined through a nonlinear process. However, in the case of Chaos Theory, share prices are viewed as arising from hidden patterns that

actually demonstrate a sense of order, and may be predicted if the underlying patterns are identified (Cunningham, 1994). This differs from the RWT in that under Chaos Theory, there is a pattern but users are not able to understand it; in RWT, there is no pattern. These underlying and complex patterns that support market activity may result from rational or irrational behavior, or a combination thereof. For the purpose of this study, Chaos Theory may reflect the researchers' inability to identify patterns or commonalities of data within study results. Thus, there may be unseen patterns within the share price fluctuations, such as a "no effect" result in calculations, that are driven by specific factors.

Summary – Literature Related to the Efficient Market Hypothesis

In summary, there exists a significant amount of research that attempts to explain and demonstrate how markets react to information, and how market participants interact with information and with one another. The Efficient Market Hypothesis (EMH) has generally been upheld through event and association studies. Share prices are seen as a product of information and actions by rational investors, and under Noise Theory, also reflect the actions of irrational investors that may have a disproportional impact on share prices. Event studies seek to understand and explain the impact of information on share prices, and viewing those share prices as an outcome of information reflects an important underlying theory.

The weak form of market efficiency and the Random Walk Theory has largely been rejected, and the strong form of market efficiency is viewed as largely theoretical

(Fama, 1970). This study assumes the semi-strong form of market efficiency, and the event study methodology used reflects these underlying assumptions. Testing of the EMH, as discussed previously, does require a “mountain of presumptions” (Findlay & Williams, 2000) to link market theory to testable scenarios. Event study methodology does not intend to measure fundamental market efficiency, or identification of the “right” share price; it simply seeks to understand how market participants respond and react to information and reflect it in share prices. While frequently the event study methodology and EMH has been assessed using accounting data, such as the release of earnings information or dividend transactions, it is also used for other types of information announcements, which will be discussed further in Chapter 3. In particular, an understanding of how markets incorporate information into share prices forms an important foundation for appropriate use of the event study method to assess reactions to the ACA.

Healthcare Organizations and Financial Markets

With an understanding of the ACA and financial markets, we can now move to an intersection of the two fields of study, investigating previous research. This includes studies of historical legislative and regulatory developments and their relationship to share prices and financial performance for healthcare companies, as well as understanding the information valued by financial markets in their evaluation of healthcare organizations.

Previous Legislative and Regulatory Developments

The healthcare industry is highly regulated (Khansa, Cook, James & Bruyaka, 2012) and there are thus many previous regulatory and legislative actions throughout the last several decades that researchers have evaluated to understand their financial implications. Most recently, the Health Insurance Portability and Accountability Act (HIPAA) introduced specific requirements related to protection of patient data, with the intention of reducing fraud and abuse. The nature of these requirements necessitated the investment in information technology and security infrastructure by healthcare organizations (Kilbridge, 2003). Khansa et al. used event study methodology to evaluate the impact of the legislative HIPAA developments on the share prices of healthcare, information security, and information technology firms, finding that there was a negative relationship to changes in share prices for firms in the healthcare industry but a negative relationship to the share prices of information technology and security companies. The authors recognized that the long-term effects of HIPAA may serve to reduce operating costs and be a positive outcome for healthcare organizations, but the fear and uncertainty regarding the initial costs of compliance were a potential driver of the decrease in share prices. This result may be analogized to the ACA; while long-term effects may be positive, uncertainty in the financial markets may result in temporary or initial share price volatility.

Prior to the introduction of HIPAA legislation, the Prospective Payment System (PPS) was introduced by the federal government in 1983 to create a new method of compensating hospitals for Medicare inpatient services. This new payment methodology provided incentives for hospitals to increase efficiency by paying a fixed rate for

diagnoses (Jacobson, 1994). Changes in the economic incentives for hospitals in this significant market segment served to increase systemic risk for publicly traded hospitals (Asper & Hassan, 1993). This was in contrast to the market response as reflected in share prices. Folland and Kleiman (1990) and Jacobson (1994) used event study methodology to evaluate the impact of PPS on the share prices of publicly traded hospitals, finding that the financial markets did not decisively respond to the new legislation, either positively or negatively. Jacobson (1994) concluded that investors “correctly anticipated the ineffectiveness” (p. 450) of the bill.

Topping, Carroll and Lindley (1997) also examined the PPS legislation from a broader perspective, with an overall objective of understanding the impact on hospitals’ capital acquisition practices. They found that changes introduced by PPS caused hospital margins to decrease, which depressed bond ratings and increased the borrowing costs for hospitals and increased the rate of defaults. These factors combined to delay investment in infrastructure by hospital entities. The different methodologies and approaches used by these researchers to assess the impact of legislative developments on healthcare organizations can inform studies of current events. The different results of the Topping et al. (1997) and Jacobson (1994) studies are also of note: while the legislation had little impact on near-term share prices, in the longer time horizon it did impact hospitals’ borrowing costs.

Perhaps the most recent and relevant analysis of market events and the ACA is the research conducted by Borochn and Golec (2016). Their analysis of two events relating to the ACA, including the House passage of the Act and the Supreme Court decision upholding the constitutionality of the ACA, was done through a modified event study.

Since they examined stock option pricing rather than share price fluctuations themselves, their findings are not directly indicative of what one should expect from this research, but may be directionally accurate. The authors found that pharmaceutical stocks experienced little reaction to the passage of the Act, while hospital shares experienced significant positive abnormal returns.

Interconnectedness of Healthcare Industry Participants

The results of the Khansa et al. HIPAA study reflect the strong links within the healthcare industry between buyers and suppliers. This is echoed by the results of analysis by Ewing, Kruse, and Thompson (2008), who found strong correlations between changes in share prices of payers (insurance companies) and product suppliers (firms providing medical goods such as pharmaceuticals, durable medical equipment, etc.). They found similarly strong relationships between payers and providers (such as hospitals and physician groups). This demonstrates the natural interconnectedness of firms operating within the same industry, and highlights the risk of confounding variables when conducting event studies that relate to the healthcare industry.

Like other industries (Engle & Ng, 1993), healthcare industry stocks prove to be more volatile and responsive to negative unexpected events than positive unexpected events (Ewing, Kruse, & Thompson, 2005). Perhaps unsurprisingly, there were important differences in market reactions to events impacting healthcare service providers, product suppliers, and payers based on the individual nature of the industry sub-sector. Physical capital requirements, market alternatives, and the varying levels of price and cost

pressure all served to create nuances in share price fluctuations among healthcare industry participants. Thus, while there are important linkages between market participants in the healthcare sector, there are also significant differences in how the market responds to new information.

Information Valued by Financial Markets

Research has shown that nonfinancial data is highly valued by financial markets as they assess healthcare organizations' prospects (Watkins, 2000). Studies have also shown that this nonfinancial data is under-represented in traditional corporate financial reporting content for healthcare organizations (Chu, Zollinger, Kelly & Saywell, 1991; Sherman, 1986). Additional research has identified specific nonfinancial metrics that may prove valuable: Craycraft (1994) highlighted the importance of socioeconomic variables such as population age, growth, and prevalence of Medicaid patients, during the assessment of a hospital's financial performance. Similarly, Lawrence and Kurtenbach (1995) discussed the importance of operational factors such as number of births, operations, and case mix (an indicator of the severity of health issues). These nonfinancial metrics are more frequently reported for public companies given their reporting requirements under the Securities and Exchange Commission through the inclusion of Management Discussion and Analysis. In the case of non-public organizations, particularly those who participate in the municipal bond market, these typically present a reporting gap (Watkins & Brenner, 2003). Case mix of admissions in particular was found to be important in assessing bond ratings (Watkins & Brenner, 2003). Accordingly, analysts are increasingly demanding non-financial data to inform

their recommendations on public company share prices and bond ratings (Bukh & Nielsen, 2010). Qualitative discussions and information on ACA-related metrics within financial disclosures for publicly traded health insurers could thus prove valuable for individuals attempting to understand the impact of the Act on organizations.

Relevance of Financial Markets for Healthcare Organizations

As the healthcare industry increasingly adopts capitation payments for hospitals (Deloitte & Touche, 2000), similar to the PPS legislation discussed previously, financial risk transfers from the insurance payers to the providers (Conrad & Shortell, 1996). Hospital financial compensation is held flat, placing increasing pressure for them to develop cost efficiency while maintaining high levels of quality. This is also the case for HMO's or integrated care organizations, where established insurance premiums provide the primary funding for the cost of care delivery. These relationships enhance the risk interconnectedness explored by Ewing, Kruse, & Thompson (2008) between the payer and provider sectors, blurring the lines between the nature of the payer and the providers.

The transition towards managed care organizations is also encouraged through the ACA's incorporation of Accountable Care Organizations (ACO's), which provides a structure for physicians, hospitals and other care providers to deliver care in an integrated fashion (Centers for Medicare and Medicaid Services, 2016). This increases the need for insurers to access sources of capital for infrastructure for care delivery purposes. Gray (1993) noted that as a result of these industry shifts, financial markets highly valued organizations with sufficient access to capital. The need to access to capital, whether

through the bond markets or issuance of shares, increases the healthcare industry's dependence on the financial markets (Topping, Carroll, & Lindley, 1997). This was particularly evident during the financial market fluctuations in the late 1990's and early 2000's: Reiter, Wheeler and Smith (2008) found that healthcare organizations dependent on debt financing (in particular, not-for-profit hospitals) were impacted by market liquidity restraints, leading to an under-investment in healthcare infrastructure. Reviewing this stream of literature leads one to conclude that a variety of types of healthcare organizations (payers and providers) now need to develop care delivery infrastructure, and access to capital through the financial markets is a critical component of enabling organizations to make this investment.

Summary – Literature Related to Healthcare Organizations and Financial Markets

Previous research relating to healthcare organizations and financial markets has evaluated the impact on share prices of specific regulatory and legislative events such as HIPAA (Khansa et al., 2012) and the PPS (Folland & Kleiman, 1990; Jacobson, 1994) in a similar manner as planned within this study. Literature also has highlighted the interconnected nature of industry participants such as providers, payers, and suppliers (Ewing et al., 2008), which is increasingly true with new structures introduced by the ACA such as Accountable Care Organizations. In understanding the relationship between healthcare organizations and the financial markets, it is clear that the need to access capital makes healthcare organizations increasingly reliant on the opinions of market participants (Reiter, Wheeler & Smith, 2008; Topping et al., 1997). The literature

reviewed in this section support not only the nature and planned methodology of this study, but also demonstrates the relevance and importance of its results.

Chapter 2 Overview

Chapter 2, comprising a literature review of topics relevant to the study of the ACA and market theory, as well as the interconnectedness of healthcare organizations and financial markets, provides a background for the data components analyzed within this report. Through the literature review, it is apparent that while there is a significant amount of popular press discussion about the ACA and its implications for publicly traded health insurers, there is relatively little academic study specific to this area. Thus, the gaps in the literature support the need for an evaluation of the relationship between ACA-related events and changes in the share price of publicly traded health insurers. In sum, this study seeks to link the literature and information on the ACA to the underlying theories regarding market response, thus evaluating the intersection of the two main topics within Chapter 2, and apply these theories to actual market response of events.

In Chapter 3, a discussion of the methodology will be incorporated to support the selection of a research method to answer these questions. The discussion in Chapter 3 will also address how companies were selected for analysis, the methods of data collection, and the overall approach for evaluation.

Chapter 3: Methodology

There is a gap in the literature regarding the financial market's response to the ACA for publicly traded health insurers. Literature does address the business response of those insurers to the ACA, unique considerations of for-profit versus not-for-profit healthcare organizations, and considerations associated with MLR calculations. However, the community of knowledge fails to adequately provide an understanding of how the ACA, and the MLR in particular, relates to changes in share prices for publicly traded insurers. Given that the ACA was the federal legislation that established the MLR, in order to understand market reaction to the MLR it is necessary to examine the response to the ACA itself in its various iterations. Examining the MLR through the lens of the overall response to the ACA will allow us to understand how the MLR requirements are related to changes in share prices. Market reactions to regulatory developments associated with the MLR provide a separate view into the perceived importance of the ratio.

Chapter 3 provides contextual information that outlines the research design, participant selection, relevant measures and data collection procedures, as well as an overview of data analysis. In particular, the chapter explores how the event study method has been used in previous studies, supporting its use to answer the research questions within this dissertation. This chapter incorporates the results of a pilot study in preparation for calculations with a larger sample in Chapter 4.

This chapter will establish the methodology used to evaluate the following specific hypotheses:

H1: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for legislative events.

H2: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for regulatory events.

Section 1: Research Design & Rationale

The event study method is an approach to evaluating changes in stock prices that occur around specific events. In a meta-analysis focused on the use of event studies in the fields of finance and accounting, Kothari and Warner (2005) summarized articles relating to event studies from 1974 to 2000, identifying 565 articles that utilized event study methodology to identify and assess abnormal share price activity. The event study method is also used to evaluate activity unrelated to finance and accounting; for example, sports event sponsorship announcements (Kudo, Yong Jae, Walker, & Connaughton, 2015), information technology security breaches (Campbell, Gordon, Loeb, & Zhou, 2003), and turnover within the Chief Executive Officer (CEO) position (Bloom, 2012). Within the healthcare industry, Hwang (2013) considered the relationship between clinical trial result announcements and changes in stock prices for pharmaceutical

companies, finding that the release of clinical trial results (both positive and negative) were significant events.

The event study method is frequently attributed to an initial 1933 publication by Dolley that questioned the use of pure accounting data to assess the capital market's reaction to stock splits, suggesting instead the use of a mathematical method that compared the expected returns for a company's stock to the actual returns experienced. The event study method was more fully developed by Ball and Brown (1968) and Fama, Fisher, Jensen, and Roll (1969), and the seminal work in the field is commonly attributed to these researchers. The event study method was initially used to assess firm-specific events such as mergers and acquisitions and stock dividends or splits. In this manner, theories relating to the Efficient Market Hypothesis could be evaluated in light of the market's expectations of the individual firm.

Use of the event study soon expanded beyond assessing firm-specific financial events. In the 1980's a series of event studies were used to evaluate the impact of regulatory events on share prices. For example, Aharony and Swary (1981) evaluated the impact of the 1970 Bank Holding Company Act, Smith, Bradley, and Jarrell (1986) considered the impact of oil price regulation, and Doyle (1985) evaluated the effect of agency rulings on share prices. These studies provide a basis for the use of event study methodology in assessing ACA regulatory events. Concerns about the mathematical models used in these initial analyses led to further discussion and refinement of the standard event study methodology to incorporate specific challenges when applying it in a regulatory setting. As discussed by Schwert (1981), in the case of regulatory events the market's reaction is a combination of the assessment of the probability of eventual

adoption and implementation, as well as the estimate of the potential impact on financial performance. Pastor and Veronesi (2012) refer to these as political uncertainty and impact uncertainty, respectively. The combination of these factors lead to complications in applying standard event study methodology to regulatory events, and are addressed by adaptations of standard event study methodology calculations. These mathematical refinements will be incorporated into this study.

As mentioned previously, challenges assessing changes in share prices for regulatory or legislative events include the lack a well-defined announcement given that the legislative and administrative processes are time intensive in nature, the likelihood that regulatory announcements are anticipated in advance of their official publication date, and that they may impact multiple companies within an industry (Binder, 1985). Other market events, such as dividend events (Asquith & Muilins, 1983; Charest, 1978), stock issuances (Asquith & Muilins, 1986) and redemptions (Dann, 1981) are also found to be related to changes in share prices only the extent to which they are unanticipated. One recognized challenge of using event study methodology for legislative or regulatory announcements is that the information may be anticipated in advance; care must be taken in the design of the study to identify and isolate announcement dates. Event study methodology has consistently demonstrated that these types of unexpected events appear to be incorporated into prices within one day of the announcement (Fama, 1991). In particular, earnings surprises appear to be incorporated into share prices within 30 minutes and the temporary accompanying volatility has subsided within two hours (Lee, 1992). These timelines and prior studies regarding market reactions are important considerations when determining the appropriate event window to use in an event study.

Other specific issues, and the solutions presented by various researchers in the field, are outlined in Table 3 in the subsequent Measures section. At the time of Binder's 1985 analysis of the application of event study methodology to regulatory events, he concluded that "event study methodology will be useful only if the researcher can identify announcements that contain unanticipated information" (p. 168). However, future refinement of the mathematical model as developed by Mulherin (2007) and Landin (2001) serve to address certain of the issues identified by Binder (1985). These methodological revisions will be incorporated into the measures and data analysis planned as outlined in the following sections.

A step-by-step summary of the event study methodology as applied to regulatory events will serve to provide an overview of the method but also guide future discussion in this section regarding data analysis. This summary is based on the outline used by Bloom (2012) as attributed to Seiler (2004):

1. Define events and event period. In the case of regulatory events, one must consider whether the event was widely anticipated by the markets through media coverage or other methods of information dissemination, thus the event period must be carefully selected. Events, in the case of this study, represent announcements or publications associated with the ACA; while all legislative or regulatory in nature, they may result from an agency ruling or Congressional action. The event window represents a period of time over which share prices will be analyzed; for example, +/- 3 days on each side of the day of the event.

2. Select the companies for analysis. Considerations in this step include validating that entities selected for analysis have readily available share prices and are actively traded to ensure sufficient data availability.
3. Establish expectations of “normal” stock price behavior through selection of estimation periods and indices. The objective of this step is to determine the basis for the calculation of normal returns. This includes selection of an appropriate index or indices, as well as a period prior to the event window that will be used for measurement. A separate option when selecting an index is whether to use an equally-weighted index or one that is value-weighted to reflect the weighting of market capitalization. Canina, Michaely, Thaler, and Womack (1998) demonstrate that value-weighted indices (also termed capitalization-weighted) are a better representation of portfolios held by investors and are statistically preferable.

With an index or indices selected, the next consideration is to select the estimation period. The estimation period serves as the benchmark of time used to establish expectations regarding a normal rate of return. As discussed by Salinger (1992), errors may occur when the event window and the estimation period overlap, and thus careful consideration of dates must be made. When using monthly data measurements, studies commonly use five to seven years of data to determine the estimation period (Binder, 1998). In the case of daily data measurements a 120-day estimation window period is commonly used (Campbell, Gordon, Loeb, and Zhou, 2003), although the use of 30, 60, or 90

day periods are also utilized. There is no consensus regarding the appropriate length of an estimation window (Bloom, 2011).

4. Calculation of normal and abnormal returns. A regression analysis is performed during the estimation window, considering the financial performance of the selected index and the specific firm stock performance. The coefficients of the regression analysis are used to determine the normal return that would occur for the selected stock during the event window. Mathematically shown, the calculation of the normal return is as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it}$$

Where

- R_{it} is the rate of return for Company i for period t
- α_i is the intercept term
- β_i is the systematic risk of Company i
- R_{mt} is the index return for period t
- ϵ_{it} is the error term, assumed to be zero

Abnormal returns are calculated as the difference between the actual returns realized for the specific firm, and the normal returns that were calculated assuming the absence of an event. Mathematically shown, individual abnormal returns are as follows:

$$AR_{it} = R_{it} - E(R_{it})$$

Where AR_{it} = Abnormal return for company i in period t

R_{it} = Actual return for company i in period t

$$E(R_{it}) = \text{Expected return for company } i \text{ in period } t$$

The difference between the normal and abnormal returns reflects the market reaction to the identified event. The absence of an abnormal return indicates that the event did not have a positive or negative relationship to changes in company share prices. Average abnormal returns can then be calculated to assess abnormal returns over a time period, as follows:

$$AAR_i = \frac{1}{n} \sum_{i=1}^n AR_{it}$$

Where AAR_i = Average abnormal return for time t

AR_{it} = Abnormal return for company i in period t

n = Sample size

Cumulative Abnormal Returns (CARs) can be calculated as the sum of daily abnormal returns. This allows an assessment of the magnitude of the abnormal returns over the event window. Mathematically shown, this is as follows:

$$CAR_i = CAR_{t-1} + AR_t$$

Where CAR_i = Cumulative abnormal return at time t

CAR_{t-1} = Cumulative abnormal return at time $t - 1$

AR_t = Abnormal return at time t

Cumulative Abnormal Returns (CARs) can then be averaged over the event window to calculate a Cumulative Average Abnormal Return (CAAR), as follows:

$$CAAR_i = CAAR_{t-1} + AAR_t$$

Where $CAAR_i$ = Cumulative average abnormal return at time t

$CAAR_{t-1}$ = Cumulative average abnormal return at time $t - 1$

AAR_t = Average abnormal return at time t

Brown, Stephan, and Warner (1985) stress that this is only appropriate for short event windows given the risk that compounding can result in biased results.

5. Presentation of results and analysis. Results of the calculations performed in step 4 are summarized and assessed for significance. The Patell Z-score is typically used to evaluate the statistical significance of the abnormal returns (Patell, 1976). Analysis of abnormal returns and levels of significance will indicate whether the relationship between the market and identified events, and whether such changes were positive or negative. The T test, comparing means of two populations, is one measure that will be used to analyze these results. The Boehmer Test Statistic (Boehmer, Musumeci, & Poulsen, 1991) as well as the Rank Test (Corrado, 1989) and the Sign Test (Cowan, 1992) also will be shown.

In instances of a “no result” finding, it is important to acknowledge that this could mean many different things. For example, the market could have not efficiently processed

the event information, due to leakage or existing expectations already incorporated into share prices. Alternatively, the market could have processed the information and concluded that it did not have a material implication on company or industry financial prospects. Thus, careful interpretation of “no result” findings must be made.

The analysis conducted by Pastor and Veronesi (2012) demonstrates that on average, policy change announcements will cause share prices to decrease, particularly when levels of uncertainty are high. Their findings confirmed that in general, policy changes increase share price volatility and strengthen the correlation among share price changes. This information will be considered when establishing hypotheses for this study.

Section 2: Participants

Critical inputs into the event study calculations as outlined above include the selection of events, companies, and indices, as well as the data source for the share prices of publicly traded shares and relevant indices. Additionally, within the calculations the event window (the period over which a change will be evaluated), and estimation period (the period establishing the “normal” benchmark) need to be supported. These are key components of calculations, and as discussed by Mulherin (2007), “naïve modeling” in these areas may result in inaccurate conclusion.

Events. Events selected for analysis are identified in two primary categories: Legislative (associated with either the House or the Senate), or Regulatory. These event dates, a summary of the nature of the event, and their category are included in Table 1. To select key Legislative events within this study, the legislative history as assembled by Cannan (2013) will be used. In addition to the legislative actions, various agencies release technical guidance, including the release of interim and final rules on specific ACA provisions (Centers for Medicare and Medicaid Services, 2015). Dates were selected based on the official issuance date of publications by federal agencies; while these may be subject to the regulatory “noise”, Doyle (1985) posits that these agency rulings are less likely to be anticipated by the securities market than is the case for legislative rulings. These were obtained from relevant federal agency publications; for example, the Centers for Medicare and Medicaid’s Center for Consumer Information and Insurance Oversight, as well as their Regulations and Guidance Center, and are classified as Regulatory events. As discussed in Chapter 2, under the semi-strong form of market efficiency, all public information (regardless of source) is represented within share prices. Thus, the public source of the data is not important but what is critical is that the information was available to market participants.

Given the nature of the ACA legislative events, many of the identified event dates occurred in close proximity to one another. As a result, there is a risk that share price fluctuations within the estimation window would already represent average abnormal returns and create confounding variables. In order to prevent this from impacting the calculations in this study, the approach used by Khansa et al. (2012) was used. Namely, “micro events” (as they term individual events associated with their HIPAA study) are

eliminated from the calculations if they are within 30 days of another micro event. The earliest date is used in each case, ensuring an at-least 30 day window between events selected. They state,

The omission of the micro-events does not imply that we have ignored them. On the contrary, because of overlap, it means that these micro-events are already accounted for once and thus, including them again would be redundant. It is expected that the estimation period takes into account prior information generated from prior... events. (p. 757)

Table 1
Event Dates Selected for Analysis

Date	Category	Discussion
Tuesday, November 4, 2008	Political	President Obama wins the 2008 Presidential Election. During the campaign, Obama called for universal health care, thus markets had an indication that should he be elected, the industry could face changes.
Tuesday, June 9, 2009	Legislative - Senate	Two Senate Committees created draft healthcare legislation. The Senate Committee on Health, Education, Labor and Pensions (HELP) was the first to produce a draft and it was submitted to the Congressional Budget Office (CBO) on this date.

The HELP Committee draft included individual mandates, state exchanges, subsidies for low income individuals and small businesses. Most notably, no public option was included in this draft.

<p>Tuesday, July 14, 2009</p>	<p>Legislative - House</p>	<p>House Bill 3200 introduced: America's Affordable Health Choices Act of 2009, incorporating many aspects of the House Discussion Draft as well as new requirements, such as a additional tax on wealthy taxpayers to pay for the bill's costs.</p>
<p>Wednesday, September 9, 2009</p>	<p>Legislative - Senate</p>	<p>Trailing the release of the Senate HELP Committee draft on healthcare legislation, on September 9, 2009 the first Senate Finance Committee draft was produced in the form of a Chairman's Mark by Chairman Baucus.</p>
<p>Tuesday, October 13, 2009</p>	<p>Legislative - Senate</p>	<p>Finance Committee reported out Senate Bill 1796, America's Healthy Future Act. The final provisions included individual and employer mandates, subsidies for low income individuals, Medicaid expansion, and tax credits for employers. Funding provisions included a variety of sources, including Cadillac plan taxes, limitations on healthcare spending accounts, and other fees. This Act did not include a public option.</p>

Wednesday, November 18, 2009

Legislative - Senate

The Senate now had two Senate healthcare reform bills to evaluate: Senate Bill 1796 (Finance Committee) and Senate Bill 1769 (HELP Committee), as well as House bill 3962. Rather than progress these further, Senate Majority Leader Reid produced a proposal that incorporated components of each of these bills. ". Significant funding features included Cadillac plan taxes, taxes on elective cosmetic surgery, insurance companies, medical devices, pharmaceutical companies. This proposal included a public option. Of particular note was the requirement of 90% Medical Loss Ratios - significantly higher thresholds than subsequent bills. The CBO cost estimate on this proposal was significantly less than the other three Senate and House Bills, but concluded that the 90% MLR requirement would "devastate the industry." Majority Reid's proposal was issued as Senate amendment 2786, to existing House bill 3590. House Bill 3590, originally titled the Service Members Home Ownership Tax Act of 2009, was effectively gutted by Senate Amendment 2786 and used as a vehicle for healthcare reform legislation.

<p>Saturday, December 19, 2009</p>	<p>Legislative - Senate</p>	<p>Senate amendment 3276 introduced to House Bill 3590, to reflect amendments from the Senate floor. These included a replacement of cosmetic surgery taxes to indoor tanning studio taxes, as well as the introduction of requirements for segregation of premiums used to cover abortion services, to ensure that federal tax subsidies were not used for provision of abortions.</p>
<p>Thursday, March 18, 2010</p>	<p>Legislative - House</p>	<p>House Rules Committee publishes amendments to Senate Bill 3590 in form of House Bill 4872 with CBO cost estimates. House Bill 4872 is titled the Health Care and Education Reconciliation Act of 2010. Significant revisions to the bill include increased subsidies, taxes on investment income above certain thresholds, and changes to effective dates on Cadillac plan taxes.</p>
<p>Monday, November 22, 2010</p>	<p>Regulatory</p>	<p>In conjunction with the ACA, the Office of Consumer Information and Insurance Oversight provided estimates and rebate modeling information. On November 22, 2010, the agency published the Interim Final Rule for Health Insurers Implementing Medical Loss Ratio (MLR) Requirements under the Patient Protection and Affordable Care Act (OCIIO-</p>

9998-IFC), to include data and technical discussion regarding the modeling initially provided. With this data, industry analysts were better able to assess the overall impact on health insurers in aggregate and better understand the underlying assumptions made by federal agencies when crafting regulations.

Thursday,
December 30,
2010

Regulatory

Given the complexity and volume of the December 1, 2010 interim final rule, perhaps it was inevitable that certain technical errors were included. On December 30, 2010, the Health and Human Services Department issued a publication to correct technical errors in their original interim and final rule published on December 1, 2010. These errors included typographical errors as well as clarifying language (for example, addressing the use of “may” and “can”). Further, the December 1, 2010 rule failed to properly incorporate the NAIC’s recommendation of treatment of fraud recovery expenses, which were treated as an allowable component of the MLR ratio denominator in a manner similar to claims costs. This date was selected for analysis as insurers and industry analysts would be impacted by these revisions to the

original interim and final rule to the extent that it adjusted their initial interpretation of the rule and estimate of its impact.

<p>Friday, December 2, 2011</p>	<p>Regulatory</p>	<p>The administrative and operational guidance issued in the timeline to this date have primarily focused on the insurers' perspective of calculation of MLR and issuance of rebates. However, the treatment of the rebates by group health policyholders or sponsors of such plans that are covered by the Employment Retirement Security Act of 1974 (ERISA) had yet to be addressed. At question was whether the employer (policyholder) receiving the rebate was obligated to transfer all or part of the premium rebate to their employees. Complications such as termination of employee during or subsequent to the coverage period also arose. Technical release 2011-04, Guidance on Rebates for Group Health Plans Paid Pursuant to the Medical Loss Ratio Requirements of the Public Health Service Act was released on December 2, 2011 by the Department of Labor to address such issues. To the extent that the employer</p>
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group had flexibility in the disposition of their rebates, in the event that a rebate occurred it may be viewed more favorably by insurers' customers and the financial markets.

Tuesday, January 3, 2012	Legislative	January 3, 2012, as the first business day of 2012, represented an important date of two ACA-related items, the first relating to the effective date of the December 7, 2011 interim final rule discussed previously, as well as the beginning of the Accountable Care Organization (ACO) structure. Intended to encourage integrated health systems where healthcare providers and other key constituents such as local healthcare governmental agencies form relationships to better manage and coordinate Medicare patient care, participants are able to financially benefit if certain objectives are achieved. Insurers such as Humana, United Healthcare, and Cigna elected to participate in private ACO's, with the objective of improving their
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members' health and thereby decreasing their overall cost structure (Kaiser Health News, 2014).

<p>Wednesday, May 16, 2012</p>	<p>Regulatory</p>	<p>As insurers and agencies began to implement the requirements of 45 CFR 158, additional needed technical corrections were identified. Accordingly, on May 16, 2012 the Department of Health and Human Services issued a correcting amendment in the form of 77 FR 28788. This technical amendment included components such as clarification of the definition of a small group for purposes of calculating the MLR. Additionally, revisions were made to ensure consistency with the NAIC's recommendations on MLR calculations to include three months of claims payments subsequent to year-end. This publication represents an important component of the final MLR regulations.</p>
<p>Thursday, June 21, 2012</p>	<p>Regulatory</p>	<p>The Center for Consumer Information and Oversight, an arm of CMS, published a report on "The 80/20 Rule" outlining the results of the 2011 MLR filings by insurers and rebate amounts.</p>

<p>Friday, February 15, 2013</p>	<p>Regulatory</p>	<p>The Center for Consumer Information and Oversight, an arm of CMS, published a report on "The 80/20 Rule" outlining the final results of the 2011 MLR filings by insurers and rebate amounts with additional analysis from their June 21, 2012 publication.</p>
<p>Thursday, June 20, 2013</p>	<p>Regulatory</p>	<p>The Center for Consumer Information and Oversight, an arm of CMS, published a report on "The 80/20 Rule" outlining the final results of the 2012 MLR filings by insurers and rebate amounts.</p>
<p>Tuesday, January 7, 2014</p>	<p>Regulatory</p>	<p>The January 7, 2014 final rule issued by the Department of Health and Human Services impacts a variety of sections of 45 CFR as it addresses ACA clarifications. Certain of these revisions specifically relate to MLR calculations, but many of these modifications apply directly to insurers in other ways, such as discussion of insufficiency of reinsurance fees collected in relation to reinsurance claims submitted. This date was selected as these amendments and publications continued to refine and revise the implementation and compliance with ACA provisions.</p>

Thursday, July 24, 2014	Regulatory	The Center for Consumer Information and Oversight, an arm of CMS, published a report on "The 80/20 Rule" outlining the final results of the 2013 MLR filings by insurers and rebate amounts.
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Event Window. As discussed by Binder (1985) and others, one key challenge in establishing an event window is that it is unknown when expectations change during the course of a regulatory event. Larker, Ormazabel, and Taylor (2011) address this risk in their analysis of corporate governance regulation by selecting both the formal announcement date as well as the date it appears in the media, finding that in all but one case these events are on the same day. An important component of selecting the event window is to balance the risk of information “leakage” with the risk that an inappropriately broad event window will increase the results of a “no effect” finding (Lamdin, 2001). Accordingly, studies have used an event window of the event date +/- 3 days, comprising a seven day window (Kudo, Yong Jae, Walker, & Connaughton, 2015), or simply used daily, weekly, or monthly data, with equal acceptance and use within the literature (Lamdin, 2001). Given the quickly moving regulatory timeline for the legislative development of the ACA, as outlined in the Dates section, this +/- 3 day window will be used. This will prevent significant overlap in event windows for individual events, and allow for sufficient precision in calculations to address the risk of a “no results” finding. This method will also be employed for agency rulings.

Earnings announcements, which are incorporated into share prices within one day (Fama, 1991) differ from regulatory, legislative and political developments due to the

level of complexity of rulings and bills and the need to understand and assess the ultimate outcome on organizations. Thus, it is reasonable to use a longer event window for this study, as supported by the methods used by other event study researchers as discussed previously.

Companies Selected. One underlying assumption of the event study methodology is the normal distribution of data. Brown and Warner (1985) emphasize that non-normality of data proves especially problematic when event windows are based on daily events. Corrado (2011) concludes that active markets, such as the New York Stock Exchange (NYSE), typically have sufficient normality of share price data to overcome these challenges. Within the companies actively traded on the NYSE, there are 16 companies classified as healthcare insurers based on their SIC or NAICS code. These include the following:

Table 2

Companies Selected for Analysis

Company Name	Exchange	Ticker Symbol
Aetna Inc.	NYSE	AET
AFLAC Inc.	NYSE	AFL
Anthem Inc. (formerly Wellpoint)	NYSE	ANTHM (WLP)
Assurant Inc.	NYSE	AIZ

Centene Corp.	NYSE	CNC
Cigna Corp.	NYSE	CI
CNO Financial Health Group Inc.	NYSE	CNO
Health Net Inc.	NYSE	HNT
Humana Inc.	NYSE	HUM
Molina Healthcare Inc.	NYSE	MOH
Principal Financial Group	NYSE	PFG
Reinsurance Group of America Inc.	NYSE	RGA
Stancorp Financial Group Inc.	NYSE	SFG
UnitedHealth Group Inc.	NYSE	UNH
Unum Group	NYSE	UNM
WellCare Health Plans Inc.	NYSE	WCG

When evaluating the impact of a regulatory event, Schwert (1981) suggests the use of a portfolio-level calculation to address the concern that regulatory changes impact multiple firms; this method will be utilized during this study. These 16 companies will comprise the healthcare insurer portfolio based on their shared SICs (6321 or 6324) or NAICS code (524114) classification. The use of a portfolio of companies is also supported by the research conducted by Firth (1976), which found that earnings announcements are absorbed into the share prices of close competitors. Efficient markets incorporate information from a variety of sources, and using a portfolio of companies will

best reduce the presence of confounding variables that may impact an individual company's share price.

Indices. As discussed by Canina, Michaely, Thaler, and Womack (1998) selection of an index should consider the index in which the selected companies are included; for example, if the companies are members of the S&P 500 index, then it would be appropriate to use this as a basis. However, in cases where a larger sample of companies are being evaluated, it is appropriate to use a broader index. In the case of this study, not all 16 insurers are members of the S&P 500, but all are actively traded on the NYSE. As a result, the New York Stock Exchange Composite Index (ticker NYA) is an appropriate index. Based on the research of Canina et al. (1998), which demonstrated that value-weighted indices are a better representation of portfolios held by investors and are statistically preferable, a value-weighted index will be utilized, which is the case for NYA.

Data Sources – Share Prices. To institute a consistent level of measurement, the event day share price will be based on the closing share price as reported by the respective market; should the event occur on a day in which the financial markets are closed, the subsequent trading day will be used. (The use of the subsequent trading day is the accepted method in event studies to address non-trading days, as discussed in Bloom, 2011.) Open source data on close of business day share prices for the 16 insurers will be obtained from Qwandl and validated for reliability and validity on the basis of a random sample with another independent source, Yahoo! Finance. The share prices for the selected index (NYA) is the New York Stock Exchange official website; given the nature of this as the source data, no validation of share prices is considered necessary.

Estimation Period. The estimation period serves as the benchmark of time used to establish expectations regarding a normal rate of return. As discussed by Salinger (1992), errors may occur when the event window and the estimation period overlap, and thus careful consideration of dates must be made. When using monthly data measurements, studies commonly use five to seven years of data to determine the estimation period (Binder, 1998). In the case of daily data measurements a 120-day estimation window period is commonly used (Campbell, Gordon, Loeb, & Zhou, 2003), although the use of 30, 60, or 90 day periods are also utilized. However, when events occur in close proximity to one another, it is important to reduce the overlap of event dates with the estimation windows (Khansa, Cook, James, & Bruyaka, 2012). Given that the event window is based on periods of days, and considering the number of events measured, a 30-day window will be utilized.

Section 3: Measures

As discussed previously, application of the event study methodology to regulatory events requires specific consideration of challenges. The following table outlines certain of these key considerations.

Table 3

Event Study Considerations

#	Issue	Response	Reference
1	It is unclear when expectations change.	Allow for broad event windows but balance with likelihood that a large window will create a “no effect” response.	Binder (1985), Brown & Warner (1980), Lamdin (2001)
2	Regulatory events are more likely to be anticipated.	Similar to issue #1, consider broadening event window. Error on side of earliest placement of event date. Break regulatory process into “micro events” for analysis.	Binder (1985), Lamdin (2001), Mulherin (2007)
3	One industry may have “winners” and “losers” as a result of the same legislation.	Evaluate results for a portfolio of companies.	Binder (1985)
4	Confounding variables may make it unclear if prices change as a result of an industry-specific shock or regulatory event.	Review the Wall Street Journal, Business & Finance Section, for the trading day subsequent to the event day to identify what analysts believe	Binder (1985), McWilliams & Siegel (1997), Larcker,

		was the driver of market returns on that day.	Ormazabal & Taylor (2011)
6	Share price changes may be inconsistent with other metrics.	Acknowledged limitation that market response may not indicate true impact of regulation.	Lamdin (2001), Reynolds (2008)
7	Sample sizes may be insufficient to evaluate market reaction.	All NYSE health insurers are selected for evaluation, based on SICs and NAICS codes.	Lamdin (2001)
8	Cross-sectional dependence may occur when events are “clustered”.	Ensure event period is relatively short compared to estimation window.	Brown & Warner (1980), Binder (1998)
9	Expected return model used may not appropriately reflect normal return.	Use the Market Model, allowing use of actual share data, and careful selection of an appropriate index.	Kothari & Warner (2006), Brown & Warner (1985)

Examples of potential confounding variables would include events that would potentially have an impact on healthcare industry participants that are more significant than other financial market participants. Examples could include such items as outbreaks of diseases, shortages of key pharmaceuticals, new or revised healthcare regulations not within the scope of this study, events specific to individual companies within the insurer portfolio unrelated to the ACA, etc.

In summary, there are critical decision points regarding the selection of dates and sample sizes, and careful considerations of compounding variables must occur. Literature addressing these specific elements of event studies will facilitate the implementation of methodology for this study.

Regarding Normality of Data. There are several expected return models available for use in event studies, including the Capital Asset Pricing Model (CAPM), the mean-adjusted return model, the market-adjusted return model, and the market model. The CAPM has largely been rejected as a model of expected returns (Khotari & Warner, 2006), given the post-earnings announcement effect (Ball & Brown, 1968). The mean-adjusted return model and the market-adjusted return model both rely on a simple arithmetic average in their calculation of abnormal returns and thus are prone to outliers. In contrast, the market model uses the Ordinary Least Squares method (OLS) to minimize the impact of outliers (Khotari & Warner, 2006). The market model has been selected for use in this study.

However, many tools used to evaluate abnormal returns are parametric tests in which normality of data is assumed. This includes the Patell Z-test, which is a parametric, standardized abnormal return test commonly used in event studies (Bloom, 2012), as well as the Boehmer test statistic. The most common way to address non-normality of data in event studies is to pair parametric tests with nonparametric tests such as the Rank and Sign tests which do not assume data is normally distributed. In this manner, differences between parametric and nonparametric test results may indicate instances where data is not normally distributed; this allows each series of tests to serve as a robustness check against one another (Campbell, Lo, & MacKinlay, 1997).

Corrado (2011) concludes that active markets, such as the New York Stock Exchange (NYSE), typically have sufficient normality of share price data to overcome these challenges, and use of an index in this study (the NYSE Stock Exchange Index, ticker NYA) alleviates concerns about normality of data for the market benchmark. Individual insurer returns for the legislative and regulatory event categories will be evaluated for normality of data to inform reliance upon parametric and nonparametric test results.

Section 4: Pilot Study

In order to evaluate the data sources, underlying assumptions, and overall methodology that will be used in this research, a pilot study was conducted. The event day of November 4, 2008, representing the election of President Obama, was selected as it represents a triggering event for all subsequent ACA-related developments. While this is not directly related to the research questions posed in this study, it does provide an opportunity to evaluate the overall methodology and assumptions. Calculations for this date are not expected to have a significant Cumulative Abnormal Return (CAR) for the 16 insurers tested.

As discussed previously, share prices for the 16 insurers for all dates in the estimation and event windows were obtained from Qwandl; share prices for the index (NYA) was obtained from the official New York Stock Exchange website. Calculations were generated using Event Study Metrics software. The estimation window used was 30 days, while the event window was the three trading days prior to and subsequent to

November 4, 2008. No significant modifications in approach or assumptions were identified as a result of this pilot study.

Results were as follows:

Table 4

Daily Mean Abnormal Returns and Test Statistics Surrounding Pilot Event Date (N = 16)

Day	Cumulative		T test	Patell Z	Boehmer		
	Average Abnormal Returns	Average Abnormal Returns			Test Statistic	Rank Test	Sign Test
-3	-0.06	-0.06	1.19	0.79	0.66	0.58	1.39
-2	0.01	-0.05	3.06**	3.00**	4.37***	1.55	2.39*
-1	0.05	0.00	2.16*	2.20*	2.37*	1.19	1.89
0	-0.02	-0.03	-1.58	-2.37*	-1.53	-0.67	-0.61
1	0.04	0.01	0.54	0.39	0.44	0.41	0.89
2	0.04	0.05	1.89	1.45	1.71*	0.87	1.89*
3	0.00	0.05	1.67	0.98	1.07	0.37	0.89

* $p < .05$. ** $p < .01$. *** $p < .001$

Section 5: Data Analysis

Analysis of abnormal returns and levels of significance will indicate whether the financial markets reacted to identified events for the portfolio of health insurers, and

whether such reactions were positive or negative. Specific metrics evaluated will be summarized below, followed by a further discussion of the results of the pilot study.

The Cumulative Average Abnormal Returns (CAAR) amount represents the accumulated amount of abnormal returns over the event window, and is converted into percentages for an understanding of market return rates. In an event study, the CAAR serves as an effect size, since it provides information on the size of the difference between normal returns and the abnormal returns experienced as a result of an event. The T test demonstrates whether the mean of a population significantly differs from the mean of another population when assessing the Average Abnormal Returns. When evaluating the statistical significance of abnormal returns, it is valuable to pair parametric and nonparametric tests (Bloom, 2011). Parametric tests assume that individual firms' results are normally distributed, while nonparametric tests make no such assumption. The Patell Z score and Boehmer Test statistics represent parametric tests, while the Rank Test and the Sign Test are nonparametric.

The Patell Z score shows the statistical significance of the abnormal return, aggregated for all firms (Patell, 1976). Similarly, the Boehmer Test statistic shows the statistical significance of the abnormal return, aggregated for all firms but uniquely addresses issues of event clustering (volatility-changing events) (Boehmer, Musumeci, & Poulsen, 1991). The Rank Test shows the statistical significance of the abnormal return, aggregated for all firms, and is proven robust against event-induced volatility and cross-correlation (Corrado, 1989; Corrado & Zivney, 1992). The Sign Test compares the percentage of positive abnormal returns close to an event to the percentage found during

a normal period. Since the focus is on the overall percentage of abnormal returns, volatility does not impact these results (Cowan, 1992).

A summary of the test results for each daily return is shown in Table 4. These results showed a cumulative average abnormal price return (in comparison to the New York Stock Exchange Composite Index) for days -3 to the event day of -3.0%. Cumulative average abnormal returns on day -2 were -5.0%, statistically significant at the .001 level for the Boehmer test statistic, at .01 for the Patell and T tests, and at .05 for the Sign test. Nonparametric tests thus confirm the parametric test results. No other individual days demonstrated statistical significance.

As discussed previously, for dates that demonstrate statistically significant results, an additional step will be taken to identify confounding variables (Larker, Ormazabel, & Taylor, 2011). This will be addressed through review of the Wall Street Journal (WSJ) on the trading day subsequent to the event day. In this case, adjusted for non-trading days, day -2 is October 31, 2008; the subsequent WSJ publication day is November 1, 2008. Market fluctuations occurring on October 31, 2008 as discussed in the WSJ on November 1, 2008 were largely attributed to fluctuations in oil and commodity prices. Given the nature of health insurers, this is not deemed to be a significant confounding variable that would alter conclusions.

As discussed further in the Limitations section, very specific and limited steps are being taken to identify confounding variables. Examples of potential confounding variables would include events that would potentially have an impact on healthcare industry participants that are more significant than other financial market participants.

Examples could include such items as outbreaks of diseases, shortages of key pharmaceuticals, new or revised healthcare regulations not within the scope of this study, events specific to individual companies within the insurer portfolio unrelated to the ACA, etc. A more exhaustive search for additional confounding variables represents an opportunity for future research.

Chapter 3 Overview

Chapter 3 comprised an overview of the research design and event study methodology that will be used in this research project. Participant selection, relevant measures and data collection procedures, as well as an overview of data analysis, were provided. In particular, complexities of the event study method when applied to regulatory and legislative events were discussed, and key estimates and assumptions were outlined that are important inputs to the calculations. A pilot study was conducted for one date to demonstrate how the data will be collected, used, and how calculations will be presented within Chapter 4 of this dissertation.

Chapter 4: Results

As discussed in previous chapters, the purpose of this study is to answer one important question for the Affordable Care Act and in particular the introduction of a consistent, nation-wide MLR requirement: has it been associated with changes in the share prices of publicly traded health insurers? Specifically:

1. What is the relationship between legislative developments related to the establishment of the Affordable Care Act and changes in share prices of publicly traded health insurers?
2. What is the relationship between regulatory events related to the establishment of the federal Medical Loss Ratio and changes in share prices of publicly traded health insurers?

Given that the ACA was the federal legislation that established the MLR, in order to understand market reaction to the MLR it is necessary to examine the response to the ACA itself in its various iterations. Examining the MLR through the lens of the overall response to the ACA will allow us to understand how the MLR requirements are associated with changes in share prices. Market reactions to regulatory developments associated with the MLR provide a separate view into the perceived importance of the ratio.

The relationship between ACA events and changes in share prices will be measured using event study methodology to evaluate key announcements and

clarifications associated with the Accountable Care Act and the Medical Loss Ratio requirements. Each event will be assessed to determine if it had a measurable relationship (in the form of a Cumulative Average Abnormal Return or CAAR) on changes in the closing daily stock price of United States publicly traded health insurers, controlling for overall market performance. In an event study, the CAAR serves as an effect size, since it provides information on the size of the difference between normal returns and the abnormal returns experienced as a result of an event.

Through this analysis, overall trends of market perception of the ACA's MLR provisions and MLR regulatory developments will become apparent. Events will be categorized as legislative or regulatory, and evaluated in a three-day event window for the period before and after an event.

This chapter will address the following hypotheses:

H1: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for legislative events.

H2: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for regulatory events.

Hypothesis 1: Legislative Events

Drafts of ACA legislation included differing requirements related to Medical Loss Ratio reporting and rebate levels. Understanding the overall market reaction to legislative events associated with the ACA, including iterations of MLR requirements, is a necessary first step in answering the research questions.

An initial review of the normality of return data was conducted for all legislative events and all 16 insurers, for all trading days in the 30 day estimation window and +3 event window. This information indicates the extent to which parametric tests may be impacted by non-normality of data. Skewness calculations for this data set demonstrated slightly positive skew of 0.95, with a median of 0.17%, and mean of 0.23%. Since the 0.95 skewness is within the range of -1.00 to +1.00, then the return data is considered normal (Morgan, Leech, Gloeckner, & Barrett, 2004). Kurtosis calculations demonstrated a leptokurtic distribution (defined as greater than the normal distribution rate of 3.00); return data kurtosis was 12.95. This higher kurtosis level results from infrequent extreme deviations or outliers in insurer return data. Given that nonparametric tests are designed to address non-normality of data (such as when kurtosis is high), the combination of parametric and nonparametric test results addresses high levels of kurtosis. Tests used are sufficiently robust to address skewness and kurtosis calculation results.

Table 5

Daily Mean Abnormal Returns and Test Statistics Surrounding Legislative Event Dates

(*N* = 16)

Day	Cumulative			Boehmer			
	Average Abnormal Returns	Average Abnormal Returns	T test	Patell Z	Test Statistic	Rank Test	Sign Test
-3	-0.01	-0.01	-2.42*	-1.21	-0.92*	0.86*	2.20*
-2	0.00	-0.01	-1.76*	-0.42	-0.30	-0.53	-0.26
-1	-0.01	-0.01	-1.68*	-0.44	-0.35	-0.58	-0.26
0	0.00	-0.02	-1.84*	-0.28	-0.23	-0.39	-1.14
1	0.00	-0.01	-0.36	1.02	0.76	0.09	-0.61
2	0.00	-0.02	-1.05	0.42	0.29	-0.14	-0.26
3	0.00	-0.01	-0.79	0.76	0.58	-0.10	0.10

p* < .05. *p* < .01. ****p* < .001

A summary of the test results for each daily return is shown in Table 5. These results showed a cumulative average abnormal price return (in comparison to the New York Stock Exchange Composite Index) for the period from day -3 to 3 of -1.48%. These results were not statistically significant for any of the tests performed. Cumulative average abnormal returns on day -3 were -1.0%, statistically significant at the .05 level for the T test, Boehmer test statistic, Rank and Sign tests. Nonparametric tests thus confirm the parametric test results. No other individual days demonstrated consistent

results with statistical significance. These results suggest that the selected ACA-related legislative events in aggregate did not have a significant relationship to changes in share prices of the publicly traded health insurers. The hypothesis is not supported.

A Review of Individual Legislative Event Dates

Moving from an aggregate legislative category view, the next analytical step is to consider individual components of that category: share price activity associated with individual legislative dates. Once individual dates are assessed, we can better understand the MLR content within the draft legislation to form a more complete picture about the market's response to MLR.

When considering individual dates within the overall legislative category, one date did reflect results of note: June 9, 2009. On this date, the Senate Committee on Health, Education, Labor and Pensions (HELP) was the first Senate committee to submit a draft bill on healthcare legislation to the Congressional Budget Office (CBO) for review. The HELP Committee draft included individual mandates, state exchanges, subsidies for low income individuals, and for small businesses; many of these elements were ultimately included in the final ACA legislation. Chronologically, as demonstrated in Table 1, this was the earliest draft produced of ACA legislation within the House or Senate. As such, it represents the first opportunity for the financial markets to respond to draft healthcare reform legislation in any format. As documented within the CBO's cost estimate of the draft legislation dated June 15, 2009, the HELP Committee draft did include requirements related to Medical Loss Ratios, with the provision that the HHS

Secretary would have the authority to set the levels at which rebates would be required (Congressional Budget Office, 2009).

The results for event date June 9, 2009 were as follows:

Table 6

Daily Mean Abnormal Returns and Test Statistics Surrounding June 9, 2009 (N = 16)

Day	Cumulative		T test	Patell Z	Boehmer		
	Average Abnormal Returns	Average Abnormal Returns			Test Statistic	Rank Test	Sign Test
-3	-0.01	-0.01	-3.44***	-4.02***	-6.22***	-1.82	-3.28***
-2	0.00	-0.01	-3.29***	-3.86***	-5.62***	-1.76	3.28***
-1	-0.03	-0.04	-2.97**	-3.52***	-5.95***	-1.73	-2.78**
0	-0.03	-0.06	-2.41*	-2.79*	-7.60***	-1.59	-3.78***
1	0.00	-0.06	-1.87	-2.19*	-5.08***	-1.07	-2.78**
2	-0.02	-0.08	-2.70**	-3.13**	-6.34***	-1.54	-3.28***
3	-0.01	-0.09	-2.82**	-3.18**	-6.56***	-1.59	-3.28***

* $p < .05$. ** $p < .01$. *** $p < .001$

Cumulative average abnormal returns for the period from -3 to 3 days for event date of June 9, 2009 was -9.46%, with statistical significance at the $p < 0.001$ level for the Boehmer and Sign tests, and at $p < 0.01$ for the T and Patell Z tests. Note that the Rank test did not demonstrate any statistically significant results during the event window. With the exception of the lack of statistically significant Rank test results, parametric and nonparametric tests were consistent. The average abnormal returns

produced each day from day -3 to day 3 were consistently negative (with days -2 and 1 both producing average abnormal returns of -0.2%) and test results demonstrating statistical significance at the $p < 0.001$ or $p < 0.01$ levels.

A Review of Individual Insurer Share Prices for Event Date June 9, 2009

After considering aggregate legislative category results, as well as a view of share price fluctuations for specific days within that category, the next refinement of data is to evaluate individual companies' share price performance. Considering individual company share performance on event date June 9, 2009, all insurers experienced negative cumulative abnormal returns for the period from -3 to 3 days with the exception of Assurant (ticker AIZ), with positive returns of 7.4%. This is in comparison to cumulative average abnormal returns that reflect much larger negative returns for this period. Excluding AIZ from the analysis of the June 9, 2009 legislative event date, CAARs through event date + 3 / - 3 were 10.58% (in comparison to the 9.46% including AIZ). This was statistically significant at the $p < 0.001$ level for the T, Patell Z, and Boehmer test statistics.

A summary of individual insurer cumulative average abnormal returns for the period from -3 to 3 days for event date June 9, 2009 is as follows:

Table 7

Cumulative Average Abnormal Returns for June 9, 2009 (-3 to 3) By Insurer

	Cumulative Average
Ticker	Abnormal Returns
AET	-0.14
AFL	-0.07
ANTHM	-0.08
AIZ	0.07
CNC	-0.03
CI	-0.14
CNO	-0.19
HNT	-0.15
HUM	-0.08
MOH	-0.08
PFG	-0.07
RGA	-0.08
SFG	-0.10
UNH	-0.17
UNM	-0.02
WCG	-0.17

A review of the Wall Street Journal Business & Finance Section for the trading day subsequent to the June 9, 2009 event date (Wednesday, June 10, 2009) in an effort to identify obvious signs of confounding variables did not identify any events that appear to

invalidate the results previously discussed. Financial market drivers were attributed to government bailout of financial institutions and automotive industry firms.

Summary: Legislative Events

In summary, the aggregate category of legislative events was not shown to have a statistically significant relationship to changes in share prices of publicly traded health insurers. The hypothesis was thus not upheld. However, when reviewing individual event dates within the overall legislative category, there was one date for which publicly traded health insurers did experience statistically significant cumulative average abnormal returns: June 9, 2009. On that date, the first draft of ACA legislation, with MLR requirements, was produced by the HELP Committee. Refining the investigation further, for the June 9, 2009 event date, all insurers experienced negative cumulative average abnormal returns with the exception of Assurant, whose shares demonstrated a cumulative average abnormal return of 7.4%. The scope of the HELP Committee legislation makes it difficult to determine the extent to which the inclusion of the MLR requirements are related to changes in share prices; however, it does provide context for the market's overall assessment of the ACA.

Hypothesis 2: Regulatory Events

An initial review of the normality of return data was conducted for all regulatory events and all 16 insurers, for all trading days in the 30 day estimation window and +3 event window. This information indicates the extent to which parametric tests may be

impacted by non-normality of data. Skewness calculations for this data set demonstrated negative skew of -2.91, with a median of 0.05%, and mean of 0.03%. Since the -2.91 skewness is outside of the range of -1.00 to +1.00, then the return data is not considered normal (Morgan, et al., 2004). This indicates that nonparametric tests may prove more reliable than parametric tests when evaluating the cumulative average abnormal returns. Kurtosis calculations demonstrated a leptokurtic distribution (defined as greater than the normal distribution rate of 3.00); return data kurtosis was 56.33. This higher kurtosis level results from infrequent extreme deviations or outliers in insurer return data. Given that nonparametric tests are designed to address non-normality of data (such as when kurtosis is high), nonparametric tests address this distribution of data. Tests used are sufficiently robust to address skewness and kurtosis calculation results.

Table 8

Daily Mean Abnormal Returns and Test Statistics Surrounding Regulatory Event Dates

(N = 16)

Day	Cumulative		T test	Patell Z	Boehmer		
	Average Abnormal Returns	Average Abnormal Returns			Test Statistic	Rank Test	Sign Test
-3	0.00	0.00	4.09***	3.75***	3.54***	1.12	3.10*
-2	0.01	0.01	4.34***	4.36***	3.81***	1.38	3.63***
-1	0.00	0.01	1.78	2.17*	1.93	0.47	1.69
0	0.01	0.02	3.09**	4.48***	4.08***	1.51	1.87
1	0.00	0.02	2.27*	2.63**	2.35*	0.78	1.51
2	0.00	0.02	2.88**	3.73***	3.25**	1.24	2.22*
3	0.00	0.02	2.29*	2.46*	2.52*	0.78	1.69

*p < .05. **p < .01. ***p < .001

A summary of the test results for each daily return is shown in Table 8. These results showed a cumulative average abnormal price return (in comparison to the New York Stock Exchange Composite Index) for period day -3 to 3 of 1.9%. This was statistically significant at the p < 0.05 level for the T, Patell Z, and Boehmer Test Statistics. Sign test results of 1.69 for day -3 to 3 were reported at p < .10. More noticeable were the results for day 0, which reflected a cumulative average abnormal return of 1.6%, statistically significant at the p < 0.001 level for the Patell Z and Boehmer

Test statistics, and at the $p < 0.01$ level for the T test. Considered in aggregate, these results demonstrate that the identified regulatory events are associated with a slightly positive change in share prices for publicly traded insurers. The hypothesis was not upheld.

It is important to note that while the parametric (Patell Z and Boehmer) and nonparametric (Rank and Sign) test results were directionally consistent, since the insurer returns in the regulatory category of data were found to be negatively skewed, parametric tests may be unreliable. Nonparametric tests provide the primary evidence that the hypothesis was not upheld.

A Review of a Subcategory of Regulatory Events

Within the larger category of regulatory events, there are three dates on which similar CMS publications occurred: the release of their reports on “The 80/20 Rule” for each preceding year. In this report, CMS outlines the results for the MLR filings by state and line of business, including rebate amounts. The CMS report allows better readers to easily compare and understand market dynamics in each jurisdiction and line of business category. However, to the extent that individual insurers had previously issued press releases or other communications regarding their rebate obligations, this information may already have been incorporated into share prices (assuming the semi-strong form of market efficiency). For example, Aetna’s rebate distribution and communication schedule for 2011 rebates included activity beginning on June 19, 2012, in advance of the CMS report publication date on June 21, 2012 (Aetna, 2012).

As discussed in Table 1 on June 21, 2012, February 15, 2013, and June 20, 2013, CMS issued publications associated with the 80/20 Rule. A summary of test results for only dates associated with 80/20 Rule publications by CMS are as follows:

Table 9

Daily Mean Abnormal Returns and Test Statistics Surrounding 80/20 Rule Publication Dates (N = 16)

Day	Cumulative		T test	Patell Z	Boehmer		
	Average Abnormal Returns	Average Abnormal Returns			Test Statistic	Rank Test	Sign Test
-3	0.00	0.00	2.47*	3.05**	2.50*	0.92	1.66
-2	0.00	0.00	2.43*	2.88**	2.22*	0.98	2.52*
-1	0.00	0.01	2.09*	2.55*	2.01*	0.92	1.95
0	0.01	0.02	3.92***	4.86***	4.31***	2.07*	3.10*
1	0.00	0.01	1.67	1.82	1.38	0.59	0.79
2	0.00	0.02	1.99	1.98*	1.50	0.71	1.37
3	0.00	0.02	1.82	1.88	1.84	0.72	1.08

* $p < .05$. ** $p < .01$. *** $p < .001$

A summary of the test results for each daily return is shown in Table 9. These results showed a cumulative average abnormal price return (in comparison to the New York Stock Exchange Composite Index) for the period from day -3 to day 3 of 1.9%.

These results were not statistically significant for any of the tests performed. Cumulative average abnormal returns on event day 0 were also 1.9%, statistically significant at the 0.001 level for the T, Patell Z, and Boehmer Test statistics, and at the .05 level for the Rank and Sign tests. Nonparametric tests thus confirm the parametric test results, although since the regulatory return data is not normally distributed, nonparametric tests provide the primary evidence for these conclusions.

Before a conclusion can be reached regarding the relationship between the 80/20 rule publications and share prices, an initial search for confounding variables must be made for event dates June 21, 2012, February 15, 2013, and June 20, 2013. Financial market activity for June 21, 2012 was attributed to declining profitability within the financial sector; for February 15, 2013 to the G-20 efforts on monetary policy and the natural gas market; and for June 20, 2013 it was attributed to the wind down of the Federal bond buying program. All information was based on the Wall Street Journal Business and Finance section summary of financial market drivers for the day subsequent to the event day. None of these identified drivers present an obvious confounding variable that would invalidate results.

A Review of Individual Regulatory Event Dates

Following the approach used for the legislative events, I will now proceed to evaluating individual dates within the overall regulatory category. This evaluation demonstrated that the directionally positive results for CAARs were consistent among the eight individual regulatory events dates. These typically produced CAARs in the -3 to 3

event day window of positive CAARs between 0% and 3%; one date did demonstrate significantly higher percentage CAARs in that -3 to 3 day event window: December 2, 2011. On that date, CMS issued technical release 2011-4, *Guidance on Rebates for Group Health Plans Paid Pursuant to the Medical Loss Ratio Requirements*. The results for event date December 2, 2011 were as follows:

Table 10

Daily Mean Abnormal Returns and Test Statistics Surrounding December 2, 2011 (N = 16)

Day	Cumulative		T test	Patell Z	Boehmer		
	Average Abnormal Returns	Average Abnormal Returns			Test Statistic	Rank Test	Sign Test
-3	0.01	0.01	3.07**	2.94**	3.20**	0.51	2.06*
-2	0.06	0.06	3.04**	2.68**	3.05**	0.35	2.06*
-1	-0.01	0.05	-1.01	-1.12	-2.02*	-0.57	-1.44
0	-0.01	0.05	-1.06	-1.19	-2.98**	-0.60	-1.94
1	0.01	0.05	-0.05	-0.20	-0.32	-0.17	0.06
2	0.00	0.05	-0.03	-0.16	-0.23	-0.17	-0.44
3	0.00	0.06	0.27	0.27	0.35	-0.03	0.06

* $p < .05$. ** $p < .01$. *** $p < .001$

While CAARs of 5.6% were experienced through day -3 to 3 for event date December 2, 2011, this was not statistically significant. Activity from period -3 to -2, with a CAAR of 6.4%, did reflect statistically significant T, Patel Z, and Boehmer test statistics at the $p < 0.01$ level. Therefore, while the cumulative average abnormal returns for this date were large, they were not statistically significant.

A review of individual share price activity for the period from day -3 to 3 for event date December 2, 2011 provides insight into why the results shown in the table above do not represent statistically significant results. Cumulative abnormal returns during this period range from - 10.0% for WellCare Health Plans (WCG) to 20.4% for Principal Financial Group (PFG). Accordingly, there do not appear to be consistent trends regarding the relationship between this event date and fluctuations in individual insurer share prices.

A preliminary search for confounding variables based on the Wall Street Journal Business and Finance section discussion significant market drivers for trading day December 2, 2011 (publication date December 3, 2011) attributed market fluctuations to unemployment rate reporting, noting that the rate had dropped to its lowest point in 32 months. This did not present any indication of confounding variables that would invalidate conclusions discussed.

Summary: Regulatory Events

As outlined previously, events within the overall regulatory category resulted in slightly positive cumulative average abnormal returns for publicly traded health insurers.

Further examining regulatory events relating to CMS publications on the 80/20 Rule demonstrated that cumulative average abnormal returns on those dates were also slightly positive, but not statistically significant. One individual regulatory event date (December 2, 2011) did demonstrate large cumulative average abnormal returns but they were not statistically significant; review of individual share performance for that date made it clear why returns were not statistically significant, given there did not appear to be consistent trends for individual share prices.

Results: In Conclusion

The overall hypotheses regarding legislative and regulatory event dates were not upheld, as within the legislative category there were not statistically significant results and for the regulatory category, cumulative average abnormal returns were slightly positive. However, refining calculations to individual dates and individual insurers did demonstrate findings of note: specifically, the share prices of insurers for legislative event date of June 9, 2009 experienced significant negative cumulative average abnormal returns. One insurer – Assurant – experienced positive cumulative average abnormal returns, unlike the other companies in the insurer population. In Chapter 5, these findings will be further discussed and analyzed in light of the Efficient Market Hypothesis and implications for further research.

Chapter 5: Discussion

The intention of this study was to examine the following research question: what is the relationship between the Affordable Care Act and the requirements related to the Medical Loss Ratio in particular, and the share prices of publicly traded health insurers? Specifically:

1. What is the relationship between legislative developments related to the establishment of the Affordable Care Act and changes in share prices of publicly traded health insurers?
2. What is the relationship between regulatory events related to the establishment of the federal Medical Loss Ratio and changes in share prices of publicly traded health insurers?

The answers to these questions have important implications for not only employees and leaders of those insurers, but also for investors, politicians, and other healthcare industry participants, as they seek maximize their investments, assess and respond to public opinion, and navigate the impact of new regulations.

As discussed previously, the ACA is arguably the most important political, legislative, and regulatory development in the healthcare industry within the last fifty years, with implications for healthcare access, payment mechanisms, and quality of care. The scope and the complexity of the Act poses difficulty for those seeking to isolate its impact: researchers judge it too early to measure quality impacts and highly difficult to

measure the overall impact on healthcare costs (Blumenthal, Abrams, & Nuzum, 2015). In contrast share prices represent one measure that can be assessed contemporaneously and serve as an early indicator of the financial market's perception of the ACA for publicly traded health insurers. In particular, the MLR represents a key area of focus in this study given its effective limitation on the profitability of insurers. While selected state MLR's did exist prior to the ACA, the Act served to make these consistent, more stringent than state ratio limits, and created highly visible metrics (Harrington, 2013).

Understanding the implications of the ACA and its MLR requirements for health insurers is of relevance not only for the publicly traded insurers and their employees, but also for not-for-profit insurers interested in financing options and employers managing their significant fringe benefit costs. Policyholders of these insurance companies also have the potential to be impacted by MLR rebates or the ancillary effects of premium reductions as insurers seek to manage their ratios. Further, the interconnectedness of the overall healthcare industry (Ewing, Kruse, & Thompson, 2008) further supports that other industry players, such as healthcare providers and pharmaceutical companies, could be impacted by developments impacting insurers.

A foundational theory relating to fluctuations in share prices is Fama's Efficient Market Hypothesis, which addresses how information is incorporated into share prices. As discussed by Ball and Brown (2014), share prices are simply the result of information flows as investors seek to learn, assess, and conclude on the information obtained. The semi-strong form of market efficiency is the basis for this study, assuming that all public information is incorporated into share prices. The fluctuations in share prices during the time period analyzed might not represent the actual overall financial impact of the ACA

and MLR provisions; as researched by Reynolds (2008) in her review of anti-dumping regulations, initial assessments may differ significantly from eventual outcomes. The EMH does not measure the quality of decisions made by rational or irrational investors, nor does it draw a conclusion about the accuracy of the appropriateness of the directional fluctuation (increase or decrease) or significance of the change. Similarly, this study does not seek to conclude on the quality or accuracy of decisions made by investors in response to ACA and MLR developments but rather to understand the nature of the share prices and decisions made by investors, reflected in the changes in share prices.

In order to answer the overall research questions, two specific hypotheses were developed:

H1: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for legislative events.

H2: Cumulative average abnormal price returns (compared to the New York Stock Exchange Composite Index) for public company insurers will be less than zero for the period -3 to +3 for regulatory events.

In sum, the hypotheses expected legislative and regulatory events to be associated with a negative change in share prices for health insurers. These hypotheses were informed by the findings of Pastor and Veronesi (2012), who found that announcements of policy changes tend to be accompanied by decreased share prices. The event study method was used to explore changes in share prices of 16 publicly traded health insurers based on shared NAICS or SIC codes, all actively traded on the New York Stock Exchange. The

period of interest was from November 4, 2008 (the election of President Obama) to March 23, 2015, the five year anniversary of the Affordable Care Act. Neither hypothesis was supported based on this study; however, other findings of note were identified and will be discussed in more detail in this chapter.

When using the event study methodology, particularly as it relates to regulatory or legislative events, special care must be taken in regards to establishment of the event windows, estimation windows, and market index. As discussed in Chapter 3, the event dates themselves were selected based on a combination of legislative reviews of ACA developments, such as that provided by Cannan (2013), and various regulatory publications issued by CMS or others. The event window was $+3/-3$ days surrounding each event date, providing an opportunity to assess the period over which information was incorporated into share prices.

A market index is used to understand general market fluctuations over a period of time; as all insurers were actively traded on the NYSE, the NYSE Composite Index was used as a market index for the purpose of this study. An estimation window serves to provide an understanding of a “normal” relationship between the selected insurers and market index; in this case, the estimation window of 30 days was used to establish an understanding of this relationship. Care was taken to avoid overlap between event dates and estimation windows; accordingly, similar to the approach used by Khansa et al. (2012), events were eliminated from the calculations if they were within 30 days of another event. The portfolio approach recommended by Schwert (1981) was used to assess overall impacts on insurer share prices, with data collected and analyzed to further evaluate individual companies and dates in addition to overall portfolio impacts. As

discussed by Khotari and Warner (2006), the use of a portfolio of companies addresses the question of homoscedasticity – instances in which the “noise” or random disturbance between the independent and dependent variables is the same across all values of the independent variables.

This study relies on the foundational EMH theory to measure and understand the relationship between information and share prices: the event study method establishes a baseline expectation for share prices absent information associated with an event. An abnormal return is calculated for each day, and on a cumulative basis, for the three days prior to and three days subsequent to an event. By measuring price fluctuations for each day, and in aggregate, the impact of information is assessed for each individual day and for a portfolio of companies. This information is used to understand the relationship between that information and share prices.

Analysis of Results

Similar approaches were taken to assess legislative and regulatory events, starting with a broad assessment of the portfolio of insurers and all events in their respective category, then refining to evaluate specific dates or individual companies within the initial study. In this manner, the two hypotheses were answered and other findings were developed that were ancillary to the initial hypotheses but related to the overall research questions. This analysis thus took a funnel effect, starting with a broad view and narrowing in focus to identify findings of note.

For each event date, parametric and nonparametric tests were conducted and generated consistent results. The Patell Z score and Boehmer Test statistics represent parametric tests, while the Rank Test and the Sign Test are nonparametric. As discussed previously, event study calculations frequently include both types of measures to identify instances in which data is not normally distributed; test results between these two measure types were directionally consistent. An evaluation of normality of data for legislative events and insurer return data demonstrated that the data was normally distributed as it had a skewness of 0.95, within the range of -1.00 to +1.00 that defines normality of data (Morgan et al., 2004). However, for regulatory events skewness was -2.91 and was determined to not be normally distributed. As a result, for this category of events nonparametric data provides the primary evidence for conclusions. No special alterations or adjustments in calculations were required other than to evaluate parametric and nonparametric test results in light of normality of data as discussed.

For events with statistically significant cumulative abnormal returns, a preliminary search for confounding variables was conducted through a review of the Wall Street Journal Business & Finance Section for the subsequent trading day. In this case, event dates June 9, 2009, December 2, 2011 June 21, 2012, February 15, 2013, and June 20, 2013 were subject to this review. It is a planned delimitation of this study to only conduct a cursory review of obvious confounding variables; in all cases, no such variables were identified.

Legislative Events

All Legislative Events. The initial hypothesis regarding all legislative events (7 in total) and all 16 insurers was not supported. While the cumulative average abnormal returns were negative, at -1.48%, as predicted, they were not statistically significant. These results suggest that the selected ACA and MLR-related legislative events in aggregate did not have a significant relationship to changes in share prices of the publicly traded health insurers. The hypothesis is not supported.

Individual Legislative Events. Using the funnel approach to further investigate this data, a subsequent step was taken to consider individual components of the overall category: share price activity associated with individual legislative dates. This did identify one key date, June 9, 2009, with statistically significant results and cumulative average abnormal returns of -9.46% for the +3/-3 event window. On this date, Senate Committee on Health, Education, Labor and Pensions (HELP) was the first Senate committee to submit a draft bill on healthcare legislation to the Congressional Budget Office for review.

The HELP Committee draft included requirements related to MLR and well as individual mandates, state exchanges, subsidies for low income individuals, and for small businesses; many of these elements were ultimately included in the final ACA legislation. Chronologically, as demonstrated in Table 1, this was the earliest draft produced of ACA and MLR legislation within the House or Senate. As such, it represents the first opportunity for the financial markets to respond to draft healthcare reform legislation in any format. The broad scope of the HELP Committee legislation makes it difficult to determine the extent to which the inclusion of the MLR requirements are related to

changes in share prices; however, it does provide context for the overall assessment of the ACA.

It appears that the financial markets responded to this first draft in a significant and negative manner. All subsequent legislative events could be viewed as refinements of the initial information produced by the HELP Committee, with variations on subsidies, specific details regarding MLR requirements, exchanges, or other elements; however, the key components of the HELP draft remained intact in many subsequent versions – most notably the MLR. With this understanding, the semi-strong form of the EMH is supported and demonstrated through the incorporation of information into share prices for that initial June 9, 2009 date. The financial markets thus anticipated the overall ACA to have negative outcomes for publicly traded insurers; the extent to which this was attributed to the inclusion of the MLR requirements is difficult to determine. However, this strongly negative response has significant implications for both further research and for those in the healthcare profession, each of which will be explored in more detail in a following section.

Individual Company Results. A review of the individual insurers' share price fluctuations for that June 9, 2009 date identified one anomaly to the overall negative change: Assurant (ticker AIZ) whose shares demonstrated a cumulative average abnormal return of 7.4%. Why did this insurer alone experience *positive* cumulative abnormal returns when all others experienced significantly negative results? According to an 8K document filed with the Securities Exchange Commission on June 10, 2009, on June 9, 2009 Assurant reached a legal settlement with Willis Group Holdings Limited regarding a property reinsurance arrangement, resulting in the receipt of \$139 million by Assurant

(Assurant Inc., 2009). This is clearly unrelated to the events associated with the ACA and presents a confounding variable; the results experienced by Assurant for event date June 9, 2009 are thus not relevant to these research questions. The settlement of litigation and the accompanying likely impact on share prices represents a confounding variable that appears to have impacted the cumulative average abnormal return used in this study. This is experienced in both within the share prices for Assurant as an individual company, as well to a limited extent for the portfolio of insurers. As discussed previously, excluding AIZ from the analysis of the June 9, 2009 legislative event date, CAARs through event date + 3 / - 3 were 10.58% (in comparison to the 9.46% including AIZ). This was statistically significant at the $p < 0.001$ level for the T, Patell Z, and Boehmer test statistics.

In summary, although the overall first hypothesis was not upheld, there was a significant and negative reaction by the financial markets to the first draft of the ACA, including MLR legislation, on June 9, 2009 for publicly traded health insurers. Given the nature of the semi-strong form of market efficiency as included within the EMH, it is perhaps unremarkable that subsequent versions of legislation did not have a similarly significant relationship to share prices. The initial information was released on June 9, 2009, and the markets responded accordingly. These findings thus support the Efficient Market Hypothesis.

Regulatory Events

All Regulatory Events & 80/20 Publication Subcategory. Taking the same “funnel” approach for the evaluation of the second hypothesis, the results of analyzing eight regulatory events for the 16 insurers demonstrated positive cumulative average abnormal returns: 1.9% for the full -3/+3 period, and 1.6% for day 0 (the event day itself). The hypothesis was not upheld, and in fact is contradictory to the findings of Pastor & Veronesi (2012), who found that on average, regulatory policy announcements causes share prices to decrease. From the findings of this study, one could hypothesize that the market responded favorably to the decrease in uncertainty; as regulatory bodies refined the requirements of the MLR, the uncertainty of ultimate impact was reduced. However, this is only a hypothesis and more research would need to be conducted to better understand the ultimate cause of the increase in share prices arising from the aggregation of the regulatory events.

Moving from an overall category focus to a specific subcategory, there were also consistently positive cumulative abnormal returns associated with the CMS 80/20 Rule, in which CMS aggregates the overall MLR results by state and line of business, providing the market with a valuable view of the overall insurance industry and an additional method to evaluate performance of individual insurers in light of their competitors. For this subcategory, cumulative average abnormal returns were also positive and statistically significant for the event day (day 0). Again, these publications eliminated uncertainty, which could have been viewed positively by financial markets.

Within the overall regulatory event category and the 80/20 Rule category, slightly positive cumulative average abnormal returns were found. Why did the market respond

favorably to these announcements? Other than eliminating uncertainty, it is possible that organizations had already adjusted their strategic and operating models to incorporate their expectations regarding MLR's, and the final regulatory requirements were less rigorous than anticipated. In this manner, understanding the actual (rather than interpreted) requirements could result in positive financial outcomes.

In the 80/20 Rule reports, CMS outlines the results for the MLR filings by state and line of business, including rebate amounts. The CMS report allows better readers to easily compare and understand market dynamics in each jurisdiction and line of business category. An overall favorable market reaction to the publication of this report over the three years during the period of analysis indicates that the report content provided new information – perhaps mitigating initial negative reactions for individual insurers as they issued their own rebate information. This would indicate that analysts were better able to evaluate individual company performance in context of the larger industry experience.

Individual Regulatory Events. No individual regulatory event dates produced statistically significant cumulative average abnormal returns; further, individual share price activity associated with regulatory dates varied dramatically among individual insurers. Thus, one could conclude that the financial markets assessed each individual regulatory development as it applied to each individual company, and that share price fluctuations reflected the different potential effect on each company. This would indicate that the overall regulation itself did not have a directionally consistent impact (i.e., negative for all insurers) but that it would have a targeted and specific outcome that differed by company.

Alternatively, this could indicate that the individual regulatory MLR refinements are complex and nuanced, and not easily understood by the financial markets. A lack of widespread understanding of the impact on these events could be one cause of the “no effect” finding. Alternatively, perhaps these MLR regulations were well understood by the financial markets but so specific, and narrowly focused, as to not have a consistent or material impact on the company’s strategic or financial objectives.

The MLR is simply one element of the ACA, which also introduced a significant amount of complexity to the industry. As noted previously, the Kaiser Family Foundation (2012) found that only 37% and 35% of Americans surveyed in 2010 and 2012, respectively, recognize the medical loss ratio as a component of the ACA. Accordingly, other elements of the ACA may have received more attention and played a larger role in driving changes in share prices. These elements may have overridden the share price impact of the MLR requirements – either by those elements having received more attention (such as the individual mandate) or through those elements actually having a larger impact on share prices.

The “no effect” finding and absence of statistically significant results for individual regulatory dates could mean many different things. For example, the market may have not efficiently processed the event information, due to leakage or existing expectations already incorporated into share prices. Alternatively, the market could have processed the information and concluded that it did not have a material implication on company or industry financial prospects. The Chaos Theory, which posits that share prices arise from hidden patterns that are not evident to researchers, may also be at work.

Thus, careful interpretation of “no result” findings must be made, and one can only hypothesize about the direct cause of these results.

Legislative and Regulatory Event Results

An additional story may be interpreted from the combination of the legislative and regulatory event categories. As discussed previously, the initial financial market response to the ACA legislation for insurers was negative based on the June 9, 2009 event date. Subsequent legislative developments were accompanied by much less significant market fluctuations, such that the entire category of developments (including the June 9, 2009 date) did not produce statistically significant results. This indicates that the initially negative response was offset or mediated by subsequent fluctuations.

Further, regulatory developments were generally positive, resulting in a CAAR of 1.9% for the -3/+3 day period surrounding the event windows. This was statistically significant only at the $p < 0.05$ level for the T, Patell Z, and Boehemer tests – but still provides some validation that the overall market response to regulatory developments continued to be more positive than the initial market response to the June 9, 2009 draft. In summary, the initial market response was strongly negative, but as future developments occurred share prices improved somewhat.

While the regulatory results alone are inconsistent with the findings of Pastor and Veronesi (2012), who found that on average, regulatory policy announcements causes share prices to decrease, when considering the share price trajectory of all events in aggregate, their findings are confirmed in this study. The results of this study are also

consistent with the findings of Engle and Ng (1993) and Ewing, Kruse, and Thompson (2005), who documented the tendency of markets to initially over-react to information. Further, Reynolds (2008) noted that initial market reactions to regulatory developments do not necessarily align with the actual outcome. An analogy could be made in this case to the initial reaction of the legislative event in comparison to the actual clarifications made by CMS to operationalize the MLR.

In Summary

When reviewing the results of this study in aggregate, it is clear that the events associated with the ACA and the MLR in particular are associated with changes in share prices of publicly traded insurers. In the case of legislative events, the first opportunity for the market to review draft legislation including requirements related to MLR is associated with a significantly negative response on share prices. All other legislative dates have a less significant relationship to changes in share prices, perhaps because the information had already been incorporated into share prices with the first HELP Committee draft. As defined by Beaver (1968), if an event has information content it will lead to a change in investor judgments, as reflected in share prices; in the case of legislative events, only the first event date (June 9, 2009) and the release of the first draft of ACA legislation was deemed to have information content.

In contrast, regulatory events generally are associated with a small positive change in share prices, perhaps in response to reduced uncertainty. While the hypotheses brought forth in this study were not upheld, the results are nonetheless of interest and

answer the research questions. Further, they uphold elements of the Efficient Market Hypothesis semi-strong theory regarding how information is incorporated into share prices.

Implications

After reviewing the findings of this research, the next question to answer is “who cares?” The response to this question will be addressed from two perspectives: from that of inside and outside academia.

Outside Academia.

Political Environment. Of these findings, one in particular has the potential to provide ammunition and serve as the basis for sound bites for politicians and organizations seeking to lobby for change: the association between negative share prices and the initial HELP Committee draft. The ACA has no shortage of opponents, and an understanding of the negative perception of the financial markets could only add to their argument for repealing or significantly reducing the scope of the ACA. This ammunition would most likely be used by strong supporters of a free market economy and by those who oppose government intervention and regulation: these findings could be distilled and mutated into a simple version of “the ACA was drafted, and the market tanked.”

However, these results must be considered cautiously: the association with negative share price fluctuations and the June 9, 2009 draft for publicly traded health insurers does not necessarily translate into the ultimate financial impact of the ACA in its entirety.

Regulatory Perspective. From a regulatory perspective, understanding that the clarifications and publications introduced by CMS and other bodies were associated with a slightly positive change in share prices may assist in encouraging future regulatory interpretations of the ACA and other legislative acts. With an understanding that the financial markets may appreciate their actions that serve to reduce uncertainty, regulatory bodies may be less hesitant to issue formal publications. The level of complexity of the ACA itself and the need for clarity from regulatory bodies to operationalize the legislation may have particularly contributed to this; when facing similarly complex legislation, regulatory bodies may incorporate lessons from their response to the ACA to more quickly clarify requirements.

Strategic Decisions. Perhaps the most relevant future implications resulting from this research are those that relate to strategic decisions: as insurers and others in the healthcare industry understand that the financial market expected the initial provisions of the ACA and the MLR to be associated with an unfavorable change in insurers' share prices, they are better able to consider their strategic choices. Low share prices have been linked to executive turnover (Maury, 2006) and Board of Director changes (Maury, 2006; Fisher et al., 2009). Clarifications of the drivers of decreases in share prices may assist in mitigating or otherwise impacting these levels of turnover. Additionally, understanding causes of share price fluctuations is relevant when companies are considering their capital and surplus balances from a regulatory perspective, in conjunction with their consideration of financing options. In sum, understanding the relationship between events and share price fluctuations (slightly positive from regulatory events, and significantly negative from the June 9, 2009 legislative date) serve to provide information from which

a variety of strategic decisions can be made. These strategic decisions must be made not only by the insurers themselves, but others participating in the healthcare sector given industry interdependencies.

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EMH represents a foundational basis for many financial and economic studies, and the results of this research uphold the semi-strong form of EMH. More importantly, this research answers two narrow and specific questions regarding share prices of publicly traded health insurers, which are one piece of the puzzle in understanding the ACA. We can further combine the results of this study of insurers' share prices ("losers" from the first HELP Committee draft) and the findings of Borochin and Golec (2016), who identified hospitals as "winners" from the passage of the ACA, to begin to paint a picture of the nuances of the ACA supported by academic research. From an insurer standpoint, these results generally reflect the dialogue in the popular press about insurers' premium increases, higher level of uncertainty, and insurers exiting state exchanges due to losses in that line of business without the certainty of ongoing risk adjustment and risk corridor funding (Altman, 2016). From the perspective of providers, the increased number of insured through Medicaid expansion, with decreased levels of charity care, are also contributing to improved hospital financial performance (Cunningham, Garfield, & Rudowitz, 2015).

Outside of confirming an existing and well-established hypothesis relating to information and share prices and reinforcing conclusions reached in the popular press, the implications for academia resulting from this study primarily serve to identify more questions and highlight the need for more research. The repercussions of the ACA and

the MLR in particular are complex and wide-reaching, and thus there are many opportunities for future study that are identified from this early share price research. In addition to the need for a variety of qualitative studies to evaluate the impact of the ACA on insurers, providers, and individuals, specific quantitative research could be conducted in a variety of areas to expand upon existing research.

Assessing Accuracy of Expectations. Share price fluctuations upon an announcement of regulations or legislation does not necessarily predict its actual outcome. One opportunity for future study does relate to comparing the initial expectations to the ultimate financial impact, similar to Reynold's 2008 research. Better understanding the linkage between initial market fluctuations and ultimate impacts could provide significant benefit to the field of economic theory. Additionally, more work could be done to understand the share price impact of the actual MLR rebates in comparison to initial forecasts. This type of research could also be more narrowly focused on the pre-and post-ACA MLR impact for states with MLR requirements prior to the ACA.

For-Profit vs. Not-for-Profit. This study was focused exclusively on for-profit, publicly traded insurers; a similar evaluation of not-for-profit organizations could be developed, based on publicly traded capital debt. Significant attention has been dedicated to assessing differences between not-for-profit and for-profit healthcare providers – this research could be extended to understand the expectations of the financial markets and if they assessed the impact of the ACA differently between these types of organizations. For example, if financial markets viewed the ACA positively for not-for-profit insurers

but negatively for for-profit insurers, what would that indicate about the long-term viability of the for-profit companies as a financial investment?

Healthcare Sector Participants. The share prices of other healthcare industry participants, such as pharmaceutical companies or hospitals, could be evaluated; this would be of particular interest given the findings of Ewing, Kruse, and Thompson (2008) regarding the close connections between industry participants. The results of the HIPAA research conducted by Khansa et al. (2012) demonstrated that one piece of legislation may be interpreted differently for its impact on different categories of market participants; it would be unsurprising if this held true for the ACA.

Individual Insurers. An additional opportunity for future study exists in a more complete evaluation of CAARs for individual insurers within the overall insurer portfolio. For example, as outlined in Table 7, CAARs for individual companies for event date June 9, 2009 ranged from Assurant's positive 7.4% to CNO Financial Health Group Inc.'s results of -19%. Additional analysis could be conducted to review individual companies' CAAR results in light of their unique market position, including member mix, financial performance, and geographic span.

Any such analysis must carefully consider that the event study methodology, when applied to individual companies, presents additional risks. Issues such as homoscedasticity, interconnectedness of market participants (Firth, 1976), and the potential for "winners" and "losers" resulting from the same events (Binder, 1985) all represent challenges in designing and interpreting an event study for individual companies.

Proxies for Share Prices. Similar to the study conducted by Borochin and Golec (2016), stock option pricing could be evaluated instead of share prices, extending their research beyond the two ACA-related dates they tested. This could be done for healthcare industry participants in a narrow manner (i.e., just pharmaceutical companies) or more broadly for a variety of sectors. As discussed previously in the context of not-for-profit organizations, capital debt pricing could also be used to assess investor sentiment. A focus on capital debt also provides an ability to evaluate not-for-profit and for-profit companies within the same sector in a more “apples to apples” comparison.

Additional Dates. The current event study methodology could be used to evaluate judicial or political actions, either in a broad category or more narrowly for specific events. Event dates associated with Supreme Court rulings (similar to the initial research conducted by Borochin and Golec, 2016 for one date) or other judicial developments might assist in our understanding of the ACA market response in a more holistic manner. Further, debate about the ACA continues to evolve, particularly during presidential election cycles. This research could be conducted on an ongoing basis, incorporating future events as they occur. The instant availability of share price data makes this “real time” analysis feasible.

Conclusion

To summarize, what is now known as a result of this research? The semi-strong form of the Efficient Market Hypothesis continues to be upheld, but that is not surprising:

Fama's 2013 Nobel Prize in Economics was granted for a reason. The two hypotheses introduced in this study relating to the expected overall negative relationship between the ACA and the MLR and share prices from legislative and regulatory events were not supported. Regulatory developments in aggregate were found to be associated with a slightly positive change share prices, perhaps because of reduced uncertainty. In aggregate, legislative events were not associated with significant fluctuations in share prices for publicly traded health insurers, but upon closer investigation the initial draft of ACA legislation, including MLR requirements, was associated with significant and negative share price fluctuations. Perhaps it was on that date that the market fully digested the implications of the MLR and the ultimate restrictions on profitability.

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