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"Does Quality Matter? A Study of Stock Price Reactions and the Implications for Healthcare Organizations."

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Abstract

Using the quality-competitive advantage-financial performance frameworks of Kroll, Wright & Heiens (1999) and Lakhal (2009), we analyze investor perceptions of how healthcare quality impacts financial performance. Using stock pricing data from U.S. financial markets, we use event study methodology to analyze how investors interpret information signals regarding the quality of care that healthcare organizations provide. Our findings are inconclusive that markets interpret higher quality healthcare will lead to a sustained competitive advantage and improved financial performance. However, our findings indicate markets may interpret that lower quality healthcare could lead to a sustained competitive disadvantage and decreased financial performance. We discuss the implications for executives, industry leaders, and policy makers.

1 Introduction

In recent years, a number of studies analyzed the relationships between providing high-quality healthcare, competitive advantage, and financial performance for healthcare organizations operating within a market-based healthcare setting. While the literature supports relationships between these constructs, insufficient evidence exists to clarify causal relationships. Furthermore, negligible research exists addressing how investors in a market-based setting interpret new information that may signal material changes to these constructs.

In this study, we add to the quality-competitive advantage-financial performance literature using a unique approach. We focus on market-based, investor perceptions of the relationship between quality of care and financial performance. We use asset-pricing data from publicly traded healthcare organizations as a proxy to analyze investor interpretations of information signals regarding changes in the quality of healthcare provided, and how those interpretations impact subsequent financial performance. In other words, do investors believe that providing high-quality healthcare is a source of sustained competitive advantage, which leads to improved profitability (as evidenced by the price changes resulting from net buying/selling of financial assets in those very organizations)?

In addition to the obvious implications for U.S. healthcare organizations, our findings also have implications for developed countries with a primarily market-based, privatized healthcare system (like the Germany, Czech Republic, etc.), as well as for countries with privatized, market-based systems that compliment governmental delivery of healthcare (such as Portugal, France, United Kingdom, etc.). More importantly, our findings have implications for health executives who operate in an environment where they require access to outside investment capital in order to expand the scale, scope, and complexity of their healthcare operations. Our findings provide insight into whether investors believe that high-quality healthcare may be a source of sustained competitive advantage, thereby leading to improved financial performance.

The remainder of the paper is organized as follows. Section 2 introduces the framework that motivates our analysis, reviews the relevant prior literature (addressing the relationships between quality, competitive advantage, and financial performance), and presents our hypotheses. Section 3 details our data and methodology. Section 4 presents our findings, discusses some limitations to our study, and provides insights on how future studies could address these limitations. Section 5 provides management implications of our results, and Section 6 provides concluding thoughts.

2 Conceptual Framework

Two frameworks motivate our analysis of the relationship between providing high-quality healthcare, as a source of competitive advantage, and increased financial performance. Kroll, Wright & Heiens (1999) contend that a customer-oriented organization, with superior product quality, may attain competitive advantage and increased returns. They develop and test a model providing evidence that higher quality outputs were positively related to return on investment, as well as to relative market share.

Additionally, Lakhal (209) proposes a framework where increased product quality (their independent variable) will have a positive impact on organizational performance (their

dependent variable), both directly and indirectly through competitive advantage (as a mediating variable). While the empirical portion of his study addressed product quality, the theoretical framework also addressed service quality, therefore proving useful when addressing service quality for the delivery of healthcare services. Consistent with the earlier framework and empirical findings of Kroll, Wright & Heiens (1999), Lakhal (2009) also found a positive relationship between quality and financial performance, both directly and indirectly through competitive advantage. While we admit that alternative perspectives exist regarding the healthcare market (Is it consumer-driven? Who is the ultimate consumer?), we treat healthcare as a traditional good/service within the Kroll, Wright & Heiens (1999) and Lakhal (2009) frameworks.

Within the healthcare literature, the constructs of quality and financial performance have been measured using numerous methodologies, and the consensus supports the notion that quality of healthcare services is positively correlated with financial performance. This positive correlation exists across the healthcare spectrum since the previous research includes many subsectors of healthcare delivery, such as general and specialty hospitals, nursing homes, outpatient clinics, and health maintenance organizations (see Appendix A for a detailed breakdown of the relevant literature). However, the causal link between the two has not yet been clarified (i.e. Does higher quality lead to better financial performance, or does better financial performance enable higher quality?).

Service quality has been measured using proxies such as mortality and morbidity rates (Cleverley & Harvey, 1992; Batchelor & Esmond, 1989) or incidences of adverse health outcomes, such as pressure ulcers or use of catheters/restraints (Weech-Maldonado, Neff & Mor, 2003a). Staffing indicators, such as nursing staff ratios (Everhart, Neff, Al-Amin, Nogle & Weech-Maldonado, 2012), level of registered nurse staffing (Weech-Maldonado et al, 2003a), etc., have also been used as proxies for quality. Another proxy for quality has been the application of quality metrics, such as the Center for Medicare and Medicaid Service's Minimum Data Set (MDS) measures (Weech-Maldonado, Neff & Mor, 2003b), Nursing Home Compare (NHC) measures (Park & Werner, 2011), or the National Committee for Quality Assurance's Healthcare Effectiveness Data and Information Set (HEDIS) measures (Born & Simon, 2001). Finally, patient perceptions of quality have also been useful proxies of the provision of quality healthcare, with a number of studies using this lens to examine the relationship with financial performance (Ittner & Larcker, 1998; Beauvais, Wells, Vasey & Dellifraine, 2007; Chi & Gursoy, 2009; and Joynt, Le, Orav & Jha, 2014).

Likewise, a number of proxies have been used to measure financial performance. Various measures of overall revenue and/or costs (Batchelor & Esmond, 1989; Nelson, Rust, Zahorik, Rose, Batalden & Siemanski, 1992; Ittner & Larcker, 1998; Weech-Maldonado et al, 2003a,b; Beauvais et al, 2007) have been used, as well as multiple measurements of (Li & Collier, 2000; Born & Simon, 2001; Gillean, Shaha, Sampanes & Mullins, 2006; Park & Werner, 2011; Everhart et al, 2012). Financial performance has also been measured using a percentage return based on some level of investment (Nelson et al, 1992; Ittner & Larcker, 1998; Li & Collier, 2000; Born & Simon, 2001; Chi & Gursoy, 2009).

We choose an alternative approach that is unique to the health management literature, using signaling theory and asset pricing to conduct an event study. An event study provides a consensus market opinion on the relationship between quality and financial performance, as well

as the market consensus on causation between the two constructs. Event study methodology has a long tradition in the mainstream finance literature (Fama, 1991) and it enables us to assess the impact of a particular event on a company's stock price as investors interpret the new information, use it to evaluate the financial assets in their portfolios, then trade accordingly, thereby leading to subsequent asset price changes. Using this approach, we identify publicly available news announcements (e.g. press releases, news articles, etc.) that may signal new information to investors regarding the quality of healthcare services that organizations provide. Additionally, we use asset price changes to measure investor interpretations of these signals as a proxy for their impact on a company's financial performance.

In other words, we measure how the market interprets the relationship between quality and financial performance. If investors, in aggregate, believe improved quality leads to improved financial performance, a positive news signal should result in a positive abnormal return (i.e. the difference between the actual return and the expected return) on a financial asset (in this case, a stock). As investors revalue that stock, they would view the stock as currently being underpriced on the market, then rush to buy it, thereby driving up the price of the stock, subsequently leading to an improvement in a company's stock price. Conversely, if investors believe reduced quality leads to lower cash flows (i.e. worse financial performance), a negative news signal should result in a negative abnormal return. As investors revalue that stock, they would view the stock as currently being overpriced on the market, then rush to sell it, thereby driving down the price of the stock, subsequently leading to lowering of the company's stock price.

Thus, using the event study methodology under the Kroll, Wright & Heiens (1999) and Lakhal (2009) frameworks, we develop the following hypotheses for our study:

> **Hypothesis 1** Positive signals of healthcare quality will have a *positive* stock price impact.
>
> **Hypothesis 2** Negative signals of healthcare quality will have a *negative* stock price impact.

3 Methods

We developed our dataset using information on publicly traded, for-profit health organizations in the United States. Using the S&P Capital IQ's Compustat North America database, we first conducted a query for all firms with North American Industry Classification System (NAICS) codes that fell within the major classification for "Health Care and Social Assistance" (major category 62). This search covered the 12-year window from 2000-2011. From the resulting list, we then screened out all companies that did not directly provide healthcare (the Social Assistance firms). The final list gave us the publicly traded companies that provide healthcare within the United States during our sample period. Table 1 provides a breakdown of the types of healthcare delivery firms included within our sample. Hospitals and Ambulatory Health Care companies were the largest categories of publicly traded health organizations within our sample, and provider practices (physicians, physical therapists, occupational therapists, etc.) were the smallest.

Table 1
Types of Healthcare Organizations in Sample

Type of Organization	Number of Type in Dataset	Number of Events in Dataset
General Medical and Surgical Hospitals	9	37
All Other Ambulatory Health Care Services	5	12
Nursing Care Facilities	4	14
All Other Outpatient Care Centers	4	7
Continuing Care Retirement Communities	4	33
Medical Laboratories	4	13
Home Health Care Services	4	16
HMO Medical Centers	2	15
Ambulance Services	2	14
Kidney Dialysis Centers	2	9
Homes for the Elderly	2	4
Psychiatric and Substance Abuse Hospitals	1	2
Specialty (except Psych. & Subs. Abuse) Hospitals	2	3
Diagnostic Imaging Centers	1	1
Offices of Physicians (except Mental Health)	1	6
Offices of PT, OT, ST & Audiologists	1	1
Totals	48	187

We then conducted an Internet search, using multiple search tools, for any news articles or press releases on the companies, specifically focusing on releases that addressed the quality of care provided by those companies. In these cases, we looked for what we deemed material changes in the quality of care they provide, and we specifically identified the precise date that the information was made available to the investing public. In each case, we made a subjective evaluation of the news release to determine if it represented a signal regarding a change to the quality of care provided.

For instance, if a news release mentioned that hospital within a larger healthcare organization (for instance, Hospital Corporation of America) successfully maintained accreditation by The Joint Commission, this release was excluded from our sample. After all, the hospital was accredited both before and after the release, so no signal (change) occurred. However, if the hospital gained its initial accreditation, the release would be deemed a positive event. If the hospital lost its accreditation, the release would be deemed a negative event. Hence, the word *change* is of most importance.

Examples of material positive signals included winning external awards for providing exceptionally high quality of care, attaining initial certification, getting an endorsement or recognition from a regionally or nationally recognized entity, or self-promotion (such as hiring industry leaders to key positions, attaining improved standing in NCQA Accreditation for Quality ratings, implementing quality improvement initiatives, etc.). Examples of material negative signals included warning letters and/or adverse actions (e.g. suspensions, fines, etc.) taken by government agencies, safety violations and adverse events (e.g. fires, wrongful deaths, poor treatment of elderly patients, crashes of facility ambulances, etc.), legal

probes/investigations by government agencies, and medical tort lawsuits. Table 1 also provides a breakdown of the number of events by organization type, and Table 2 provides a breakdown of the overall categories of positive and negative events. Positive events outnumbered negative events by almost 2-to-1, primarily due to the inclination of organizations to publicize news events that place companies in a favorable light.

Table 2
Types of Quality-Related Events in Sample

Type	Amount	Positive	Negative
Accreditation	33	33	0
Award	14	14	0
Certification	4	4	0
Acknowledgement	9	8	1
FDA	1	0	1
Lawsuits	21	0	21
Legal	8	0	8
Oversight	9	0	9
Recognition	36	36	0
Safety	26	0	26
Self-Promotion	26	26	0
Totals	187	121	66

We then used the dates of the events to pull down asset pricing data from the Center for Research in Security Prices (CRSP) database. For any events that fell on a day when the markets were closed (weekends or holidays), we used the first trading day after the announcement as the event day.

For each event, we applied the standard event study methodology. A two-step procedure is used to calculate abnormal returns using the Fama-French three-factor model (Fama & French, 1993) as a benchmark. In the first stage, we estimate the benchmark parameters, using equation 1, over an estimation period of 255 trading days (dates when the markets were open), ending 46 trading days before each event date (i.e. day 0). This approach allows for a robust estimation window of a full year of daily trading data (365 calendar days, minus weekends and holidays when the exchanges are closed), but stops the estimation period before the event window begins at 30 trading days before the event (i.e. day -30).

$$R_{jt} = \hat{\alpha}_j + \hat{\beta}_j R_{mt} + \hat{s}_j SMB_t + \hat{h} HML_t + \varepsilon_t \qquad (1)$$

In equation 1, R_{mt} represents the rate of return of a market index (S&P 500) for day t, SMB_t represents the average return on three small market-capitalization portfolios minus the average return on three large market-capitalization portfolios, and HML_t represents the average return on two high book-to-market equity portfolios minus the average return on two low book-to-market equity portfolios, and ε_t is a random variable assumed to have an expected value of zero, be homoskedastic, and be uncorrelated with R_{mt}, R_{kt} (for any $k \neq t$), or ε_s (for any $s \neq 1$).

Abnormal returns are then estimated in the second stage. For each stock in the same, the abnormal return will be calculated using equation 2 for each trading day over a 61-day event period (30 trading days before the event until 30 trading days after the event). This equation subtracts the expected daily return for a stock, based on the parameter estimates from equation 1, from the actual return on the stock (R_{jt}) during the event window in order to determine the *abnormal return* for a particular stock (denoted by subscript $_j$) on a particular day (denoted by subscript $_t$).

$$A_{jt} = R_{jt} - \hat{R}_{jt} = R_{jt} - \left(\hat{\alpha}_j + \hat{\beta}_j R_{mt} + \hat{s}_j SMB_t + \hat{h} HML_t\right) \quad (2)$$

For the event study analysis, we then use *cumulative adjusted abnormal return*, which is a sum of the daily abnormal returns over a given time frame, in order to identify any potential asset pricing effects resulting from material signals of healthcare quality. The functional form is displayed in equation 3.

Cumulative Average Abnormal Return:

$$CAAR_t = \frac{1}{N}\sum_{j=1}^{N}\sum_{t=T_1}^{T_2} A_{jt} \quad (3)$$

The event study test statistic is the time-series standard deviation test (Brown & Warner, 1980). The time-series standard deviation test, also called the "crude dependence adjustment", uses a single variance estimate for the entire portfolio. The time-series standard deviation test avoids the potential problem of any cross-sectional correlation in the security returns.

4 Findings

4.1 Results

Tables 3-4 present the findings from the event study analysis. Table 3 shows the aggregate investor reactions from the *positive* signals of healthcare quality, whereas Table 4 shows the aggregate investor reactions from the *negative* signals of healthcare quality. For both tables, Panel A shows the results from all combined events, whereas subsequent panels show results from subgroupings of positive and negative events.

For the positive events, Table 3 Panel A shows no significant effect from positive news events. The cumulative abnormal return for the event window (day 0) shows no statistical significance. This finding is robust when tested against alternate event windows of -1,0 and -1,+1 (shown at the bottom of the panel). The results also show no statistical significance for the period leading up to the event (-30,-1), nor after the event (+1,+30). Panels B-D separate the positive events into three subgroups of accreditation/certification, awards/endorsements/recognition, and self-promotion. Neither accreditation/certification events nor awards/endorsements/recognition events indicate any evidence of a positive market reaction around the event window. The results are not sensitive to how the event window is defined. Oddly, self-promotion events show significant returns during the event window, but in the opposite direction than expected (negative, rather than positive). The findings are robust to how the event window is defined.

Table 3
Event Study Results, Positive Events

This table reports the results of an event study on positive news events, specifically focusing on healthcare delivery firms that were listed on the major U.S. equity markets (New York Stock Exchange, NASDAQ, or American Stock Exchange) between 2000-2011.

$$A_{jt} = R_{jt} - \hat{R}_{jt} = R_{jt} - \left(\hat{\alpha}_j + \hat{\beta}_j R_{mt} + \hat{s}_j SMB_t + \hat{h} HML_t\right)$$

	Panel A: All Positives		Panel B: Accreditation/ Certification		Panel C: Awards/Endorsements/ Recognition		Panel D: Self-Promotion	
	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t
-30,-1	0.83%	0.462	-0.11%	-0.028	0.03%	0.013	3.97%	0.940
0,0	-0.36%	-1.107	-0.64%	-0.856	0.20%	0.491	**-1.23%**	**-1.601***
+1,+30	-0.38%	-0.210	-1.89%	-0.461	0.97%	0.429	-1.25%	-0.296
-1,0	-0.28%	-0.610	0.23%	0.216	0.38%	0.650	**-2.49%**	**-2.287****
-1,+1	0.05%	0.096	1.21%	0.936	0.54%	0.747	**-2.67%**	**-1.997****
n	121		37		58		26	

***, **, *** denotes statistical significance at the .1, .05, .and .01 levels of significance.

For the negative events, Table 4 shows a robust set of findings. When all negative events are grouped together (Panel A), the findings indicate a significant negative market response, and the findings are robust in the window before the event day (-30,-1), as well as during the event window (0). The event day finding is robust to the alternate event windows. These findings are consistent with the possibility of some information leaking out into the market early, given negative abnormal returns during the 30 trading days before the information was made publicly available. Furthermore, the findings indicate a potential market overreaction and correction, given the significant positive abnormal return in the weeks after the event window (+1,+30).

Once the negative events are broken into the two subgroups of legal/oversight and safety, the findings indicate two interesting observations. First, the evidence consistent with leakage of private information is isolated to negative events focused on lawsuits and governmental oversight. However, the negative market response in the event window and the market correction in the post-event window both appear to be entirely driven by the marketplace response to safety concerns. Again, the findings are robust to how the different event windows are defined.

Table 4
Event Study Results, Negative Events

This table reports the results of an event study on negative news events, specifically focusing on healthcare delivery firms that were listed on the major U.S. equity markets (New York Stock Exchange, NASDAQ, or American Stock Exchange) between 2000-2011.

$$A_{jt} = R_{jt} - \hat{R}_{jt} = R_{jt} - \left(\hat{\alpha}_j + \hat{\beta}_j R_{mt} + \hat{s}_j SMB_t + \hat{h} HML_t\right)$$

	Panel A: All Negatives		Panel B: Legal/Oversight		Panel C: Safety	
	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t	Cumulative Abnormal Return	Portfolio Time-Series (CDA) t
-30,-1	**-3.25%**	**-1.500***	**-3.62%**	**-1.519***	-2.69%	-0.702
0,0	**-1.30%**	**-3.285*****	-0.12%	-0.284	**-3.11%**	**-4.454*****
+1,+30	**2.80%**	**1.292***	0.94%	0.397	**5.65%**	**1.478***
-1,0	**-1.74%**	**-3.106*****	-0.34%	-0.555	**-3.89%**	**-3.937*****
-1,+1	**-0.95%**	**-1.383***	-0.37%	-0.485	**-1.84%**	**-1.525***
n	66		40		26	

, **, ** denotes statistical significance at the .1, .05, .and .01 levels of significance.

Viewing the results in a graphical form may help clarify how the subgroups of findings illustrate somewhat different market reactions to news events. The same findings are displayed in graphical form in Figures 1-4. Figure 1 shows the positive cumulative adjusted abnormal return, starting at 0% at the beginning of the window (-30), and staying near 0% over the entire pre, event day, and post windows (61 days total). In other words, on average, positive events in general do not result in any significant deviation from a normal risk-adjusted return over the entire window. Figure 2 breaks the positive events into the three subgroups, and does indicate some deviation over time. Only in the case of self-promotions can the deviations be tied to the specific quality-related events that occur on day 0 (and in this case, self-promotions actually result in a negative abnormal return, evidenced by the sharp decline on day 0).

Figure 1: Cumulative Adjusted Abnormal Returns (All Positive Events).

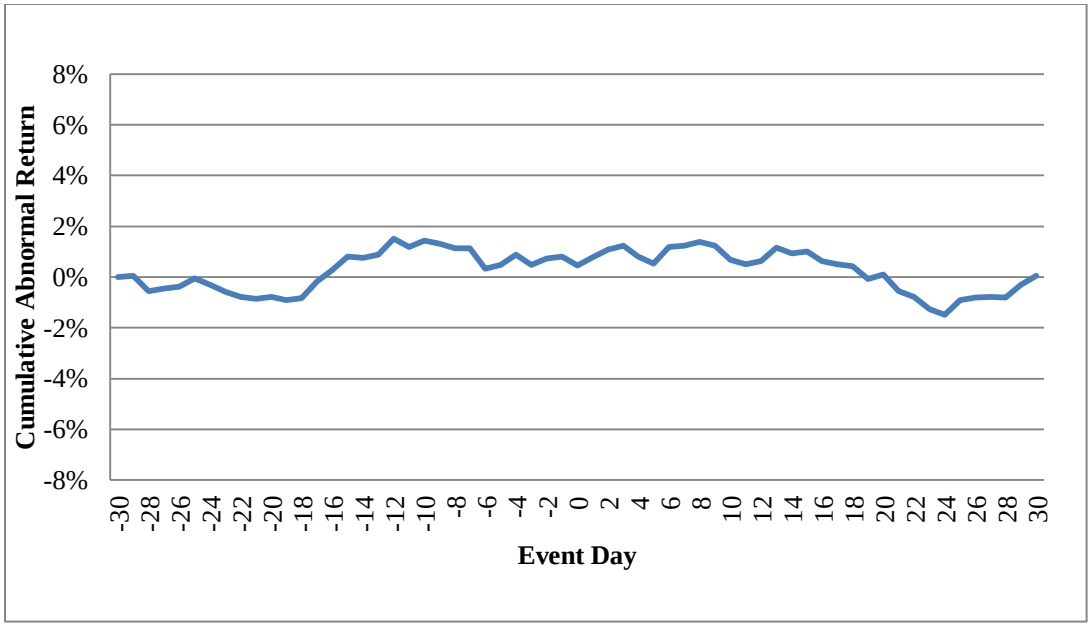


Figure 2: Cumulative Adjusted Abnormal Returns (Types of Positive Events).

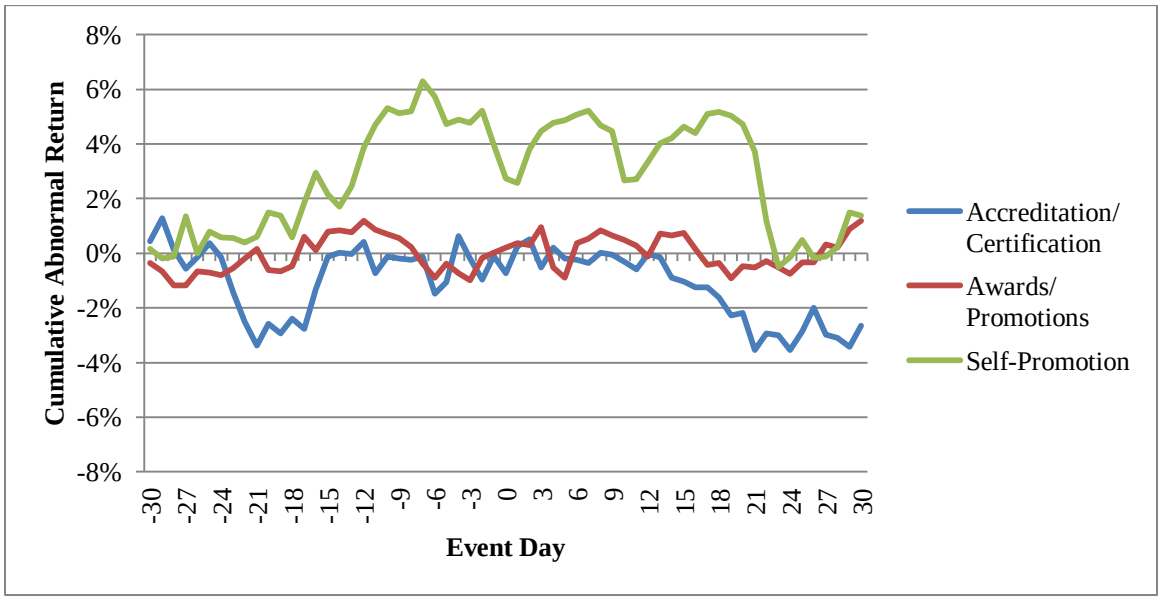


Figure 3 shows the negative cumulative adjusted abnormal returns, again starting at 0% at the beginning of the window (-30). This graph indicates some deviation from 0% over the entire 30 days pre and post event, with significant negative abnormal return in the trading days leading up to the events being publicly announced (which again may indicate leakage of information to the markets), and a slight but significant recovery as the event period closes (+30). Figure 4 breaks the negative events into subgroups for legal/oversight and safety. In both cases, the results show declines in the days leading up to the event (in the case of legal/oversight) or specifically on the event day (in the case of safety).

Figure 3: Cumulative Adjusted Abnormal Returns (All Negative Events).

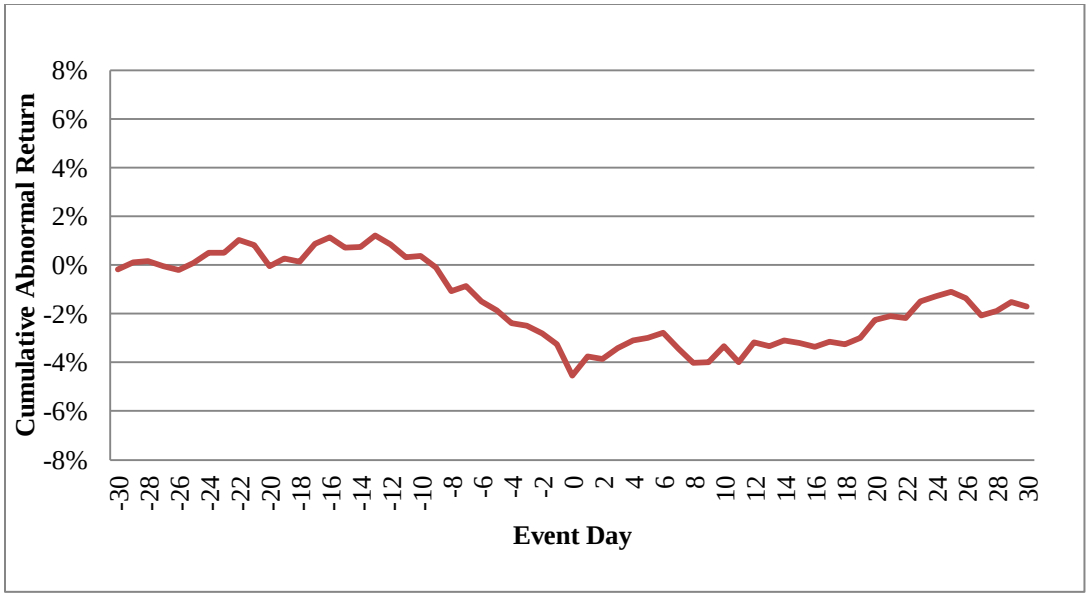
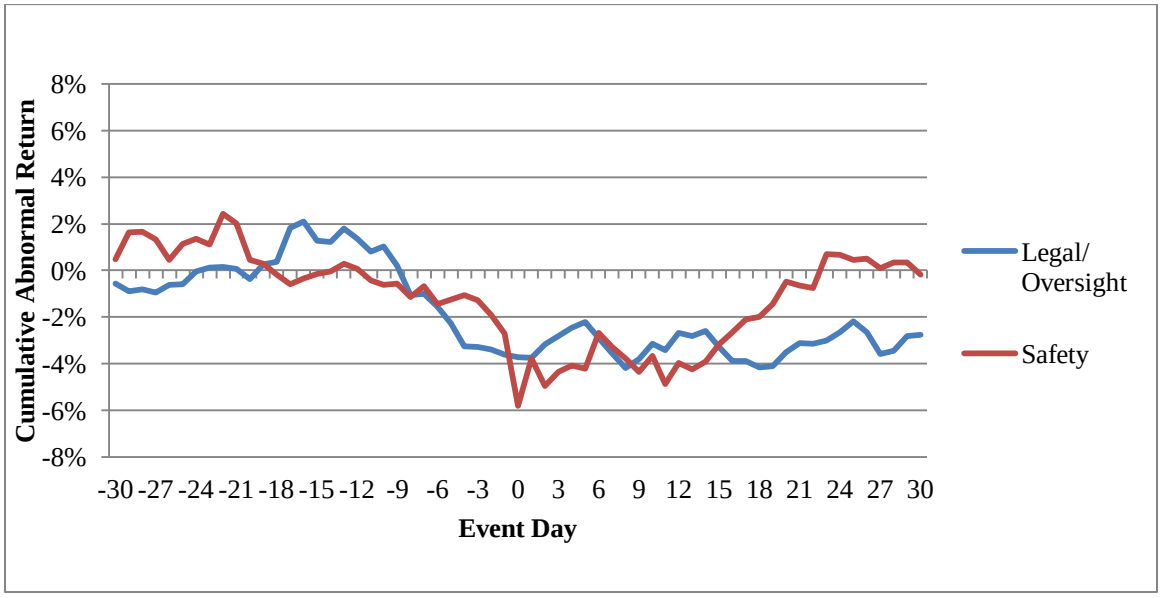


Figure 4: Cumulative Adjusted Abnormal Returns (Types of Negative Events).



However, any negative abnormal returns associated with safety events appear to completely recover by the end of the post-event window (possible evidence of a market overreaction). Conversely, any negative stock price impact resulting from legal/oversight events appears to be impounded in the stock price, at least in the near-term. The cumulative adjusted abnormal returns never recover to the 0% level as the 30 days post-event window closes. In Table 4, the cumulative adjusted abnormal returns in the +1,+30 window are relatively flat, showing no statistical significance. Thus, the graph in Figure 4 shows that the negative price impact that occurs in the trading days leading up to day 0 (which did show significance) may indeed become

permanently impounded into the price, and would not show up as a stock price reversion in the subsequent trading days.

In aggregate, these findings are consistent with the notion that the market does not appear to respond to positive signals of quality provision of healthcare. However, the market does appear to respond to negative signals of quality provision of healthcare. In some cases, the market appears to overreact (safety), and asset prices subsequently correct. In other cases, the market appears to permanently impound the information into the stock price (legal/oversight), at least in the near-term.

4.2 Limitations.

Our study does have some limitations, but these limitations provide a number of opportunities to motivate future studies. The first limitation is the sample size. Given the small number of observations, one approach could be to expand the sample period. However, frequent changes to the modern healthcare setting indicate that expanding the time frame will be challenging for future researchers, as they attempt to control for an ever-evolving industry context. Another approach could be to expand the sample by including more organizations. Our study only included companies listed on the New York Stock Exchange, the Nasdaq Stock Exchange, and the American Stock Exchange. We could have included companies listed on regional exchanges or traded over the counter. This approach will require more extensive data access, and would include many sparsely traded stocks, to include "penny" stocks, which could potentially magnify the return patterns, thereby distorting the findings. Future researchers will need to control for these complicating factors.

Another limitation is the generalizability of our findings. Our analysis focused only on the largest publicly traded, for-profit healthcare organizations within the United States. We obviously exclude healthcare organizations from other countries, so from an international research perspective, our results may not be easily generalizable to countries without significant private and market-based components to their health systems. Likewise, we excluded smaller publicly traded companies, as well as privately held companies. We also excluded not-for-profit organizations, which make up a large component of the U.S. healthcare delivery system. Future research should expand to other organization sizes and types within the U.S., as well as to other countries.

We also focused our analysis on a specific financial asset class of stocks. Future studies could focus on other financial asset classes, such as fixed-income instruments (which would capture not-for-profit organizations) and/or derivative instruments (where new information may also be revealed in advance of being impounded into stock prices), or even analyzing analyst opinions. Survey instruments could also be used to assess how private investors interpret quality-related information events.

5 Practice Implications

Our findings show a direct conflict with existing literature, which indicates that quality may be a source of competitive advantage. The conflict may very well result from the highly complex nature of the healthcare industry, thereby providing a number of management implications. Executives who run publicly traded healthcare organizations obviously need to be cognizant of

how the capital markets interpret quality-related information, as well as how those interpretations impact their asset prices (and therefore shareholder wealth). The market appears to demonstrate more clear patterns when interpreting negative signals than when interpreting positive signals.

Part of the difference may be due to the internal or external genesis of the information. Negative information is rarely generated from internal to the organization. Less than 10% of the negative events in sample derived from sources within the organization, compared to 25% of the positive events. Internally derived announcements may be viewed as positively biased, containing less information, or both (therefore viewed with skepticism by investors).

Furthermore, many of the positive events associated with accreditation/certification are normally associated with business units within the larger organization, rather than the healthcare organization overall. For instance, Joint Commission accreditation applies to individual hospitals, rather than for the entire healthcare organization. As a result, investors may only be able to attribute the good news to a small component of the larger organization, rather than to the larger enterprise itself. In this case, accreditation may not be viewed as a material signal to investors, given that they may not be able to extrapolate the signal across the entire organization, thereby linking how the improved quality will result in increased cash flows. Additionally, industry leaders may need to develop additional measures of quality that focus on the entire enterprise, rather than just for components of the enterprise. This new set of quality measures would compliment, rather than replace, measures focused on individual healthcare organizations (or subcomponents within those organizations).

Likewise, industry leaders need to better articulate to investors how higher quality helps lead to competitive advantage, and therefore better financial performance. Given the findings in our analysis, one possible interpretation could be that investors do not yet see high quality as a source of competitive advantage within the health industry. Managers must be able to articulate to investors just how providing high-quality healthcare may result in a sustainable competitive advantage, potentially through premium pricing of services, attracting new patient flow, establishing new strategic partnerships, driving down costs, etc.

Our findings are consistent with the notion that high-quality healthcare may very well be the expectation in the U.S. The capital markets simply may not reward healthcare organizations for providing high-quality healthcare. However, those same capital markets may punish healthcare organizations that provide substandard healthcare, thereby deviating from societal expectations. Given this possible explanation, industry leaders may be placed in a defensive mindset, where failing to provide high-quality care may result in competitive disadvantage.

6 Conclusion

Using the quality-competitive advantage-financial performance frameworks of Kroll, Wright & Heiens (1999) and Lakhal (2009), we analyzed investor perceptions of healthcare quality impacting financial performance. For publicly traded healthcare organizations operating within a market-based setting, investors may interpret the low-quality provision of healthcare as a source of sustained competitive disadvantage, thereby leading to decreased financial performance. Our findings do not support the converse; we found no evidence that investors interpret the provision

of high-quality healthcare as a source of sustained competitive advantage, thereby potentially leading to increased financial performance.

Based on the findings in our study, the implications are fairly clear for healthcare organizations in developed countries with market-based, privatized healthcare systems (to include any that compliment governmental delivery of healthcare). High-quality healthcare has become an expectation, and negative deviations from that expectation will be impounded into asset prices. Health executives should focus on providing a sufficiently high level of care that meets market expectations, thereby maintaining adequate access to outside investment capital that will be necessary to expand the scale, scope, and complexity of healthcare operations. For industry leaders, our findings indicate a need to better demonstrate to investors just how the provision of high-quality care creates a sustained competitive advantage, and therefore improved financial performance. For policy makers, our findings show a need for a broader, more robust mix of quality indicators covering the full spectrum of organizational levels. These standardized quality indicators will to enable investors to adequately interpret signals of real or perceived changes in the quality provision of healthcare.

Appendix A Proxies for Quality and Financial Performance					
Authors	Year	Sector	Proxies of Quality	Correlation	Proxies of Financial Performance
Cleverley & Harvey	1992	Hospitals	Mortality Rates	Negative	Profits
Weech-Maldonado, Neff & Mor	2003	Nursing Homes	Pressure ulcers	Negative	Costs
			Use of catheters and restraints	Negative	Costs
			RN staffing	Positive	Revenues & Costs
Born & Simon	2001	Health Maintenance Organizations	HEDIS quality measures	Positive	Operating profits Change in net worth
Everhart, Neff, Al-Amin, Nogle & Weech-Maldonado	2012	Hospitals	Nursing staff ratio	Positive	Profit Margin
Weech-Maldonado, Neff & Mor	2003	Nursing Homes	Quality index (developed from MDS quality measures)	Negative	Costs Revenues
Gillean, Shaha, Sampanes & Mullins	2006	Hospitals	TIme of thrombolysis, Antibiotic timing, Blood cultures, Ventricular function assessment, ACE inhibitors for left vent. systolic function	Positive Positive Positive Positive Positive	Net operating margins
Nelson, Rust, Zahorik, Rose, Batalden & Siemanski	1992	General/surgical Hospitals	Discharge, Medical billing/ discharge, Medical billing/ discharge,	Positive Positive Positive	Earnings per bed Net revenues per bed ROA
Beauvais, Wells, Vasey & Dellifraine	2007	Hospitals & Clinics	Patient perception of quality	Positive	Funding per enrollee
Park & Werner	2011	Nursing Homes	Quality (NHC measures)	Positive	Profit Margin
Born & Geckler	1998	Managed Care Organizations	Quality scores	Positive	Medical expense ratio
Joynt, Le, Orav & Jha	2014	Hospitals	Patient Satisfaction	Positive	CEO Pay
Li & Collier	2000	Hospitals	Process Quality	Positive	Financial Performance
Batchelor & Esmond	1989	Hospitals	Lower morbidity and mortality	Positive	Lower Costs

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