How Do Nonprofits Respond to Quality Disclosure?

Evidence from Nonprofit Nursing Homes

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Abstract

This paper uses a disclosure policy, the Nursing Home Quality Initiative, which mandates the public reporting of quality information on selected dimensions, to investigate the theories of nonprofits. My main finding is that nonprofits are as responsive as for-profits to quality disclosure: quality improves along the disclosed dimensions and diminishes along the less disclosed ones. I also find (1) nonprofit status is correlated with fewer deficiency citations; (2) total bed days insignificantly increase in nonprofits after disclosure; and (3) nonprofits with higher percent of revenue coming from donations are more likely to perform worse along the unreported dimensions. Additional tests reject "mimicking for-profits" as an explanation for these results. Overall, the Newhouse model plausibly explains these findings better than the other well-established nonprofit theories.

I. Introduction

The quality disclosure policy, commonly known as "report card", has been widely adopted in many industries, especially the healthcare industry with some combinations of for-profit, nonprofit and government entities. While there is an extensive theoretical and empirical literature examining the impact of information disclosure on product quality provided by a profit-maximizer (Jin and Leslie, 2003; Dranove et al, 2003; Lu, 2011; Sun, 2011; Luca, 2011), there is comparatively little research on how nonprofits, which are not organized with the explicit goal of maximizing profits (Pauly, 1987), respond to report cards.

Different nonprofit theories provide different theoretical predictions on the response behavior of nonprofits to quality disclosure. One group of theories posit that nonprofits are essentially "for-profit in disguise" (e.g. Pauly and Redish, 1977), suggesting that they behave no differently from for-profits in response to quality disclosure. Contrarily, a second group of theories posit the "contract failure" view that nonprofit firms whose incentives are softened by the non-distribution constraint may provide a better quality of service along the less easily observed dimensions, which indicates that the elasticity of quality with respect to public information for nonprofits would be less than the comparable elasticity for for-profits (e.g. Easley and O'Hara 1983); while a third group of theories agree with the Newhouse (1970) model in which a nonprofit firm may adjust its quality vector so as to maximize its quantity, indicating that the ownership difference in response to quality disclosure is hard to tell. Recently Weisbrod (2008, 2010) proposes a two-goal model in that nonprofits maximize "mission and money", which suggests that nonprofits provide higher quality along the less easily observed dimension, but may have similar response behavior as for-profits if the compared dimension is attached to profitability.

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In this study, I exploit a plausibly exogenous quality disclosure policy to address two questions: (1) how do nonprofits respond to quality incentives? (2) are nonprofits "for-profit in disguise" if they are as responsive as for-profits? In April 2002, the Center for Medicare and Medicaid Services (CMS) introduced a mandatory disclosure policy, the Nursing Home Quality Initiative (NHQI) that required the public reporting of a set of comparable quality measures on some dimensions. The NHQI was first launched in six pilot states and then expanded nationwide. The policy combined with the inspection data provides three key elements for identification. First, I can observe quality information along both NHQI-reported and -unreported dimensions. Second, there is a period when some states are affected by the policy while others are not. Third, each nursing home is randomly inspected at different points in time. These features allow me to adopt a triple differences-in-differences approach to examine whether there are any differences between nonprofit nursing homes and their for-profit counterparts in reaction to the NHQI, a strategy similar as Duggan (2000) which uses an exogenous government policy to test how organizations with different types of ownership respond to changes in financial incentives.

My main finding is that nonprofit nursing homes are as responsive as their for-profit alternatives to changes in quality incentives. The partial disclosure of quality information encourages nonprofit nursing homes to improve quality along the NHQI-reported dimensions and to diminish quality along the NHQI-unreported ones ("teaching-to-the-test").[1] I also find that (1) nonprofit status is correlated with fewer deficiency citations; (2) total bed days (a measure of quantity) insignificantly increase after disclosure; and (3) nonprofits with a higher proportion of revenue coming from donations are more likely to perform worse along the NHQI-**un**reported

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[1] It is noteworthy that the word "teaching-to-the-test" is a neutral tone in this study, describing the phenomena of resource reallocation. Given that we do not know the marginal return of each quality dimension, it is risky to conclude that "teaching-to-the-test" leads to the reduction in overall quality. Because if the disclosed quality dimensions are the most important ones to the health of the elderly, then "teaching-to-the-task" may be helpful for nursing homes to efficiently use limited resources.

dimensions. Finally, I rule out an alternative hypothesis that nonprofits may mimic the "teaching-to-the-test" behavior of for-profit alternative when competing with them. Put these findings together, I conclude that among all the well-established nonprofit theories, the Newhouse model explains these findings, plausibly, the best. And the newly-developed Weisbrod's two-goal model is worth being considered.

This paper stands at the intersection of the literature on information economics, economics of organization and health economics, and makes three main contributions. First, an advantage of this paper's micro-level data structure uniformly describing quality at disclosed and less disclosed dimensions allows me to investigate the plausibility of those nonprofit theories on quality at less easily observed dimensions. Second, and most important, I show that quality disclosure may give nonprofit firms an incentive to reallocate resources across different dimensions of quality. This new evidence about nonprofits would help researchers to better understand the maximization problem of a nonprofit organization. Third, focusing on health care, this study provides strong evidence that nonprofits are as responsive as for-profits to quality disclosure. This evidence is crucial to ongoing report card policy decisions, given that a large proportion of organizations in the healthcare industry are nonprofit.

The rest of this paper is organized as follows. Section II introduces the NHQI policy, summarizes prior research about the impact of ownership status on quality, and discusses nonprofit theories and their corresponding predictions. Section III introduces data and institutional background and discusses the validity of the identification strategy used in this paper. Section IV examines whether nonprofits are as responsive as for-profits to quality incentives. Section V investigates the motivations for nonprofits to have the teaching-to-the-test behavior. Section VI discusses the findings and concludes.

II. Background, Prior Studies and Conceptual Framework

A. Nursing Home Characteristics and the NHQI Disclosure Policy

There are many goods and services for which some dimensions of quality are difficult for consumers to identify *ex ante* and verify *ex post*. Nursing home service is a representative example. Few consumers seek out an alternative institution[2] since they are unable to identify bad quality of care on the less-observed dimensions. Meanwhile, it is impossible for nursing homes and consumers to formulate a complete contract that clearly specifies the duties of each party under all possible contingencies. The existence of asymmetric information between providers and consumers and the inevitability of an incomplete contract enables it easier for profit-maximizing nursing homes to provide inferior quality on the dimensions that are hard to monitor.

To alleviate the information asymmetry and motivate nursing homes to improve quality, the nursing home authority CMS introduced the NHQI, a mandatory disclosure policy, that publicly reported some but not all dimensions of quality information in a comparable format. The NHQI policy attracted great attention from both nursing homes and consumers. According to the CMS 2002 Pilot Evaluation Report, "88% of the nursing homes in the six pilot states reported that they had heard of the NHQI. ... and 77% indicated that the NHQI was, in part, responsible for their decision to undertake these activities." The NHQI policy also increased consumers' awareness of nursing home quality information. "Phone calls concerning nursing home information more than doubled, ... and visits to Medicare.gov's nursing home quality information increased tenfold."

After this disclosure policy took effect, profit-maximizing nursing homes improved quality along the disclosed dimensions and diminished it along the less disclosed ones, as Lu (2011)

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[2] Dick et al. (1994) found that very few nursing homes have a larger number of admissions. Only 0.5% have more than four admissions per bed in a year.

shows. The economic rationale of such a response is that information disclosure changes the relative returns across different dimensions of quality. To minimize cost, for-profit nursing homes choose to shirk on quality along the NHQI-unreported dimensions. (Holmstrom and Milgrom, 1991; Bar-Isaac et al. 2011)

One may wonder whether nonprofits, which are not organized with the explicit goal of maximizing profits or shareholders' wealth (Pauly, 1987), are immune from quality incentives induced by the partial information disclosure?

B. Prior Empirical Research

The literature examining how nonprofits respond to quality disclosure is relatively sparse. Before discussing that research, I note that my study is informed by a rich array of literature that examines the effect of ownership status on quality. These studies test various hypotheses that could explain differences in quality across ownership forms. The "for-profits in disguise" hypothesis assumes that nonprofit firms have the similar maximization problems as for-profits. This conjecture has been tested in a number of empirical studies including Herzlinger and Krasker (1987), Shortell and Hughes (1988), Keeler et al (1992), McClellan and Staiger(2000) and Slone et al (2001), which find that nonprofits and for-profits provide similar quality overall.[3]

Contrarily, the leading alternative hypothesis,[4] "contract failure", posits that nonprofits provide higher quality than for-profits, especially along the dimensions that are hard to monitor. To my surprise, empirical studies in the nursing home industry unanimously (to the best of my

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[3] This hypothesis is also supported by papers studying the effect of ownership status on other dimensions like pricing, profitability, "gaming" of reimbursement codes, and service offerings. See Cutler and Horwitz (2000), Silverman and Skinner(2004), Dafny(2005), Horwitz and Nichols (2009), Capps et al (2010) and Dafny and Ramanarayanan (2011)

[4] Other alternative hypotheses include the quality-quantity maximand model and Weisbrod (2010)'s two-goal model (See Table 1).

knowledge) support this hypothesis. Gertler (1989), Davis (1993), Aaronson et al (1994), Zinn (1994), Spector et al (1998), Harrington et al (2001), O'Neill et al (2003) and Grabowski and Stevenson (2008) find that nonprofit nursing homes have fewer deficiency citations and more staffing input than their for-profit alternatives overall. Besides, studies in other industries that provide support for this hypothesis include Mark (1996) and Schlesinger et al (1997), which find that there are some differences in quality that were unfavorable to for-profit psychiatric hospitals.

So far as I know, very few papers address the further questions: how do nonprofits respond to quality incentives? Are they "for-profit in disguise" if they have the similar response pattern as for-profits to quality disclosure? Most relevant to the present work is the small set of papers that test nonprofit behavior under asymmetric information. Weisbrod and Schlesinger (1986) use the consumer complaints to measure nursing home quality along less-observed dimensions and compare ownership types directly. They find that only religious nonprofits are less likely than for-profits to exploit the information asymmetry that exists between the homes and their consumers. Chou (2002) interacts ownership forms with family visits as a proxy of asymmetric information and identifies the plausibility of the "contract failure" theory.

My study relies on a plausibly exogenous disclosure policy to examine the differences in response to an information shock between for-profits and nonprofits along different dimensions of quality. Such an information shock is independent of the adoption of types of ownership. Different from the previous findings, this study shows the similarities in response to asymmetric information between for-profit and nonprofit nursing homes. Instead of rashly concluding that nonprofits are "for-profit in disguise", I next explore the possible causes for nonprofits to have similar behavior as for-profits under the setting of information disclosure. To my knowledge, this study is the first to consider the impact of quality information disclosure on nonprofit behavior.

C. Theoretical Background and Predictions

To date, there is little theory predicting the behavior of nonprofits in response to quality disclosure. I cannot, therefore, ground my predictions on one specific theory linking nonprofits and information disclosure to do a decisive empirical test. However, I can offer some rough predictions based on an informal discussion of the major theories of nonprofits and information disclosure (summarized in Table 1). These theories are: (1) "for-profit in disguise" theories, (2) "contract failure" theories, (3) quality-quantity maximization. A forth "hybrid" model combines disguise theory with philanthropic motivation.

In the first group of theories, nonprofits act as profit-maximizers. Pauly and Redisch (1973) suggest that nonprofits would be essentially identical to for-profits in equilibrium, with economic profits accruing to privileged employees in the form of "perquisites". Lakdawalla and Philipson (2006) regard a non-profit organization as a profit maximizing firm with cost advantage. I thus hypothesize that if nonprofits have the same maximization goal as for-profits, then nonprofits would respond to information disclosure similarly as for-profits.

The second group of theories, termed as the "contract failure" theory, posits that nonprofits are constrained by the law of non-distribution of profits and hence offer superior quality along some dimensions which cannot be well-observed by consumers. Hansmann (1980), Hart et al. (1997), Hirth (1999)[5] and Glaeser and Shleifer (2001) believe that neither the trading parties nor the contract-enforcing judge can anticipate all possible contingencies *ex ante* when forming a contract. Under the incomplete contract, powerful incentives resulting from profit maximization encourage exploiting non-contractible quality while the nondistribution constraint weakens

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[5] Researchers did not agree on the classification of Hirth(1999)'s theory in the literature. Chou (2002) views it as a member of "contract failure" theories, while Horwitz and Nichols (2009) regards it as a hybrid model that combines disguise theory and theories on output maximization. Since this work is more relevant to Chou(2002), I follow Chou's classification.

nonprofits' incentives to cut corners along the less-observed dimensions. If nonprofits indeed skimp less on quality along the less easily observed dimensions, then nonprofit nursing homes would be significantly less responsive than for-profits to changes in quality incentives.[6]

In the third group of theories, which I refer to the Newhouse model, nonprofit objective is a quality-quantity maximand subject to a break-even budget constraint. As Newhouse (1970) states, "when two quality vectors have the same cost, the decision maker chooses that quality vector which maximizes quantity bought at a given price." If quality is one-dimensional and price is fixed, the quality level that has been maximized would remain unchanged when quality information is disclosed. When quality is multi-dimensional, I would expect that post-disclosure quality might be higher at the reported dimensions and lower at the unreported than that without disclosure because consumers prefer this new quality vector which helps to maximize quantity.[7] Nevertheless, whether there are any differences between nonprofits and for-profits in response to quality disclosure is indeterminate.

In the forth category, Weisbrod et al (2008) and Weisbrod (2010) recently develop a hybrid model in which nonprofits may have two goals: mission and money. This model suggests that whether nonprofits behave differently from for-profits depends on which goal plays an important role on the compared dimension. In terms of information disclosure the two-goal model offers a hybrid prediction. If profitability plays an important role under information disclosure, then nonprofits would have a similar response pattern as for-profits do. If philanthropic motivation dominates, the elasticity of quality for all dimensions with respect to

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[6] In early models, researchers emphasize the philanthropic nature of nonprofits and view them as a superior system rewarding dimensions that are hard to measure (Weisbrod, 1989; Rose-Ackerman, 1996). The altruistic model would generate the similar predictions as the "contract failure" theory in terms of quality disclosure. To simplify the classification of nonprofit theories, I treat this model as the predecessor of the "contract failure" theories.

[7] In Section V, Part A, I provide a detailed discussion about the Newhouse Model and quality disclosure.

public information for nonprofit organizations must be less than the comparable elasticity for their for-profit counterparts. The results, therefore, depend on the tradeoff between the two goals.

III. Data

The data used in this paper are the Online Survey, Certificate and Report (OSCAR) data, and the SNF Cost Reports. The OSCAR data records deficiency citations, resident characteristics and facility characteristics at the point of inspection. The SNF cost reports provide financial information and donation structure. I merge the two datasets by provider ID and study nursing homes that were inspected between January 2002 and September 2002.[8] The merged sample includes 5434 nursing homes, of which 4,244 are for-profit (FP), 1,035 are nonprofit (NP) and 155 are owned by government (GOV). Nonprofit nursing homes account for about 20% of the whole sample.[9]

A. Summary of Policy Changes and Identification

The key feature of the data is the NHQI disclosure policy. It tells us when the policy was introduced, what dimensions are publicly reported, and which states were affected earlier than others. These variations within the policy itself demonstrate three main exogenous sources of identification.

First, the NHQI offers a standardized report card format to all nursing homes across US and publicly reports quality along selected dimensions. This provides an exogenous source of

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[8] The specific period is determined by the identification strategy used in this study. There are no significant changes in estimates when I try a longer time period from Nov, 2001 to Oct, 2002 and a shorter period from Jan, 2002 to June, 2002.

[9] Among all the nonprofits, 775 are secular nonprofit nursing homes and 260 are religious ones. At one point, I thought that religious and secular nonprofits might behave differently and hence separated nonprofits into two subgroups. However, I failed to find the significant differences in response patterns between the two groups. Therefore, I pooled them together as nonprofits.

variations in incentive changes across different quality dimensions and allows me to distinguish between the NHQI-reported and -unreported dimensions using the OSCAR inspection data. [10]

The NHQI Quality Measures (QMs) compare the *quality of care* provided by each nursing home. These selected QMs that measure changed resident health status are negative quality. For example, one measure reported is "percent of residents who need help with daily activities (*ADL*)". As we know, quality in nursing homes is mainly based on what nurses do on a day-to-day basis. It may take more staff time to allow residents to do daily activities by themselves, rather than to assist them in these activities. The elderly benefit from doing their daily activities by themselves, since this increases their confidence and level of fitness. I attach a brief introduction of these NHQI QMs in Table A1.

Figure 1 depicts the relationship between these NHQI QMs and inspection information. During an annual inspection in a nursing home, inspectors check quality along roughly 190 dimensions, which are classified into three domains: *Quality of Life*, *Quality of Care* and *Administration* (See Table A2). A deficiency citation is issued if quality along a given dimension is below the minimum standards. Because consumers had difficulty comparing and processing the deficiency citation information,[11] the CMS decided to select some quality dimensions and quantify them in a comparable format. The NHQI QMs are more user-friendly and easier-to-compare than the citation information (CMS, 2002). These selected quality dimensions to a great extent are within the domain of *Quality of Care* (See Table A3). I explore this relationship to construct three citation composition variables: (1) *Total Citations*, the total number of deficiency

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[10] I believe that all quality dimensions of elderly care can be observed if consumers are willing to pay enough search costs. In this study, the NHQI-unreported dimensions refer to those dimensions that consumers need to pay a bit more effort in search than those NHQI-reported dimensions. They differ in levels of search costs.

[11] Stevenson (2006) and Kane and Kane (2001) show that the information about deficiency citations is not very useful to consumers. The main disadvantage of such information can be summarized as too much information and no apple-to-apple comparison. This eventually triggered the introduction of the NHQI policy by the CMS.

citations covering all dimensions; (2) *Citations in Quality of Care*, the number of citations along NHQI-unreported dimensions in the domain of *Quality of Care*; and (3) *Citations in Other Domains*, the number of NHQI-unreported citations in *Quality of Life* and *Administration*. The summary statistics of these measures are reported in Table 2.

A second source of exogenous identification is provided by the CMS report card experiments, conducted in six randomly selected pilot states in April 2002 and then expanded this policy to 50 states in November 2002. The different points in time at which states are affected by the NHQI policy, as depicted in Table 3, are another source of variation I exploit in the analysis. I believe that the selection of pilot states is uncorrelated with the characteristics of nursing homes in each state. [12] To verify this intuition, I conduct a probit analysis in which the dependent variable indicates if it is a pilot state. The independent variables include the average deficient citations, staffing, income per capita, population over 65, unemployment, number of facilities, percentage of minorities and so on. Though not reported in a table, the results support my intuition in favor of random assignment of state adoption -- estimated coefficients on these characteristics are insignificantly different from zero.

A third source of exogenous identification is the annual inspection. It randomly assigns some nursing homes to have the 2002 inspection before the pilot policy took effect. Those nursing homes inspected earlier in 2002 were not affected by the NHQI pilot policy. This particular source of variation identifies the effect of interest in the differences-in-differences regressions. To assess whether the random inspections balanced nursing homes' characteristics

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[12] To obtain a clean effect of the NHQI pilot policy, I exclude from the list those states that had adopted their own state report card policies before 2002. I concerned that a move from *zero* to ten disclosed measures is likely to have a different effect on behavior than a move from *some* to ten.

between early- and late-inspected groups, I compare the pretreatment covariates[13] across groups. Though not reported, the results show that all the differences in these covariates are small and insignificant. I conclude that, in general, the random assignment worked as intended.

The random annual inspection allows me to compare the different trends of outcome variables across treated and control groups on a monthly basis.[14] Figure A1 shows the trend of total citations among pilot and non-pilot states in a full year. As we can see, the trends are parallel before April, 2002 and differ afterward -- total citations increase in the pilot states and decrease in the non-pilot states. The parallel trends before the policy came into effect are consistent with the random selection of pilot states, and the immediate differences in trends afterward suggest that the control group is not contaminated by the policy. This alleviates my concern that nursing homes in the non-pilot states might also respond to the NHQI policy executed in pilot states. Perhaps, nursing homes in the non-pilot states were uncertain about whether the policy would eventually be adopted nationwide and thus did not immediately respond to the NHQI pilot policy.

B. The Construction of Donation Measures

I use the 2001 donation information reported in the SNF cost reports to construct variables measuring the importance of donation as a revenue source in each nursing home. I select the pre-shock year because contemporaneous donations would be affected by post-NHQI responses.

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[13] I use nursing home characteristics in 2001 to conduct this probit analysis. The dependent variable is a binary variable that equals 1 if a nursing home was inspected before April in 2002 and 0 otherwise.
[14] Nursing homes in the treated and control groups are mutually exclusive if I use (less than) one year data only. I also tried using multiple years to run the regression. In such a setting, nursing homes were repeatedly sampled into either group and were not mutually exclusive. Though the results remain robust, I am uncomfortable reporting them because the random assignment can be manipulated by choosing different time periods (resulting in various sampling times).

Two donation variables are constructed. One variable, denoted as *%Revenue*, is the ratio between total donations and total revenue. Nursing homes with a larger share of revenue coming from donation are more sensitive to donors' preference. The other variable describes the efficiency in donation "production", which equals total donations divided by total residents. I denote it as *Donation Per Capita* and use it for robustness checks.

I compare the donation sample with the IRS Form 990. In my sample, the mean and median of *%Revenue* is 2.2% and 2.5% respectively, which is consistent with the donation information provided by IRS Form 990.[15] It is worth noting that donations are a relatively small percentage of nursing home revenues, but can constitute a sizeable percentage of the nursing home's net surplus (profits) (11.3 % at the median in the sample). Besides, the amount of donations also helps to signal unobservable quality to the public, attract demand and therefore increase the revenue generated by the core business. I caution that different researchers may have different judgment on the importance of donations in the healthcare industry. Nevertheless, there have been several prior studies using the healthcare donation data to study its impact on nonprofit corporate governance (Brickley et al, 2010).

It is important to point out that among the 1,035 nonprofits, only 542 nursing homes reported their donation information in 2001. A possible concern is that the missing donation information might bias the estimation. I have no way to tell if the nursing homes with no donation information received no donations or simply did not report how much they received from donors. To make full use of the donation information, I provide estimation results for two extreme cases (zero or missing). The estimated coefficients thus give us the bounds of the magnitude of the donation effect.

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[15] Fishman and Hubbard (2003) list the donation intensity by industry using the IRS Form 990. As their table shows, the median "donations/revenue" in Health is 3%, which is close to my statistics.

IV. Do Nonprofits Behave Differently from For-profits in Response to NHQI?

Nursing homes have an incentive to improve quality scores along the NHQI reported dimensions and diminish quality along the unreported ones after the introduction of the NHQI report card policy. Lu (2011) document the evidence of such behavior of nursing homes in reaction to the NHQI policy. Here, I am interested in answering how a nursing home's type of ownership influences its response, especially on the less-observed dimensions, to quality incentives that are created by the introduction of the NHQI policy.

A. Estimation

Table 4 shows the preliminary changes in citation composition by ownership types. The introduction of the NHQI pilot policy is associated with an increase in *Total Citations* and *Citations in Other Domains* (Quality of Life/Administration) and a decrease in *Citations in Quality of Care* (emphasized by the NHQI QMs) in for-profit nursing homes in the pilot states. The results become more significant after being compared to their corresponding controls in the non-pilot states. It seems that nonprofit nursing homes have similar response patterns as their for-profit counterparts after the introduction of the disclosure policy. In addition, there is no apparent time trend or seasonality in quality since the changes in non-pilot states help to control these effects.

To obtain clean empirical evidence about ownership differences in response to the NHQI, I run specifications of the following form using the full sample:

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\begin{aligned}
Y_{jst} = &\ \alpha_0 + \alpha_1 OWN_{jt} * Pilot_s * NHQI_t + \alpha_2 Pilot_s * NHQI_t + \alpha_3 OWN_{jt} * Pilot_s \\
&+ \alpha_4 OWN_{jt} * NHQI_t + \alpha_5 * OWN_{jt} + \alpha_6 * NHQI_t + \alpha_7 X_{jst} + \alpha_8 Qt_t \\
&+ \alpha_9 St_s + \alpha_{10} Qt_t * St_s + \varepsilon_{jst}
\end{aligned} \tag{1}
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Here Y_{jst} represents the outcome variables such as the NHQI QMs and citation compositions for nursing home j in state s at month t. *NHQI* is a binary dummy variable that equals one after and zero before April, 2002. *Pilot* is a binary dummy variable that equals one for states that are among the six pilot states: Colorado, Florida, Maryland, Ohio, Rhode Island and Washington. I interact *Pilot*NHQI* with a nursing home's type of ownership, *OWN*, to examine whether there were significant differences across ownership types in response to the NHQI. Hence, the coefficient of *Pilot*NHQI* indeed reflects the response pattern of for-profit nursing homes. I interact *OWN* with a *NHQI* dummy to control for other factors that were differentially affecting each type of nursing homes in the post-NHQI period. The interaction term *OWN*Pilot* controls for other factors that affect different ownerships in the pilot states differently. *X* is a vector of individual facility characteristics including resident mix (*Medicaid*), facility size (*Beds*), market competition (*HHI*) and affiliation status (*Chain*). *Qt* is a vector of quarter indicators that allows systematic differences over time. *St* is a state dummy that controls for fixed geographic differences. I control *Qt*St* for time-varying geographic differences. I also include *OWN* and *NHQI* in the specification to guarantee that the model is saturated. ε is a random error term. The standard errors are clustered by state.

In this regression the unit of observation is a nursing home inspection. The random inspections help to identify the effect of interest by controlling nursing home specific characteristics that could also affect these dependent variables. Identification of the ownership effect is therefore primarily due to the time series and cross-sectional variations in whether a state was affected by the policy. However, the introduction of the NHQI may possibly motivate nursing homes to change the composition of residents by cherry-picking healthy elderly and thus may bias the estimation. Two pieces of evidence argue against this possibility. First, I document

the evidence of the effect from NHQI on resident health composition and fail to find any statistically significant changes in mean and variation of patient health status.[16] Second, the NHQI QMs are risk-adjusted measures. This helps to explain why there is little cherry-picking effect of report cards in nursing homes.

B. Main Findings

Table 5 presents the response patterns of each type of nursing home. The coefficients of *Pilot*NHQI* show that nursing homes improve their scores of the NHQI QMs, but get more deficiency citations, especially on the NHQI-unreported dimensions in a short run. More importantly, there are no corresponding differences between for-profit and nonprofit nursing homes, as the insignificant estimates on the coefficients of *NP*Pilot*NHQI* show.

The first five columns show the impact of NHQI on the NHQI QMs. The coefficients of *Pilot*NHQI* are negative and significant for *Bedfast* and *Bowel* and negative and insignificant for *ADL*, *Transfer* and *Depression*. To take *Bowel* as an example, the result shows that the introduction of the NHQI helps to reduce the percent of residents who have bladder and bowel problems by about 1 percent. Given that the mean of *Bowel* is 4.6, the magnitude of the coefficient account for 22% of its mean. It is valuable to mention why the results for some NHQI QMs are insignificant. I agree with Mullen et al. (2010) that the relative benefit-cost ratios matter in a multitasking framework. Even if a measure is reported, if this measure is valued less by consumers, or very costly to improve, then firms may not put their effort into the improvement of such a measure. For example, in the above case, the measure *ADL* is extremely difficult to improve. If an elderly patient cannot move any more, even the best nursing care cannot make her

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[16] Specifically, I adopt the health status measure used in Dranove et al. (2003) and calculate its mean and variance for each nursing home. The dif-in-dif coefficients are insignificant.

do daily activities by herself. Overall, the coefficients of *Pilot*NHQI* along the NHQI-reported dimensions show that nursing homes improve their NHQI QMs in response to the NHQI disclosure policy.

The remaining columns show the impact of NHQI on deficiency citation compositions. The *Pilot*NHQI* coefficient for *Total Citations*, which covers both the NHQI-reported and -unreported dimensions, is large and positive at the one percent significance level. The result suggests that the introduction of the NHQI is associated with an average increase in deficiency citations by 1.2 per inspection.

More interestingly, the *Pilot*NHQI* coefficients for *Citations in Quality of Care* and *Citations in Other Domains* are very different, though both of them measure the NHQI-**un**reported dimensions. The former is insignificant, negative and almost converges to zero, while the latter is significant and positive with large magnitude. The diverse effects suggest that the changes in the NHQI-reported dimensions may have different spillover effects over the other unreported dimensions.[17] As Lu (2011) mentioned, some underlying quality dimensions may share commonalities in production with the NHQI QMs, while other unreported tasks have to compete with the reported ones for limited nursing resources. Given that the CMS focused on *quality of care* when selecting the NHQI QMs, I tentatively conclude that there are few changes in the deficiency citations within the domain of *Quality of Care,* perhaps because the negative spillover effects resulting from resource competition are offset by the positive spillover effects resulting from shared commonalities. Furthermore, the negative spillover effects may strictly dominate in other domains. Overall, the introduction of NHQI leads to more deficiency citations,

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[17] I could also use the terms "complements" and "substitutes" used in the multitasking framework by Holmstrom and Milgrom (1991) to understand the different spillover effects. If an unreported quality dimension is complementary to (or a substitute for) a reported NHQI QM, then improving this reported dimension will lead to the improvement (or deterioration) of the corresponding unreported one.

especially along the NHQI-unreported dimensions in the domains of *Quality of Life* and *Administration*.

Most critical to my analysis, the coefficient of *NP*Pilot*NHQI* is small and insignificant for each dependent variable. The magnitude of those coefficients for the triple interaction term is small relative to their means respectively, some of which even converges to zero, i.e. *Citations in Quality of Care*. Besides, I also verify that the insignificance is not caused by large standard errors.[18] Overall, the results suggest that nonprofit nursing homes are as responsive as for-profits to the changes in quality incentives.

Further, I conduct F-tests on the sum of the coefficients of *Pilot*NHQI* and *NP*Pilot*NHQI*, which tells the effect of the NHQI policy on nonprofit behavior. The p-value remains significant for *Bedfast*, *Bowel*, *Total Citations* and *Citations in Other Domains* and insignificant for *ADL*, *Transfer* and *Depression*,[19] which is not very different from the estimates for for-profit nursing homes. The trivial and insignificant differences between the two ownership types indicate that nonprofits behave no differently from their for-profit counterparts in response to quality disclosure.

In addition, the preliminary analysis in Table 4 indicates that the nonprofit status is correlated with fewer deficiency citations, which is confirmed by the coefficients of *NP* in Table 5. Since there is an extensive empirical literature examining the impact of ownership status on nursing home quality using the OSCAR data that I used for this study and agreeing that nonprofits have fewer citations than for-profits (Aaronson et al, 1994; Spector et al, 1998;

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[18] To do so, I calculate how much percentage changes in mean could make nonprofit nursing homes behave significantly differently from for-profits. If a small mean change in pilot states can make these interaction terms show up as significant, I am relieved of the large standard error concern. Using a simple formula 1.96*SE/mean, I find that the percentages are within a reasonable range for almost all the dependent variables.

[19] The aggregated magnitude for *ADL*, *Transfer* and *Depression* almost converges to zero. Since nursing homes may not improve all reported quality, these results are reasonable.

Harrington et al, 2001; O'Neill et al, 2003; Grabowski and Stevenson, 2008), I choose to directly cite their evidence in this study rather than replicating their work to document the causality again.

For a robustness check, I use two alternative specifications. One specification replaces $Qt*St$ with a vector of state-specific linear time trends that allows different states to be on different trajectories with respect to outcomes, because all of the variations in the treatment indicators may be absorbed by the $Qt*St$ interactions. Table 6 shows that the results remain robust even after the $Qt*St$ interactions are dropped. The other weights the specification with the number of residents in each nursing home, because nursing homes with different sizes may respond to the NHQI differently. Though not reported in the table, the results are quite robust.[20]

To summarize, there is no supportive evidence that nonprofit nursing homes are less responsive than profit-maximizing firms to changes in quality incentives. Instead, I observe that when quality information on some dimensions is released to the public, quality in nonprofits improve along the disclosed dimensions and diminish along the less disclosed dimensions, which is similar to that of for-profit nursing homes. Besides, the nonprofit status is correlated with fewer deficiency citations compared to for-profits. It seems that the findings neither fully support the "contract failure" theory nor completely agree with the "for-profit in disguise" hypothesis.

V. Extensions

In this section, I explore the possible reasons that drive nonprofits to the "teaching-to-the-test" response. The additional supplemental tests focuses on three areas: 1) examining the

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[20] Ownership could signal unverifiable quality to consumers and hence affect consumers' purchase decisions. One might wonder if ownership signaling would possibly affect firm quality decisions in response to the NHQI disclosure policy. To rule out this possibility, I conduct a test using the NHQI disclosure policy as an imperfect information substitute for ownership signaling. If consumers are aware of ownership when making purchasing decisions, I should expect to see that the market share of for-profits would significantly increase after the introduction of the NHQI because the disclosure policy helps for-profits to reduce their information disadvantage in signaling. However, so far, I fail to find such evidence.

other relevant predictions of the Newhouse model; 2) establishing the new evidence for the "uninformed-donor" hypothesis; and 3) ruling out the "mimicking for-profits" hypothesis.

A. Revisiting the Newhouse Model

The Newhouse model assumes that nonprofit objective is a quality-quantity maximand subject to a break-even budget constraint (Newhouse, 1970). When quality is one-dimensional and price is fixed, the quality level that has been maximized should remain unchanged when quality information is disclosed. When quality is multi-dimensional, the assumption of full or partial disclosure leads to different theoretical predictions.

Let's consider a simple quality function which is the sum of the product of quality at each dimension (q_i) and its corresponding marginal utility (a_i), i.e. $Q(a,q) = \sum_{i=1}^{n} a_i * q_i$. In the case of full disclosure, the CMS discloses quality information for all dimensions and hence does not change the relative marginal utility across dimensions (a_i for all i). This means that there exists a unique quantity and quality bundle that maximizes the utility of nonprofits when price is constant. The quality vector of nonprofits should be the same regardless of information disclosure.

In the real world, the CMS discloses quality information for selected dimensions, which is a case of partial disclosure. As a result, consumers may value quality more for the reported dimensions and less for the unreported ones. The vector of marginal utility (a_i for all i) for consumers is changed by the disclosure policy. As Newhouse (1970) states, "when two quality vectors have the same cost, the decision maker chooses that quality vector which maximizes quantity bought at a given price." In the disclosure setting, this suggests that at the same unit cost, nonprofits may pick a different quality vector from what they would have chosen if there were no public reporting. Quality of this new vector may be higher at the reported dimensions and

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lower at the unreported than that without reporting because consumers prefer the new quality vector which helps to maximize quantity when price is unchanged.

The Newhouse model predicts quality changes in opposite directions for reported and unreported dimensions in the context of partial disclosure, and an increase in quantity due to the new quality vector. And this hypothesis holds when nonprofits break even[21] and price and unit cost are unchanged after the introduction of the disclosure policy.

I use the quantity and financial information of nonprofits in the SNF Cost Report to test these predictions. To do so, I again use pilot and non-pilot states as the treatment/control groups and adopt 2002 as the reference year to construct a difference-in-difference model.[22] The identifying assumption is that the 2002 balance sheet/quantity should be affected by the policy more for nursing homes in pilot states than non-pilot states, given that the CMS expanded the policy nationwide in November, 2002, which is close to the end of a year. The specification is as follows:

$$W_{jst} = \delta_0 + \delta_1 * Pilot_s * Post_{jt} + \delta_2 * X_{jst} + \delta_j + \delta_t + \xi_{jst} \tag{4}$$

Here, W_{jst} refers to quantity measured by *total bed days* or financials such as *average revenue*, *unit cost* and *unit labor cost* in a log format and *annual profit* at nonprofit nursing home *j* in state *s* at year *t*. *Post* equals one if it is 2002 and zero otherwise. All the remaining variables are as same as those in Equation (1). Hence, δ_1 stands for the differential effects of report card between pilot states and non-pilot states. Nursing home specific effects and year effects are controlled. ξ is a random error term. The standard errors are clustered by state. I also weigh the equation by the number of patients for a robustness check.

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[21] I use an/the SNF cost report to examine whether nonprofit nursing homes break even using the 2001 profit information. The data show that the average annual profit is \$685,916 and its standard deviation is 1,368,01. Hence, t-value is 0.50. There is no evidence for positive profits in nonprofit nursing homes.
[22] I propose this new model because the information in the SNF cost report is filed by nursing homes each fiscal year. Neither monthly information nor random filings are involved.

Table 7 shows that none of the coefficients of these financial measures are significant. The unchanged average revenue indicates that price is not adjusted according to the change of disclosed information, which is consistent with the fact that public payers set the price for majority of the nursing home residents. Both unit cost and unit labor cost remain the same as before, which suggest that nonprofits do not significantly change the unit cost of the service they provide after the introduction of the NHQI policy. This is consistent with the break-even budget story. Besides, there is no evidence that nonprofits change their annual profits due to the policy. Based on this set of results, I confirm that the assumptions for the Newhouse model with multiple dimensions are valid.

Next, I examine whether quantity increases as the Newhouse model predicts. Table 7 shows that the coefficient of total bed days is positive and insignificant, suggesting that the introduction of the report cards is associated with an insignificant increase in quantity in nonprofit nursing homes. Despite that the insignificant result could be interpreted as little impact of report card, it could also be a result of the short period of the longitudinal data because it may take time for nonprofit nursing homes to increase quantity due to the changes in quality,

B. The "Uninformed Donor" Hypothesis

Donations are important in the nonprofit sector. Every year, many nonprofit firms spend time and money raising funds from donors. Donations help to lower the costs of the nonprofit firms and thus provide them with a competitive advantage over for-profit firms (Lakdawalla and Philipson, 2006). Donations may also increase the perquisites for employee of a nonprofit when the constraint of the non-distribution of profit is imperfectly enforced.

The determinants of donations in nonprofit markets are price, quality and advertising.[23] Publicly released quality information provides firms with an effective way of advertising quality. For example, business schools often publicize their rankings in *US News* or *Business Week* to promote their reputation and collect more donations. Nursing homes also use the NHQI quality measures to advertise themselves and raise donations from local communities.

Nonprofit nursing homes obtain their donations mainly from small donors (UW Medicine, 2007). Because small donors have difficulty in monitoring quality, report cards provided by a credible third-party become an important aid for donors to judge quality and make donation decisions. When the CMS reports comparable NHQI quality measures on selected dimensions to the public, nursing homes are very likely to take advantage of donors.[24] Hence, it would be valuable to examine if raising donation amounts is the motivation for nonprofits to employ "teaching-to-the-test".

To do so, I first investigate how nonprofits that rely on donations respond to a plausibly exogenous shock, the introduction of NHQI *pilot*. I use *%Revenue* (the proportion of revenue coming from donation) to measure the degree of reliance on donations and perform the following specification on the nonprofit nursing home sample:

$$
\begin{aligned}
Y_{jst} = {} & \beta_0 + \beta_1 DON_{j,01} * Pilot_s * NHQI_t + \beta_2 Pilot_s * NHQI_t + \beta_3 DON_{j,01} * Pilot_s \\
& + \beta_4 DON_{j,01} * NHQI_t + \beta_5 * DON_{j,01} + \beta_6 * NHQI_t + \beta_7 X_{jst} + \beta_8 Qt_t \\
& + \beta_9 St_s + \beta_{10} Qt_t * St_s + \varepsilon_{jst}
\end{aligned}
\tag{2}
$$

This specification is similar to Equation (1) except that we replace *OWN* with *DON*. Here, *DON* refers to the variable, *%Revenue* in the pre-NHQI year.[25] The underlying assumption for

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[23] Many papers discussed the determinants of donations in nonprofit markets. See Weisbrod and Dominguez (1986), Posnett and Sandler (1989), Okten and Weisbrod (2000), Tinkelman (2004), and Sargeant et al. (2006)

[24] It is worth emphasizing that most of the donors in the nursing home industry are individuals. Unlike hospitals, nursing home donors play an unimportant role on the board.

[25] I select the pre-shock year because contemporaneous donations would be affected by the post-NHQI response.

identifying the donation effect is that without the NHQI policy shock, nursing homes with different degrees of importance of donations as a revenue source would continue their courses. Such an information shock is independent of the selection of donation structure. To verify this assumption, I classify nursing homes based on the distribution of *%Revenue*. Figure 2 shows that nursing homes in the bottom quartile have similar trends as those in the top quartile before the introduction of the NHQI policy. Besides, the random assignment (inspection) helps to control those factors, such as religious institution, hospital affiliation and other unobservable variables that may affect both donations and responsiveness to public reporting.

Table 8 shows that nonprofits with a higher percentage of revenue coming from donations are more likely to have more deficiency citations, especially along the NHQI-unreported dimensions, after the introduction of the *NHQI pilot*. Columns (1) and (2) report the results using *Total Citations* as the dependent variable. The coefficient of *%Revenue*Pilot*NHQI* for each case (missing or zero) is positive and significant. To take Column (2) as an example, the coefficient suggests that a 1% increase in *%Revenue* results in the increase in total citations by 0.39 per inspection, which accounts for 7% of the mean of *Total Citations* (=0.39/5.6). Combining these results with the parallel pre-NHQI trends in Figure 2, I believe that the effect is not driven by the unobserved differences between nursing homes with and without donations, but a result of the NHQI policy shocks. Further, column (5) and (6) show the similar response pattern using *Citations in Other Domains* as the dependent variable.

Interestingly, the coefficients of *%Revenue*Pilot*NHQI* in column (3) and (4) are small [26] and insignificant when using *Citations in Quality of Care* as the dependent variable. One may wonder whether these coefficients ought to be significantly negative because nursing homes

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[26] To take Column (4) as an example, 1% increase in *%Revenue* insignificantly leads to 0.049 citations, which accounts for 5% of the mean for *Citations in Quality of Care*.

relying on donations may have strong incentives to show nice numbers along the reported dimensions (emphasizing *quality of care*) which may exert a strong positive spillover effect on the unreported dimensions in the domain of *Quality of Care*. This is a valid argument, but fails to consider the other side of the donation effect on the unreported dimensions. The negative spillover effect along the NHQI-unreported dimensions, resulting from resource competition, may be also intensified via the donation effect. The two sides of the donation effects cancel each other out. As a result, there are no clear effects on the *Citations in Quality of Care* along the NHQI-unreported dimensions.

Table 8 also shows that the introduction of *NHQI pilot* helps to weakly reduce deficiency citations in nonprofit nursing homes when the donation effect is controlled. The coefficient of *Pilot*NHQI* in each column is large and negative. Some of them are negative at the ten percent significance level. The results suggest that the disclosure policy does encourage nonprofits without donations to weakly reduce their citations, even along the **un**reported dimensions. A question that remains unanswered is that why nonprofits that are not supported by donations improve quality along the NHQI-**un**reported dimensions. One possible explanation is that when a nonprofit nursing home does not rely on donations, the negative donation effect disappears and quality along the unreported dimensions is mainly influenced by the positive spillover effect resulting from the shared commonality in production with the reported ones. In a word, the positive spillover effect dominates when a nonprofit nursing homes is not financed through donations.

To make sure that the results are robust, I take the following several steps: (1) to rule out the heterogeneity concern that the results may be driven by a few nursing homes, I recode *%Revenue* by its quartiles. The results show that nursing homes with *%Revenue* at the top

quartile are most likely to have citations along the **un**-reported dimensions; (2) since I cannot tell whether the missing donation information represents missing or zero donations, I present the estimates for both cases; (3) I use *Donation Per Capita* as another measure for donation dependence (See Table A4). In general, the results remain robust.

In summary, Table 8 shows that nonprofit nursing homes with more revenue coming from donations may generate more deficiency citations along the NHQI-unreported dimensions. Due to the limitations in data, this finding is not sufficient enough to reach the conclusion that nonprofit nursing homes take advantage of donors' information asymmetry and therefore perform by "teaching-to-the-test" in reaction to the NHQI disclosure policy. However, this evidence at least suggests that donation, a pecuniary factor, might play a role when nonprofits respond to quality disclosure.

C. Mimicking For-profits

The nonprofit mimicking literature suggests that the presence of for-profits in a market may affect the behavior of nonprofits. Duggan (2002) demonstrates that the behavior of nonprofits is systematically related to the share of nearby for-profits, and nonprofits may mimic the behavior of for-profits when competing with them. In the nursing home setting, nonprofits may mimic the "teaching-to-the-test" behavior of for-profits.

To further investigate this mimicking hypothesis, I conduct a test proposed by Duggan (2002) to examine if the behavior of nonprofits in response to information disclosure is influenced by nearby for-profits when competing with them.

$$\Delta Y_{jt} = \gamma_1 + \gamma_2 * OWN_{jt} + \gamma_3 * OWN_{jt} * ForFrac_{jt} + \gamma_4 * \Delta Y_{j,t-1} + \gamma_5 X_{jt} + \varepsilon_{jt} \tag{3}$$

Here, the fraction of for-profits (*ForFrac_{01}*) is measured by the number of for-profits over all

nursing homes within ten miles of each facility.[27] *Y* refers to the two citation variables: *Total Citations* and *Citations in Other Domains* (for simplicity, we denote this variable as *UNREP* in the table). $\Delta Y_{02\text{-}05}$ therefore stands for the change in deficiency citations from 2002 to 2005. I also include $\Delta Y_{00\text{-}02}$ to control the pre-existing trend in the home-specific citation composition. In addition, some unobserved factors that cause the entry of for-profits into a particular market may also lead other firms to behave differently from those of the same ownership type in a market with relatively few for-profits. I exploit the introduction of NHQI as a plausibly exogenous shock to deal with the endogeneity problem.

Table 9 shows that there is no evidence that the penetration of for-profit nursing homes motivates nonprofits to mimicking. Columns (1) and (2) consistently show that there is no positive correlation between the fraction of for-profit penetration and total citations in nonprofits. Columns (3) and (4) replace $\Delta Total\ Citation_{02\text{-}05}$ with $\Delta UNREP_{02\text{-}05}$, the change in the number of the citations on the unreported dimensions from 2002 to 2005. The results remain the same. Overall, there is no evidence supporting the mimicking for-profits hypothesis.

D. Inefficient Management

One may argue that managers in nonprofit organizations do not know what quality dimensions are important to consumers. The disclosure policy provides them some guidance about quality management. Therefore, given the break-even budget constraint, quality scores may improve along the reported dimensions and deteriorate along the unreported ones. I do not assess this argument in detail for two reasons. First, the rationale for the introduction of report cards is that sellers know more quality information about themselves than the public, including

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[27] I also tried using alternative market definitions, including the fraction within five miles of the nursing home or the share of patients coming from each nursing home's county. The results remain unchanged.

the government. This inefficient management argument is valid if and only if nonprofit sellers have less knowledge about quality provided by their firms than those policy makers. Second, if this argument holds, we would not observe that the "teaching-to-the-test" response disappears after the donation effect is controlled.

VI. Discussion and Conclusions

This paper uses a plausibly exogenous source, the introduction of the NHQI, a quality disclosure policy that mandates the public reporting of selected quality measures, to investigate the theories of nonprofits. The main finding is that nonprofits are as responsive as for-profits in reaction to the NHQI policy: quality improves along the NHQI-reported dimensions and diminishes along the NHQI-unreported ones.

The most important part of the main finding is the similar changes in quality along the disclosed dimensions. These quality dimensions are important to the life and health of the elderly but were less easily observed by consumers before the NHQI disclosure policy was introduced and became more observable afterwards. If we agree that the officially-defined NHQI QMs indeed tell consumers something that they do not know, we can infer from this evidence that the elasticity of quality (at least along those reported dimensions) with respect to public information for nonprofits is as same as the comparable elasticity for for-profits.

The finding that nonprofits have similar changes along the less disclosed dimensions, which continue to be less easily observed after the NHQI policy was implemented, suggests that nonprofits may as well cut corners on the less observed dimensions due to cost concerns. Nevertheless, we should not overlook the evidence that nonprofit status is correlated with fewer deficiency citations than for-profit ownership, especially along the unreported dimensions. It

seems that the "for-profit in disguise" hypothesis could not fully explain the two contradicting findings.

The Newhouse model, plausibly, may explain these findings better than the other well-established nonprofit theories. When the CMS partially disclosed some selected quality measures, it is very likely for a nonprofit nursing home to adjust its quality vector, given the same unit cost, so as to maximize quantity because consumers may prefer the new quality vector. Quality in the new vector may be higher on the reported dimensions and lower on the unreported ones than that without reporting and the amount of change happens to be as same as that in for-profits as a result. Besides, the maximized quality subject to the break-even budget constraint is still higher than that of for-profit counterparts. Nevertheless, I am a bit uneasy with the supplemental evidence that total bed days insignificantly increase after disclosure.

Recently, Weisbrod (2010) proposes a new theory that nonprofits may have two goals: mission and money. Whether nonprofits behave differently from for-profits depends on which goal plays an important role on the compared dimension. In this study, I find that donations increase the nonprofit elasticity of quality with respect to public information. I, therefore, suspect that the profitability goal may result in the "teaching-to-the-test" behavior of nonprofits when they respond to quality disclosure and the missionary goal guarantees that the hard-to-measure quality of nonprofits is still higher than that of for-profits. Due to the limitations in data, this finding is not sufficient enough to support the two-goal model. However, it at least provides some interesting evidence that donation, a factor related to profitability, might matter in the maximization problem of nonprofit organizations. Future research can test nonprofit theories from this new perspective.

It is worth noting that my conclusion in favor of the Newhouse model is neither drawn from the donation evidence nor tarnished by it. The donation results can also be interpreted by the Newhouse model. Nursing homes with more revenue coming from donations might be more sensitive to the disclosure policy than those without. As a result, they might more responsively adjust their quality components to cater for the need of consumers.

This study exploits a disclosure policy to test nonprofit theories rather than documenting the impact of this disclosure policy.[28] Therefore, though the period that this paper studies is short, it is a fair test of nonprofit theories. The finding that similar as for-profits, nonprofits as well improve quality along the disclosed dimensions has important policy implications, suggesting that the report card policy is effective across types of ownership. This is particularly important for the healthcare industry where a large proportion of organizations are nonprofit.

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[28] Werner et al (2009) and Lu (2011) document the impact of the NHQI policy and explains the incentives for nursing homes to multitask.

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Figure 1: The Relationship between the NHQI QMs and Deficiency Citations
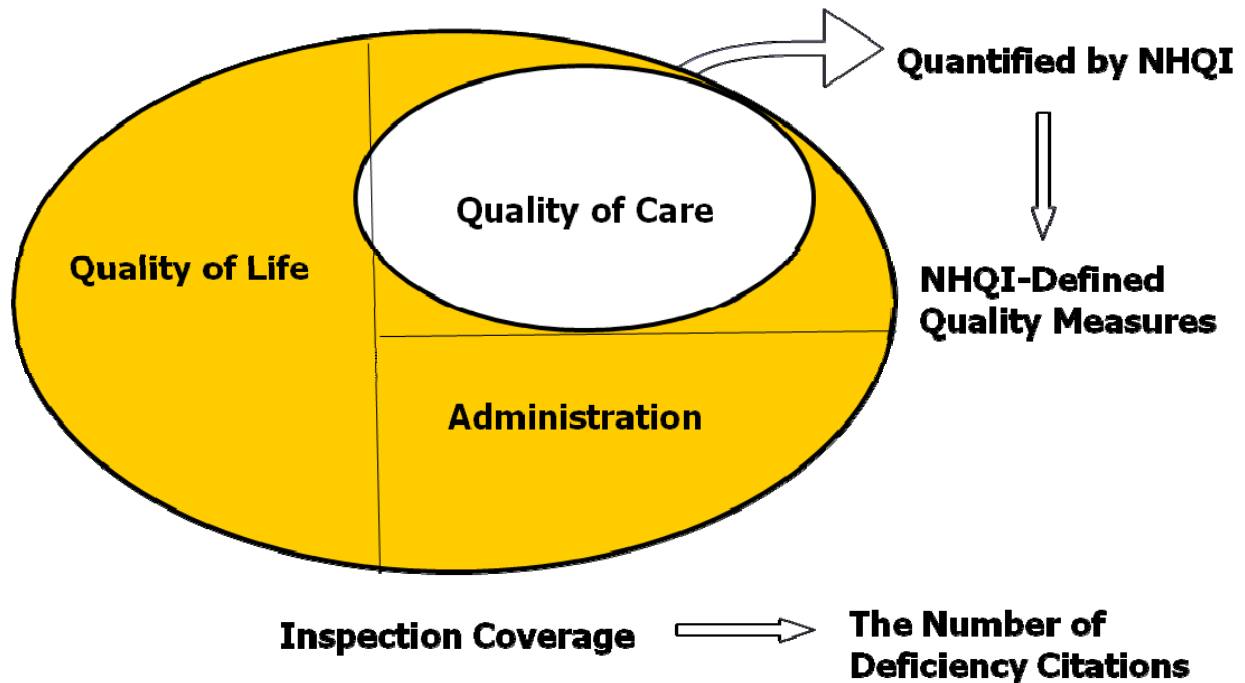
Notes:

a. There are more than 190 quality dimensions inspected during an annual inspection. I use the big oval to represent the entire inspection coverage.

b. These quality dimensions are classified into three domains by the CMS. These domains are *Quality of Life*, and *Administration* (see Table A2).

c. Consumers were not satisfied with the inspection information mainly because the information was too much to process and it was hard to make an apple-to-apple comparison. This eventually triggered the introduction of the NHQI policy, which quantified some quality dimensions in a comparable format. These selected quality measures overlap to a great extent/often duplicate the quality dimensions in the domain of *Quality of Care* (see Table A3).

d. Therefore, the small oval (not shadowed) in the figure represents the quality dimensions quantified by the NHQI. And the shadowed area stands for the NHQI-unreported dimensions.

Figure 2: Pre-NHQI Trends of Total Citations
(Classified by the Importance of Donation)
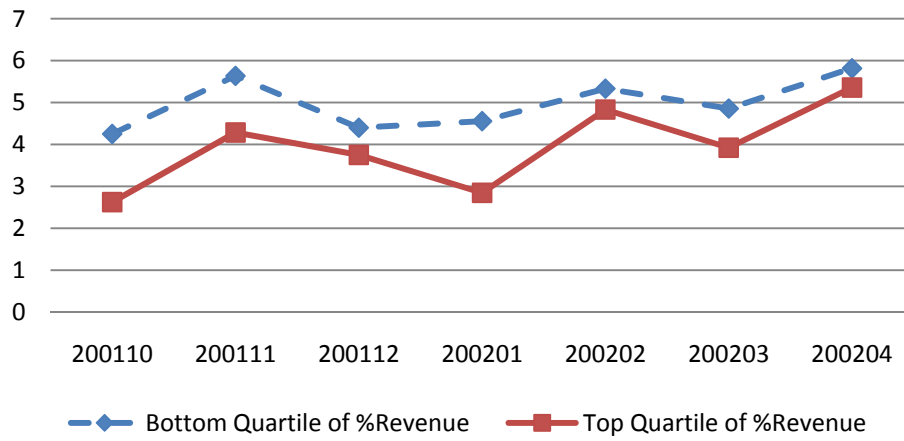
Notes:
  a. Figure 2 shows the trends of total citations for nursing homes in the pre-NHQI period.
  b. The nursing homes are classified by the importance of donations as a revenue source. The dash line represents the trend for nursing homes at the bottom quartile of *%Revenue,* while the solid line represents the trend for nursing homes at the top quartile of *%Revenue*.
  c. In general, the trends are identical in the pre-NHQI period.

Table 1: Nonprofit Theories and Their Corresponding Predictions

Nonprofit Theories	Main Reference	Quality	Responsive to Quality Disclosure
For-profit in Disguise	Pauly and Redisch (1973)	NP=FP	NP=FP
Contract Failure	Hansmann (1980)	NP>FP	NP<FP
Quality-Quantity Maximand	Newhouse (1970)	NP>FP	NP<FP, NP=FP, or NP >FP
Two-goal Model	Weisbrod (2010)	NP>FP	NP<FP or NP= FP

Table 2: Summary Statistics

Variable	Full Sample		Nonprofits	
	Mean	SD	Mean	SD
NHQI QMs				
ADL (%)	26.8	11.6	24.7	11.7
Bedfast (%)	4.6	6.1	3.5	6.5
Transfer (%)	27.1	13.1	24.8	12.8
Bowel (%)	4.6	6.1	3.5	6.5
Depression (%)	32.3	16.8	33.9	16.5
Inspection Outcomes				
Total Citations	6.7	5.7	5.6	5.1
- Quality of Care	1.1	1.3	0.9	1.2
- Quality of Life / Administration	4.5	4.0	3.7	3.5
Control Variables				
Percentage of Medicaid Patients (%)	0.7	0.2	0.5	0.2
Beds	111.6	56.6	113.1	79.8
Herfindahl-Hirschman Index	0.6	0.3	0.7	0.3
Donation Measures				
%Revenue			2.2	5.0
Donation per capita			0.3	2.7
Financials and Quantity [d]				
Log Average Revenue			4.9	0.4
Log Unit Cost			4.8	0.5
Log Unit Labor Cost			4.2	0.4
Profit [e]			6.6	16.2
Log Total Bed Days			10.6	0.5
Observations	5434		1035	

Notes:

a. This table provides summary statistics for the variables used in this study.
b. For the definition of each NHQI QMs, see Table A1.
c. The number of observations for donation measures is different from others.
d. The variable "Beds" is divided by 100 in regressions.
e. The Financials and Quantity information is obtained from SNF cost report (2001-2002). Therefore, the number of observation is different.
f. I do not take the log transformation of *Profit* because some of the nonprofit nursing homes have negative net income. Instead, I normalize *Profit* by 100,000.

Table 3: Pilot States versus Non-pilot States

Group	States
Pilot States	CO, FL, MD, OH, RI and WA
Non-pilot States	AK, AL, AR, AZ, CT, DC, DE, GA, HI, ID, KS, KY, LA, ME, MI, MN, MO, MT, NC, ND, NE, NH, NM, OK, OR, SC, SD, TN, VA, WV and WY

Notes:

a. This table shows the pilot and non-pilot states.

Table 4: Changes in Citation Composition by Ownership Type

Ownership Type	All Dimensions			NHQI-Unreported Dimensions					
	Total Citations			Quality of Life /Administration			Quality of Care		
	Jan-Mar	May-Sept	Δ%	Jan-Mar	May-Sept	Δ%	Jan-Mar	May-Sept	Δ%
FP									
Pilot States	6.84	6.98	2.0%	4.64	4.88	5.2%	1.08	1.01	-6.6%
Non-pilot States	7.23	6.96	-3.7%	4.69	4.62	-1.4%	1.18	1.13	-4.1%
NP									
Pilot States	5.38	5.47	1.5%	3.62	3.62	0.2%	0.97	0.84	-13.6%
Non-pilot States	5.95	5.45	-8.4%	3.96	3.58	-9.7%	0.97	0.92	-4.8%

Notes:

a. This table uses raw data to show the changes in citation composition by ownership type.

b. The introduction of the NHQI pilot policy is associated with an increase in total citations and NHQI-unreported citations in the domain of *Quality of Life/Administration* and a slight decrease in the domain of *Quality of Care* (emphasized by the NHQI QMs) in for-profit nursing homes in the pilot states. The results become more significant after being compared to their corresponding controls in non-pilot states.

c. It seems that nonprofit nursing homes have a similar response patterns as for-profit ones.

d. The level of citations is much higher in the for-profit nursing homes than in nonprofit ones. This indicates that nonprofit is not "for-profit in disguise".

Table 5: Do Nonprofits Behave Differently from For-profits in Response to Information Disclosure?

	NHQI Quality Measures					Inspection Outcomes		
	NHQI-reported Dimensions					All Dimensions	NHQI-unreported Dimensions	
	ADL	Bedfast	Transfer	Bowel	Depression	Total Citations	Citations in Quality of Care	Citations in Other Domains
Pilot * NHQI	-0.144	-0.966*	-0.890	-1.035**	-2.290	1.236***	-0.014	1.028***
	(1.203)	(0.518)	(1.395)	(0.436)	(2.111)	(0.265)	(0.090)	(0.209)
NP*Pilot*NHQI	1.142	0.077	1.562	0.082	1.976	-0.397	-0.004	-0.240
	(1.226)	(0.531)	(1.613)	(1.383)	(1.479)	(0.726)	(0.183)	(0.510)
GOV*Pilot *NHQI	-3.075	1.622	-2.813	-0.110	2.041	-3.945	-0.533	-1.731
	(3.009)	(2.353)	(3.969)	(2.179)	(5.403)	(4.236)	(0.845)	(2.883)
GOV	1.293	-0.104	1.517	-0.52	1.96	-2.344*	-0.165	-1.420
	(1.440)	(1.436)	(1.595)	(0.706)	(2.657)	(1.254)	(0.285)	(0.914)
NP	0.629	-0.778***	0.093	-0.809***	2.416**	-0.987***	-0.116*	-0.557**
	(0.561)	(0.247)	(0.830)	(0.286)	(0.890)	(0.279)	(0.067)	(0.222)
GOV*Pilot	0.115	0.119	0.608	0.641	-1.484	4.608	0.61	3.102
	(1.737)	(1.995)	(1.820)	(1.570)	(4.094)	(3.017)	(0.727)	(1.955)
NP*Pilot	-1.511	0.1	-0.976	1.12	0.237	-0.295	-0.071	-0.265
	(0.903)	(0.454)	(1.168)	(0.989)	(1.171)	(0.815)	(0.198)	(0.510)
NHQI	0.003	0.34	0.242	0.445	1.242	-0.602**	-0.033	-0.412**
	(0.599)	(0.413)	(0.766)	(0.365)	(1.016)	(0.244)	(0.072)	(0.178)
GOV*NHQI	1.207	-0.121	0.98	0.382	0.722	1.479	0.022	0.780
	(1.581)	(1.575)	(1.764)	(0.806)	(3.245)	(0.945)	(0.226)	(0.669)
NP*NHQI	-0.547	0.24	-0.478	0.377	-1.356	0.038	0.005	-0.100
	(0.647)	(0.286)	(0.957)	(0.340)	(1.005)	(0.332)	(0.082)	(0.240)
Quarter Dummy	Y	Y	Y	Y	Y	Y	Y	Y
State Dummy	Y	Y	Y	Y	Y	Y	Y	Y
Quarter*State	Y	Y	Y	Y	Y	Y	Y	Y
R-Squared	0.280	0.193	0.209	0.162	0.176	0.149	0.122	0.155
N	5434	5434	5434	5434	5434	5434	5434	5434

Table 6: Do Nonprofits Behave Differently from For-profits in Response to Information Disclosure? Robustness Check

	NHQI Quality Measures					Inspection Outcomes		
	NHQI-reported Dimensions					All Dimensions	NHQI-unreported Dimensions	
	ADL	Bedfast	Transfer	Bowel	Depression	Total Citations	Citations in Quality of Care	Citations in Other Domains
Pilot * NHQI	-0.613	-1.023*	-1.214	-1.236*	-1.435	1.551***	0.039	1.151***
	(1.355)	(0.567)	(1.665)	(0.663)	(2.546)	(0.521)	(0.134)	(0.360)
GOV*Pilot *NHQI	-1.663	2.953	-2.612	2.798	4.143	-3.81	-0.094	-1.472
	(3.408)	(3.142)	(3.341)	(3.026)	(6.319)	(4.321)	(0.619)	(3.079)
NP*Pilot*NHQI	1.711	0.823	2.221	0.887	-0.6	-0.26	0.025	-0.244
	(1.666)	(0.696)	(2.143)	(1.726)	(2.407)	(0.631)	(0.247)	(0.435)
GOV	2.849	0.928	1.447	0.791	4.34	-3.149***	-0.422	-1.580**
	(1.807)	(1.920)	(1.844)	(1.435)	(5.244)	(0.945)	(0.264)	(0.773)
NP	1.496*	-0.438	1.031	-0.44	1.442	-0.833	-0.096	-0.393
	(0.813)	(0.419)	(1.202)	(0.316)	(1.284)	(0.539)	(0.117)	(0.376)
GOV*Pilot	-1.837	-0.362	-0.332	-0.466	-1.07	3.635*	0.366	1.864
	(2.635)	(2.937)	(2.653)	(2.762)	(5.202)	(2.118)	(0.416)	(1.507)
NP*Pilot	-2.370**	-0.312	-1.844	0.478	1.535	-0.332	-0.036	-0.33
	(1.033)	(0.457)	(1.369)	(0.991)	(1.656)	(0.881)	(0.257)	(0.536)
NHQI	0.44	0.201	0.454	0.222	0.705	-0.869*	-0.044	-0.498*
	(0.915)	(0.649)	(1.193)	(0.513)	(1.511)	(0.466)	(0.125)	(0.274)
GOV*NHQI	3.134	-0.88	4.770*	-0.876	-2.507	2.671*	0.385	1.251
	(2.578)	(2.170)	(2.635)	(1.463)	(6.002)	(1.342)	(0.335)	(0.928)
NP*NHQI	-1.066	-0.236	-1.026	0.128	0.668	-0.307	-0.06	-0.252
	(0.934)	(0.437)	(1.285)	(0.426)	(1.528)	(0.514)	(0.109)	(0.343)
Quarter Dummy	Y	Y	Y	Y	Y	Y	Y	Y
State Dummy	Y	Y	Y	Y	Y	Y	Y	Y
State Linear Trend	Y	Y	Y	Y	Y	Y	Y	Y
R-Squared	0.506	0.519	0.451	0.468	0.426	0.436	0.405	0.434
N	5434	5434	5434	5434	5434	5434	5434	5434

Table 7: Do Nonprofits Increase Profit and /or Quantity?

	Financials				Quantity
	Log Average Revenue	Log Unit Cost	Log Unit Labor Cost	Annual Profit	Total Bed Day
	(1)	(2)	(3)	(4)	(5)
Pilot*Post	-0.003	-0.009	0.012	0.525	0.009
	(0.030)	(0.035)	(0.043)	(0.722)	(0.010)
Medicaid Patients (%)	-0.007	0.052	0.041	-0.413	0.008
	(0.092)	(0.076)	(0.064)	(1.944)	(0.066)
Beds	-0.003*	-0.003**	-0.003***	-0.007	0.003*
	(0.002)	(0.001)	(0.001)	(0.018)	(0.002)
HHI Index	-0.07	-0.061	-0.051	-1.278	0.0003
	(0.064)	(0.053)	(0.039)	(2.474)	(0.033)
Chain	0.023	-0.002	0.016	0.681	-0.0001
	(0.030)	(0.026)	(0.030)	(0.821)	(0.017)
Year Dummy	Y	Y	Y	Y	Y
State Dummy	Y	Y	Y	Y	Y
R-Squared	0.909	0.935	0.92	0.923	0.981
N	3928	4026	4308	3840	4357

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Notes:

a. This table documents the differential effects from the NHQI on nonprofits financials and quantity.
b. Both profit and quantity insignificantly increase in nonprofit nursing homes after the introduction of the NHQI.

Table 8: How Does Donation Affect Nonprofit Behavior?

%Revenue=	All Dimensions		NHQI-unreported Dimensions			
	Total Citations		Citations in Quality of Care		Citations in Other Domains	
Donation/Revenue	(1)	(2)	(3)	(4)	(5)	(6)
	Missing	Zero	Missing	Zero	Missing	Zero
Pilot*NHQI	-3.184	-1.627*	-0.640	-0.464*	-2.922*	-1.264
	(1.938)	(0.930)	(0.547)	(0.235)	(1.681)	(0.843)
%Revenue *Pilot *NHQI	56.805**	39.269**	7.803	4.874	45.709**	31.600***
	(27.672)	(17.434)	(7.149)	(5.539)	(19.537)	(11.324)
%Revenue*NHQI	-18.075	-15.629	-2.384	-2.499	-14.147	-11.812
	(13.854)	(14.111)	(3.511)	(3.820)	(10.162)	(9.908)
%Revenue*Pilot	-45.037	-35.478*	-9.485	-7.45	-36.568*	-26.195**
	(29.003)	(18.523)	(7.715)	(5.844)	(20.143)	(11.804)
%Revenue	13.044	10.22	4.141	3.568	10.477	8.388
	(14.288)	(13.987)	(3.983)	(3.713)	(10.090)	(9.513)
NHQI	-0.590	-0.194	-0.114	-0.001	-0.36	-0.095
	(0.835)	(0.602)	(0.264)	(0.188)	(0.460)	(0.410)
Medicaid Patients (%)	4.594***	3.379***	0.816**	0.407**	2.978***	2.248***
	(1.374)	(0.880)	(0.310)	(0.152)	(0.942)	(0.649)
Beds	0.636**	0.614***	0.092	0.095	0.424***	0.405***
	(0.245)	(0.166)	(0.096)	(0.067)	(0.101)	(0.112)
HHI Index	-0.125	-0.725	-0.049	-0.134	0.233	-0.238
	(0.968)	(0.570)	(0.207)	(0.115)	(0.686)	(0.450)
Chain	0.293	0.065	-0.116	-0.067	0.109	-0.011
	(0.681)	(0.371)	(0.156)	(0.100)	(0.422)	(0.245)
Quarter Dummy	Y	Y	Y	Y	Y	Y
State Dummy	Y	Y	Y	Y	Y	Y
Quarter*State	Y	Y	Y	Y	Y	Y
R-Squared	0.268	0.215	0.243	0.195	0.291	0.231
N	542	1035	542	1035	542	1035

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Notes:
a. This table shows that nonprofits with more donations expressed as a percentage of revenue are more likely to have more deficiency citations, especially along the NHQI-unreported dimensions, after the introduction of the *NHQI pilot*.
b. It also shows that "teaching-to-the-test" disappears when the donation effect is controlled.
c. Missing refers to the missing donation information and Zero to no donations received. The results remain robust in the two extreme cases.

Table 9: Do Nonprofits Mimic The Behavior of For-profits When Competing?

	ΔTotal Citations$_{02\text{-}05}$		ΔUNREP Citations02-05	
	(1)	(2)	(3)	(4)
NP*FP-FRAC01	-0.901	-3.174*	-0.565	-1.858
	(0.566)	(1.782)	(0.415)	(1.308)
FP*FP-FRAC01	0.055	0.434	0.085	-0.215
	(0.399)	(0.968)	(0.293)	(0.711)
GOV*FP-FRAC01	0.952	1.213	1.451	1.582
	(1.431)	(1.452)	(1.051)	(1.066)
GOV01	0.834	0.786	0.244	-0.448
	(0.610)	(1.114)	(0.448)	(0.818)
NP01	0.602	3.499*	0.398	1.555
	(0.426)	(1.939)	(0.313)	(1.423)
ΔTotal Citaions00-02	-0.437***	-0.437***		
	(0.010)	(0.010)		
ΔUNREP Citations00-02			-0.458***	-0.458***
			-0.011	-0.011
Beds	0.056	0.056	-0.016	-0.017
	(0.128)	(0.129)	(0.094)	(0.095)
ONLY-NH01		0.32		0.217
		(0.208)		(0.153)
NP*NP-FRAC01		-2.664		-1.544
		(1.786)		(1.311)
FP*NP-FRAC01		0.817		-0.096
		(1.010)		(0.742)
GOV*NP-FRAC01		2.839		2.845**
		(1.908)		(1.400)
State Dummy	Y	Y	Y	Y
R-Squared	0.242	0.243	0.248	0.249
N	7435	7435	7435	7435

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Notes:
   a. This table shows that the citation changes in nonprofits are not positively associated with the share of for-profits in a market.
   b. It helps to rule out the "mimicking for-profits" hypothesis.

Table A1: The Selected Reported NHQI Quality Measures

Variable	Measure	Connection to Nursing Home Quality	Numerator
ADL	Percent of residents whose need for help with daily activities has increased	It may take more staff time to allow residents to do these daily activities than to do the tasks for them. This can affect their health in a good way.	Residents with worsening late-loss ADL (bed mobility, transfer, eating or toileting) performance at t relative to t-1
Bedfast	Percent of residents who spent most of their time in bed or in a chair	Staff should encourage residents to take part in physical activities and stay as active as possible.	Residents who are restricted in bed or in a chair on the target assessment
Transfer	Percent of residents whose ability to move about in and around their room	Staff should create interventions that help residents move around more as they get older.	Residents with worsening in transfer self performance at t relative to t-1
Bowel	Percent of residents who lose control of their bowels or bladders	Loss of bowel or bladder control is not a normal part of aging and can often be successfully treated in cognitively intact residents with the help of staff.	Residents who are frequently incontinent or fully incontinent on the target assessment (bowel or bladder incontinence)
Depression	Percent of residents who are more depressed or anxious	Staff can help to prevent depression and alleviate anxiety by tender loving care.	Residents with mental issues on the target assessment

Notes:
a. This table introduces the connections of NHQI-defined QMs to quality. The denominator is the number of total residents in each nursing home.
b. The available OSCAR data recorded data on transfer, eating and toileting in the category of ADL at the nursing home level. I cannot distinguish the difference between one resident getting worse in both eating and toileting and two residents getting worse in individual measures. So, I calculate the percent of residents who need help in each activity and use the average percentage of the three activities to measure *ADL*. This variable is highly correlated with *ADL* provided by the Minimum Data Set (MDS) data from 2003 to 2005.
c. The information is collected from the Nursing Home Quality Manual provided by the Quality Improvement Organization.

Table A2: Overview of Regulatory Standards for Deficiency Citations

Quality of Care	
FTAG	DESCRIPTION
F309	Quality of Care
F310	Activities of Daily Living Maintenance
F311	Appropriate ADL Treatment
F312	ADL Services
F313	Vision and Hearing
F314	Pressure Sores
F315	Catheter Prevention
F316	Incontinence Care
F317	Range of Motion Maintenance
F318	Limited Range of Motion Services
F319	Mental and Psychosocial Services
F320	Maintenance of Psychosocial Functioning
F321	Nasogastric Tubes
F322	Nasogastric Care
F323	Accident Environment
F324	Accident Prevention
F325	Nutrition
F326	Therapeutic Diet
F327	Hydration
F328	Special Needs
F329	Unnecessary Drugs
F330	Antipsychotic Drugs
F331	Drug Reduction
F332	Medication errors
F333	Significant Medication Errors

Administration			
FTAG	DESCRIPTION	FTAG	DESCRIPTION
F151	Exercise of Rights	F159	Facility Manage Personal Funds
F152	Free of Reprisal	F160	Convey Funds
F153	Access to Records	F161	Financial Security
F154	Informed of Condition	F162	Limit on Charges to Funds
F155	Refuse Treatment	F163	Choice of Physician
F156	Notice of Rights and Services	F164	Privacy and Confidentiality
F157	Notice of Changes	F165	Voice Grievances
F158	Resident Manage Financial Affairs	F166	Resolve Grievances

Table A2: Overview of Regulatory Standards for Deficiency Citations (Continued)

\ Administration			
FTAG	DESCRIPTION	FTAG	DESCRIPTION
F167	Survey Results	F281	Professional Standards
F168	Information	F282	Qualified Personnel
F169	Work	F283	Discharge Summary
F170	Mail	F284	Post Discharge Plan
F172	Visitors	F285	Preadmission Screening
F173	Ombudsman	F490	Administered Effectively
F174	Telephone	F491	Licensure
F175	Married Couples	F492	Compliance With Laws
F176	Administer Own Drugs	F493	Governing Body
F177	Refuse Transfer	F494	Required Training
F201	Transfer and Discharge	F495	Employee Competency Program
F202	Documentation	F496	Registry Verification
F203	Notice Before Transfer	F497	In-service Education
F204	Orientation for Transfer or Discharge	F498	Proficiency of Nurse Aides
F205	Notice of Policies	F499	Qualified Professionals
F206	Permitting Resident to return to Facility	F500	Outside Services
F207	Equal Access to Quality Care	F501	Medical Director
F208	Admission Policy	F502	High Quality, Timely Services
F221	Physical Restraints	F503	Meets Lab Standards
F222	Chemical Restraints	F504	Services Ordered by a Physician
F223	Abuse	F505	Notifies Physicians
F224	Staff Treatment of Residents	F507	Clinical Records
F225	Unemployment Individuals	F508	Radiology and Other Services
F226	Policy and Procedures for Staff	F511	Radiology Notification of Physician
F271	Admission Orders	F513	Records Signed and Dated
F272	Comprehensive Assessment	F514	Clinical Records
F273	Frequency	F516	Records Safeguarded
F274	Change in Condition	F517	Plan for Emergency
F275	Annual Assessment	F518	Emergency Training
F276	Review of Assessments	F519	Transfer Agreement
F277	Coordination	F520	Quality Assurance Committee
F278	Accuracy of Assessments	F521	Quality Assurance Activities
F279	Comprehensive care Plans	F522	Disclosure of Ownership
F280	Plan Requirements		

Table A2: Overview of Regulatory Standards for Deficiency Citations (Continued)

FTAG	DESCRIPTION	FTAG	DESCRIPTION
Quality of Life			
F240	Quality of Life	F388	Physician Alternates
F241	Dignity	F389	Availability
F242	Self-Determination/Participation	F390	Physician Delegation of Tasks
F243	Resident and Family groups	F406	Services
F244	Listen to Group	F407	Qualifications
F245	Participate in Other Activities	F411	Routine and Emergency Services (SNF)
F246	Accommodate Needs	F412	Routine and Emergency Services (NF)
F247	Notice Before Room Change	F425	Pharmacy
F248	Activities Program	F426	Procedure
F249	Activities Director	F427	Service Consultation
F250	Social Services	F428	Drug Regimen
F251	Social Work Qualification	F429	Report Irregularities
F252	Environment	F430	Facility Action
F253	Housekeeping	F431	Labeling
F254	Clean Linens	F432	Storage
F255	Private Closet	F441	Infection Control
F256	Adequate Lighting	F442	Preventing Spread of Infections
F257	Comfortable Temperatures	F443	Direct Contact
F258	Comfortable Sound	F444	Hand Washing
F353	Sufficient Nursing Staff	F445	Linens
F354	Registered Nurse Staff	F454	General Health and Safety
F360	Well-Balanced Diet	F455	Emergency Power
F361	Qualified Staff	F456	Space and Equipment
F362	Sufficient Staff	F457	Resident Rooms
F363	Menus and Nutritional Adequacy	F458	Room Space
F364	Food	F459	Exits
F365	Individual Needs	F460	Privacy
F366	Food Substitutes	F461	Windows
F367	Therapeutic Diets	F462	Toilets
F368	Frequency of Meals	F463	Resident Call System
F369	Assistive Devices	F464	Dining and Activities
F370	Sanitary Conditions	F465	Other Environment Condition
F371	Food Sanitation	F466	Emergency Water
F372	Garbage Disposal	F467	Ventilation
F385	Physician Supervision	F468	Equipment in Corridors
F386	Physician Visits	F469	Pest Control
F387	Frequency		

Source: Nursing Facilities, Staffing, Residents and Facility Deficiencies, 1998-2004 (Harrington et al, 2005)

Table A3: Connections between NHQI-reported Quality Measures and Inspection Regulatory Standards

Measure Systems	Inspection Regulatory Standards	NHQI-reported Quality Measures
Overlapped Dimensions	F221 Physical Restraints	Percent of Residents Who Were Physically Restrained
	F310 Activities of Daily Living Maintenance F311 Appropriate ADL Treatment F312 ADL Services	Percent of Residents Whose Need for Help With Daily Activities Has Increased
	F314 Pressure Sores	Percent of Residents Who Have Pressure Sores
	F315 Catheter Prevention F316 Incontinence Care	Percent of Residents Who Lose Control of Their Bowels
		Percent of Residents Who Have a Catheter Inserted and Left in Their Bladder
		Percent of Residents with a Urinary Tract Infection
	F317 Range Motion Maintenance F318 Limited Range of Motion Services	Percent of Residents Who Spent Time in Bed/ Chair
		Percent of Residents Whose Ability to Move Got Worse
	F319 Mental and Psychosocial Services F320 Maintenance of Psychosocial Functioning	Percent of Residents Who are Depressed or Anxious

Notes:
  a. This table documents the overlapping dimensions of quality between two measure systems, the NHQI-reported Quality Measures and the inspection regulatory standards.
  b. All the descriptions for the inspection regulatory standards are recorded in Table A2.
  c. The dimensions quantified by the NHQI QMs are a subset of those covered by an inspection. The NHQI QMs aim to measure the quality of care that the elderly received. Therefore, almost all the highly overlapped dimensions contained in /that comprise the inspection regulatory standards are in the domain of *Quality of Care*.
  d. Source: Lu (2011)

## Table A4: How Does Donation Affect Nonprofit Behavior? Robustness Check

Donation Per Capita= Donation/Residents	All Dimensions		NHQI-unreported Dimensions			
	Total Citations		Citations in Quality of Care		Citations in Other Domains	
	(1)	(2)	(3)	(4)	(5)	(6)
	Missing	Zero	Missing	Zero	Missing	Zero
Pilot*NHQI	-0.923	-0.865	0.014	-0.174	-1.153	-0.760
	(1.275)	(0.735)	(0.379)	(0.238)	(1.137)	(0.678)
Donation Per Capita *Pilot *NHQI	2.252**	2.307***	0.259	0.338	1.629**	1.753***
	(0.862)	(0.707)	(0.201)	(0.201)	(0.663)	(0.566)
Donation Per Capita*NHQI	-0.485	-0.861	0.127	0.025	-0.305	-0.565
	(0.744)	(0.638)	(0.168)	(0.150)	(0.570)	(0.472)
Donation Per Capita*Pilot	-0.879***	-1.059***	-0.164*	-0.207***	-0.805***	-0.854***
	(0.301)	(0.146)	(0.091)	(0.061)	(0.230)	(0.112)
Donation Per Capita	0.036	0.010	0.0002	-0.002	0.041**	0.026
	(0.023)	(0.022)	(0.007)	(0.007)	(0.017)	(0.016)
NHQI	-0.725	-0.182	-0.159	-0.014	-0.467	-0.091
	(0.843)	(0.574)	(0.251)	(0.175)	(0.491)	(0.388)
Medicaid Patients (%)	4.259***	2.883***	0.840**	0.391**	2.659**	1.858***
	(1.432)	(0.898)	(0.339)	(0.167)	(0.989)	(0.646)
Beds	0.851**	0.719***	0.158	0.124*	0.519***	0.446***
	(0.399)	(0.217)	(0.123)	(0.066)	(0.181)	(0.120)
HHI Index	-0.181	-0.721	-0.078	-0.13	0.179	-0.227
	(0.932)	(0.558)	(0.204)	(0.114)	(0.676)	(0.417)
Chain	0.302	0.097	-0.146	-0.081	0.161	0.047
	(0.682)	(0.371)	(0.148)	(0.095)	(0.436)	(0.246)
Quarter Dummy	Y	Y	Y	Y	Y	Y
State Dummy	Y	Y	Y	Y	Y	Y
Quarter*State	Y	Y	Y	Y	Y	Y
R-Squared	0.262	0.207	0.226	0.18	0.274	0.217
N	583	1097	583	1097	583	1097

* p<0.10, ** p<0.05, *** p<0.01

Notes:
   a. We replace the variable *%Revenue* with *Donation Per Capita* for a robustness check.
   b. The results are quite robust.

Figure A1: Monthly Trends of Total Citations Pilot versus Nonpilot States
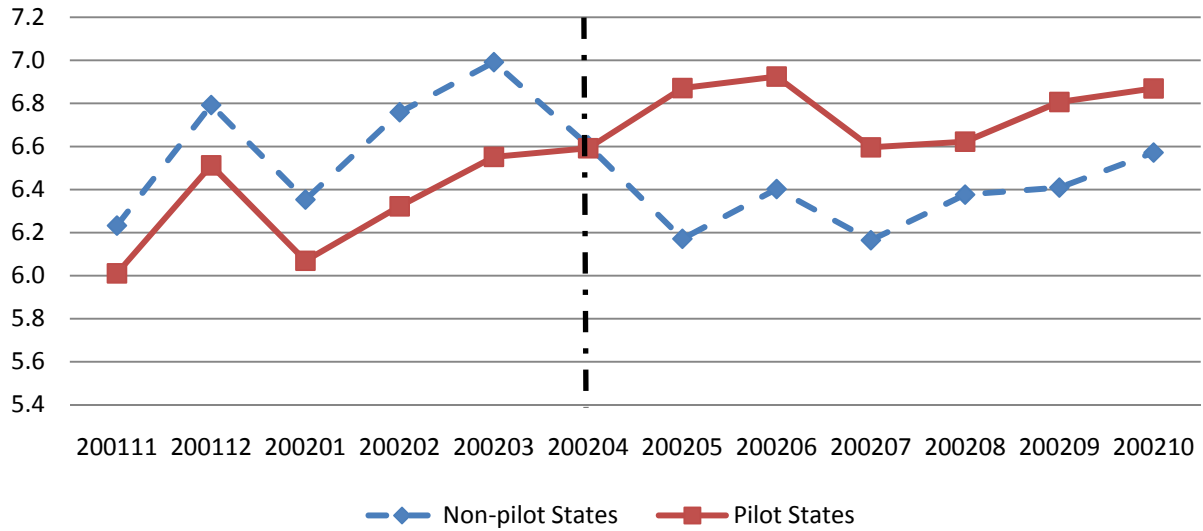
Notes:

a. Figure 1 depicts the trends of total citations among pilot and non-pilot states on a monthly basis in a full year.

b. The trends of the two groups are identical before April, 2002 and differ afterward--total citations increase in the pilot states and decrease in the non-pilot states.

c. Source: Lu (2011).