Peer Review File

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Reviewer A

Comment 1: This study looks at important factors in the life of the hospital, and I believe the efforts are well-intentioned. However, the design as it currently stands leaves a few questions open that I think could be addressed to improve the paper. Specifically, there are assumptions embedded throughout the paper that the health care sector functions like other businesses, when that is not always the case due to the nature of its services.

Reply 1: I added discussion about the differences between healthcare and other industries across the manuscript.

Comment 2: The authors reference the introduction of the ACA, etc., as a reason for the novelty of the study, but include data going back to 2006. These two facts seem at odds with each other, given the 2010 passing of ACA and the even later implementation of key provisions.

Reply 2: I just deleted mentioning ACA.

Comment 3: In my opinion, deletion of the last sentence on page 2 would strengthen that section (L79-80)

Reply 3: the last sentence on page 2 was deleted.

Comment 4: Clarification of how the pricing discussion fits health care given different prices of services based on payor would be helpful in the background.

Reply 4: This comment is addressed by discussing how pricing is different in healthcare and how hospitals can pursue an appropriate strategy to take advantage of the situation (page 3, paragraph 3 and page 4, paragraph 1).

Comment 5: Prior to the start of the hypotheses, the discussion around potential predictor variables feels as though a range of ideas are being loosely connected. Could these be brought together more clearly? As well, the reference to Porter's ideas should be more specifically applied to health care.

Reply 5: I tried to revise the discussion prior the hypotheses and make it more relevant and concise.

Comment 6: There are some aspects of H1 that need to be further explained. Is uniqueness being perceived as quality? Why, and by what measure? As well, I think you need additional support showing that economies of scale would reduce costs in health care.

Reply 6: I added discussion about how unique services with high technology may help a hospital to improve its public image in the market.

Comment 7: Is this the best place for the explanation of the hybrid strategy? It seems

like it would fit better under H2 and/or be discussed in background. Hybrid does not seem as relevant to H1.
Reply 7: The discussion of hybrid strategy is after H1.

Comment 8: Toward the end of the H1 section, cost containment and price become conflated, when they are not necessarily the same. As well, the idea of services being offered because they are needed is not acknowledged (an issue specific to health care).
Reply 8: the issues are addressed at the end of H1 discussion.

Comment 9: Can H4, H5, and H6 be collapsed into one hypothesis?
Reply 9: The issue is addressed.

Comment 10: In research methodology, the time period needs more justification. Urban also needs a clearer definition.
Reply 10: More justification is added. Also, the definition of urban hospital added.

Comment 11: P6, L248-249 - Is there any reason that the three cost leadership variables wouldn't be strongly correlated? They seem to be redundant in what they measure, at least to some extent.
Reply 11: I agree that they may measure similar characteristic of a hospital. Three main measures have been used to operationalize cost leadership in the strategic group and financial performance literature in the hospital context: total expenses to the number of occupied beds, total cost per patient day, and total salaries per patient day (Forte et al., 2000; Landry et al., 2010; Marlin, Huonker, & Hasbrouck, 2004). By dividing total expenses by the number of beds occupied, a hospital's expense based on its current level of business was ascertained. Total cost and salary per patient day also express how efficiently internal finances are managed based on current business (Landry et al., 2010). We used these three measures because we did not do any exploratory research study (e.g., qualitative study of hospital CEOs), did follow other researchers who had done some exploratory studies to identify these three variables. Nevertheless, after extracting data we did factor analysis among three variables and when we saw strong correlation between the three variables, we created a composite score.

Comment 12: L250 - this section repeating earlier information and not necessary.
Reply 12: the repeated part was deleted.

Comment 13: L260 - while I recognize that the authors may be limited by the variables available to them, the measurement of "the most updated technology" is a concern. The sources cited in support of this are older than a decade.
Reply 13: we were aware about this issue. However, because we used AHA dataset to capture different variables and the AHA has not updated their checklist to include new questions capturing any new type of services that may have been offered by hospitals after 2010 (our most recent reference).

Comment 14: L268 - I would prefer more context about these rare services (e.g. offered for a special population)
Reply 14: More context added about rare services.

Comment 15: L330-343 - Given the ideas here, it might be important to include descriptive statistics to see how hospitals (and their approaches) were distributed geographically and in proximity to others
- Overall with methods, I'm still unclear on the role of time. Could this be done with two years of data? Is there anything important about the longer period, or is it a matter of having a larger sample?
Reply 15: It would be great to show hospitals' strategies on map, however it is not easy to show the strategy of more than three thousand hospitals across the United States. Some justification added about using data between 2006-2016. Also, having larger number of observations is another reason to use the data between 2006-2016.

Comment 16: The discussion seems to be claiming causal effect - is it possible that hospitals that are struggling feel more limited in their strategies, rather than these strategies predicting performance?
Reply 16: Yes, it could be possible that hospitals choose their strategy due to some internal and external factors. That is why we have investigated the internal and external predictors of hospital strategy in a different paper. Also, I tried to modify the language of paper on discussion to avoid using causal language.

Comment 17: L447 - The use of "creative strategists" needs clarification.
Reply 17: the issue is addressed.

Comment 18: L452 - There is some price sensitivity in health care - perhaps clarify to not as sensitive as other industries?
Reply 18: the issue is addressed.

Comment 19: L465-466 - It could be interesting to add a descriptive analysis or post hoc of these services by hospital size
Reply 19: Correlation table added as appendix.

Reviewer B
This study assessed the relationships between Michael Porter's strategic generic strategy and the financial performance of hospitals in the US using longitudinal data 2006-2016.

I applaud the authors for such a well-written manuscript. I have always wished reading a research paper could be as fun as reading a novel; I felt like I read a novel when I read this manuscript. Also, the topic is timely and relevant given the pressure to reduce cost and improve quality at the same time.

These are some comments/suggestions

Comment 1: Conceptual framework

It may be good to mention that Michael Porter's generic strategies also include "focus" strategy, "cost-focus" and "differentiation-focus". I understand why these two groups were not included in your study because your study is on general hospitals but not on specialty facilities (these could be the health care organizations that pursue focus strategies (low cost and differentiation). So, mentioning the four generic strategies and giving the rationale why organizations that purse focus strategies are not included in your study would be great and that could also be included in the limitations.

Reply 1: discussion about focus strategy is added on page 4, paragraph 1.

Comment 2: On page 2, lines 66-69, there may be other significant changes prior to 2000, but the ACA should not be cited as an example of those changes because the ACA was signed into low in 2010 and fully implemented in 2014.

Reply 2: I deleted the ACA.

Comment 3: Research methodology

If you did some data cleaning, please provide the steps you used to come up with the final study sample of 23,570 hospital-year observations. What was the original sample size? Did you drop some hospitals from your sample? Why were they dropped? How many were dropped? How did you deal with missing values, which are always a problem with secondary data.

Across the study years of 2006-2016, did you check if some hospitals switched their generic strategies from low cost to differentiation strategy and vice-versa/

Reply 3: data cleaning process briefly added to the manuscript. In terms of hospitals switching their strategy, changing strategy has happened for some hospitals, however, it is not possible to show strategy change using any figure, table, or chart since we had about 2700 hospitals every year, and it would not be possible to show the strategy change for each hospital on the manuscript.

Comment 4: Regarding your dependent variable, operating margin is a good measure of financial performance, but it does not capture other non-operating expenses. Hospitals that pursue a low cost strategy may reduce the cost of non-operating expenses and still qualify as part of the low-cost strategic group.

Reply 4: we originally were planning to use both operating margin and total margin as our dependent variables. However, after doing literature review, we concluded to focus only on profit margin as our dependent variable.

Comment 5: You mentioned in the discussion that you saw "fluctuation of hospital strategic group membership before 2010" how did you deal with that in your methods? Because if hospitals switched from one strategy to another during the study period, this may be a variable that can affect their financial performance compared with those who stayed low cost or differentiators throughout the study years.

Reply 5: That is a great point. We used generalized estimating equation (GEE)

regression for the multivariate analysis. Rather than modeling the within-subject covariance structure, GEE treats it as a nuisance and simply models the mean response (Diggle, Liang, & Zeger, 1994). In fact this model takes care of within-subject (variation in a hospital's strategy).

Reviewer C

Comment 1: Good article. Here is what we know. Strategy directs the activities of an organization in a specific direction. It is merely a plan and the allocation of resources toward the achievement of an organizational-specific goal. However, we also know that the success of any strategy is controlled by internal and external factors that influence the organization as well as the industry, and some of these factors, especially the external factors are beyond the control of the organization. For example, natural disasters, wars, recession, etc. Were these considered or it was assumed that "all other things remained constant" especially these vulnerabilities I listed above?
Reply 1: Yes, it could be possible that hospitals choose their strategy due to some internal and external factors. That is why we have investigated the internal and external predictors of hospital strategy in a different paper.

Comment 2: The authors discussed mobility barriers – 1. the bringing together of powerful minds, technology, resources, and other competitive strategies. 2. The absolute cost of moving from one strategic group to another, as an operating cost, relative to the strategic group incumbents, that the new entrant must face. I assume these alleviation strategies mainly lie within Porter's five forces and that these external environmental factors that influence organizational strategies are accounted for under these mobility barriers countering efforts.
Reply 2: I completely agree. Both internal and external factors that are mentioned in Porter's five forces. As mentioned previously, we investigate these factors in a different paper.

Comment 3: Research has shown that the growth of productivity in service firms is traditionally low compared to the manufacturing firms; hence, the organization of factors in manufacturing firms has been quite documented in the literature to be linked with financial performance. This provokes the question of whether management practices and organizational factors that have enhanced financial performance in manufacturing firms can also be accounted for the service firms like hospitals. The financial performance of the company is essential to measure management as the individuals and groups within the organization that contributes towards the financial objectives of the company. M, A.S.S. & Zhengge, T. (2016) reported that high considerations of the factors including market share position, firm size, asset utilization, leverage, and liquidity discussed in this article have been proven to be determinants of financial performance of organizations. It is a strategic move by managers to leverage company assets and effective organization and management of people and asset utilization in increasing the size of the firm.

The research methodology deployed was appropriate and well-executed. Findings are consistent across the literature

Reply 3: Thanks for the feedback. I agree that management practices and organizaonal factors are very important factors in predicting hospital performance. However, since we used secondary data in our analysis, we had to limit our analysis to available variables.

Reviewer D

In "The association between strategic group membership and hospital financial performance" the authors use data from 2006-2016 to categorize hospitals into strategic groups and test whether group membership is correlated with financial outcomes. The authors point out that several studies have already examined the issue of hospital strategic group membership and financial performance, but all publications occurred in the early 2000s – prior to many changes in the US healthcare system, most notably the passage of the Affordable Care Act (ACA).

I agree this topic is worth revisiting with more recent data and is of potential interest to hospital management. I have several suggestions related to the empirical design that I would like to see addressed.

Major comments:

Comment 1: The authors point out that theoretically strategic group membership is assumed to be highly stable over time (pg. 3). Did you test this hypothesis empirically? How many hospitals changed groups during your sample period? You may consider a separate analysis of hospitals that switch groups and those that are stable to see how your results are impacted.

Reply 1: We are working on a different paper which is addressing strategy switching in hospitals.

Comment 2: The authors should include controls for whether the hospital is located in a state that expanded Medicaid eligibility following the ACA.

Reply 2: that is a great point. We were aware that some variables like Medicaid expansion and other state level policies or regulations that may impact the performance of hospitals. To address this issue, we included state fixed effect in our analysis.

Comment 3: The distribution of strategic groups is noticeably different across non-profit and for-profit hospitals. Notably, in 2016, only about 16% of for-profits are hybrid compared with 30% of non-profit. If you analyze non-profit hospitals and for-profit hospitals separately, do your financial hypotheses hold up?

Reply 3: We did not do separate analysis for just for-profit hospitals and non-for-profit hospitals. However, as it is seen on table 4, we have the ownership of hospital as one of our control variables that is showing the difference between these two types of hospitals.

Comment 4: I would have liked to seen at least some sensitivity analyses or robustness

checks. Are your results robust to using other measures of hospital profitability? You could consider for example, total operating margin or patient operating margin adjusted for case mix or volume. Are your results robust to limiting the sample to years after the ACA was enacted?
Reply 4: we did some sensitivity analysis using total margin and the results were similar to operating margin. That is why we only used operating margin as our dependent variable. In terms or duration of our analysis, we used data between 2006-2016 to study the strategic group and financial performance in long time. However, we are currently working on another paper using difference-indifference model to see the impact of ACA on strategy of hospitals.

Comment 5: Hospital closures were not mentioned in the paper, so I assume your sample includes hospitals that closed/shut down during the study period. It is likely that hospitals that closed during the study period had poor financial outcomes in the years leading up to their closure. If hospitals that close tend to belong to the same strategic group, this could systematically bias your findings. One way around this issue would be to focus on a balanced panel of hospitals.
Reply 5: we tried to address these by two methods. First, we manually counted the number of hospitals closed this period and we did sensitivity analysis with and without these hospitals. We did not see any differences in our results because of insignificant number of hospital closure (Neeraj Puro, Nancy Borkowski, Larry Hearld, , Nathaniel Carroll, , James Byrd, , Dean Smith, , Akbar Ghiasi Financial Distress and Bankruptcy Prediction: A Comparison of Three Financial Distress Prediction Models in Acute Care Hospitals, Journal of Healthcare Finance, 2019). We also used generalized estimating equation (GEE) regression for the multivariate analysis. Rather than modeling the within-subject covariance structure, GEE treats it as a nuisance and simply models the mean response (Diggle, Liang, & Zeger, 1994). In fact, this model takes care of within-subject (variation in a hospital's strategy).

Comment 6: Would like to see summary statistics (means, SD, correlations) of variables used to construct the composite cost-leadership and differentiation scores – these could be included in appendix.
Reply 6: Descriptive tables added to appendix.

Minor comments:
Comment 7: Perhaps I misunderstood how you defined the four strategic groups, but it was not clear why the differentiation rank for the "cost-leadership" group is equal to 3 rather than 4 (Table 1, column 5).
Reply 7: because cost-leaders are assumed to do poorly in differentiation but better than stuck-in-the middle. That is why "cost-leadership" group is equal to 3 rather than 4.

Comment 8: Pg. 9: the authors point out there is a fluctuation of strategic group membership prior to 2010 and a stability afterward. However, 2005-2006 look similar to 2010 onward, so characterizing 2008-2009 as outlier years due to the recession is

more accurate than saying membership fluctuated prior to 2010.
Reply 8: This argument was based on trend figure from 2006to 2016. I added the figure to appendix. As it can be seen there is significant fluctuation in strategic grouping of hospitals prior to year 2010.