

FORGET QUALITY: DO NON-PROFITS EVEN SIGNAL THEIR STATUS?

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February 8, 2006

ABSTRACT. Why do firms take non-profit status? One of the most popular theories in the law and economics literature is that non-profit status is a signal of quality (Hansmann 1980; Glaeser & Shleifer 2001). This paper offers a simple, empirical test of this theory. If non-profit status signals quality, surely non-profit firms would want to ensure that consumers were aware of their non-profit status. A simple way firms could broadcast such a signal would be to add it to their names, but this sort of signaling is unheard of. Alternatively, firms might indicate their non-profit status on, e.g., their website or in yellow pages listings. Taking this cue, we conduct a survey of over 2800 firms in the hospital, nursing home and childcare industries. Our aim is to determine whether non-profit firms communicate their status to consumers on their websites or yellow pages listings.

We conclude that non-profit status may signal quality, but the value of the signal is very poor. We infer this from the fact that firms that have other signals of quality, such as a religious or academic affiliation, are less likely to signal that they are non-profit. Firms only signal non-profit status, however, when it is cheap to do so. The most costly signals we examine are those in yellow pages listings, followed by home pages and then about-us pages on websites. Yet less than 7.5 percent of non-profit firms signal their status in yellow pages listings; only 25 percent do so on their home pages and 30 percent on their about-us pages. Indeed, over 35 percent never signal their non-profit status. Even among firms that have no other indicators of quality, roughly 70 percent of hospitals and 30 percent of nursing homes never signal their status on their websites.

Why do firms take non-profit status? The law and economics literature has offered four major theories. First, promoters² who have quasi-altruistic motives, such as providing high quality service, take non-profit status to financially support that motive (Newhouse, 1970; Lakdawalla and Philipson 1998). Second, non-profit firms address unsatisfied demand for government-funded provision of certain public goods (Weisbrod

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² Because a non-profit firm, unlike a for-profit firm, does not technically have an owner, I will refer to the would-be owners (as well as owners of non-profit firms) as principals, promoters, or entrepreneurs.

1979). Third, some profit-maximizing firms take non-profit status simply because it promises a tax subsidy; this is smugly called the for-profit-in-disguise model.³

The fourth and most popular theory in the literature, however, is that firms take non-profit status because that status is a signal of quality (Hansmann, 1980, 1996; Easley & O'Hara, 1983; Weisbrod & Schlesinger, 1985; Hirth, 1999; Glaeser & Shleifer, 2001).⁴ The theory starts with the premise that there are certain product or service markets where consumers and producers may be able to contract over quantity but not quality. The reason may be that the consumer cannot observe product quality (non-observability) or that the consumer cannot prove to a court that the agreed-upon quality was not provided (non-verifiability). In these markets, profit-maximizing firms have an incentive to shirk on quality in order to reduce costs and increase take-home profits. Non-profit status is a solution because it removes the profit incentive. On the margin, cost-cutting through reduction of non-contractible quality will not increase the non-profit principal's take-home pay. Therefore, she has no incentive to shirk in this manner. From the consumer's perspective, then, non-profit status is a signal that a firm will provide the non-contractible quality it promises.⁵

³ This theory raises two questions: why would a profit-maximizer take non-profit status and why don't all firms take advantage of the non-profit subsidy. The answer to the first is that non-profit status allows employees to take home profits in the form of competitive wages; only the distribution of what economists call "rents" are prohibited. This is the so-called non-distribution constraint. The answer to the second question could be that principals of firms with a cost advantage might offer take-home pay (i.e., rents after corporate income taxes) greater than competitive wages. Alternatively, some firms may be better able to evade the non-distribution constraint through the use of perquisites. David (2004).

⁴ See Malani, Philipson, David (2003) for positive citations to the signaling theory.

⁵ A related theory is that firms choose non-profit status not to signal to consumers that they will not shirk but to signal to workers that they will not shirk on terms of employment or work conditions. Francois (2000).

The purpose of this paper is to empirically test this signaling theory.⁶ Direct tests of whether non-profit firms produce greater non-contractible quality are impossible if product quality is non-observable. If the product quality is merely non-verifiable, it is still likely that a researcher will have difficulty measuring that quality for the same reasons a court would. In any case there is an exhaustive literature on whether non-profit firms produce higher quality than for-profit firms. Recent systematic reviews find the evidence inconclusive (Ortmann & Schlesinger, 2004; Schlesinger & Gray 2003; Malani, Philipson & David 2003; Sloan, 2000).

Direct surveys of whether consumers think non-profit firms are more trustworthy are available, but their conclusions are mixed. Schlesinger et al. (2004) reviewed surveys between 1985 and 2000 and found that, although roughly two-thirds of respondents see non-profit hospitals as more trustworthy,⁷ a majority of respondents also thought for-profit hospitals provided higher quality care and one-third of respondents were unable to provide a coherent definition of non-profit ownership. More importantly, it is unclear

⁶ For a theoretical critique of the signaling theory, see, e.g., Ortmann and Schlesinger (2002). They argue, among other things, that the theory mistakenly assumes that the non-distribution constraint is well-enforced and that non-profit status may remove the profit incentive, but in its place promoters may substitute a preference for something other than quality, e.g., for laziness. (The authors also review the empirical literature on the theory, but that analysis often appears to confuse the signaling theory with the altruism theory of Newhouse and Lakdawalla & Philipson.) In addition, Malani (2001) notes that there are many different signals of quality besides organizational form. These include malpractice liability, report cards, and reputation. A challenge for the quality-signaling theory of non-profit status is explaining why it persists in the presence of alternative signals of quality (and vice versa).

A general criticism of all the major economic theories of non-profit status is that they do not explain why the law only allows certain firms in certain markets to take non-profit and why the law grants the sorts of tax benefits (and imposes the sorts of tax costs, Malani and Choi (2005)) that it does. For instance, critics of the signaling theory might ask why aren't firms in other markets with non-contractible quality allowed to take non-profit status? That is, why aren't lawyers or auto mechanics allowed to take non-profit status?

⁷ Notably, Mauser (1993) surveyed parents of children in non-profit day-care centers and Towers-Perrin (1995) surveyed consumers in the process of choosing health care plans and found that 25 and 46 percent, respectively, said they trusted non-profit firms more than for-profit firms. However, a 1996 survey by the Roper Center for Public Opinion Research at the University of Connecticut found that its respondents were evenly split between those that trusted and those that distrusted non-profit firms.

whether surveys actually measure true and strongly held beliefs or just cheap talk. None reviewed by Schlesinger correlate responses to actual consumer decisions.

The economics literature has produced two indirect but creative tests of the signaling theory, but neither study is determinative. The first, Philipson (2000), begins with the observation that, if non-profit status signals higher non-contractible quality, then consumers should be willing to pay and a non-profit firm should be able to charge a higher price than a for-profit firm, holding constant all observable features of the two firms. Philipson tests this prediction using data from the nursing home industry but finds no statistically significant difference between the prices of non-profit and for-profit homes. His finding, however, is of limited value. The nursing home industry is subject to a myriad of price, quantity, and quality regulations that render price data unreliable.⁸

A second study that tests the signaling theory is Chou (2000). Chou examines the quality of care – as measured by various health outcomes – that non-profit and for-profit nursing homes provide to two populations of nursing home residents: one that has the assistance of family members to monitor the quality of the home and one that does not. The latter population is said to suffer from asymmetric information vis-à-vis the home. Chou finds that non-profits provide better quality care than for-profits to residents without family, but no better care than for-profits to residents with family. Although Chou's study is revealing, it has some shortcomings. For example, many of the health outcomes examined are verifiable and Chou does not control for price. More puzzling,

⁸ Regulations include Medicare financing and thus price setting and quality regulation for skilled nursing facilities, state certificate of need laws, and medical malpractice liability. For further commentary on Philipson's empirical work, see Vogt (2000). For empirical work along the lines of Philipson's but challenging the signaling-to-worker hypothesis of Francois, see Leete (2001). That study surveys wages of 1.4 million workers in industries with mixed no-profit and for-profit production in 1990 and finds that non-profit workers make more than for-profit workers in half the industries and less than for-profit workers in the other half of industries.

however, is that the population that suffers from asymmetric information does not appear to seek out non-profit homes despite their superior performance.⁹

Our paper adds to this literature a relatively more direct and hopefully more compelling test of the signaling theory. If non-profit status signals quality, surely non-profit firms would want to ensure that consumers were aware of their non-profit status. A simple way facilities could broadcast such a signal would be to add it to their names (e.g. the Ravenswood Non-Profit Hospital or the Edgewater Non-Profit Nursing Home).¹⁰ This sort of signaling is unheard of. Assuming that this fact by itself does not sink the signaling theory, one might suppose that firms would take other steps to signal their status when it is not otherwise obvious. For example, they might indicate their non-profit status on their website or in yellow pages advertisements. Taking this cue, we conduct a survey of over 1800 non-profit firms' websites and yellow pages advertisements in the hospital and nursing home industries. We also conduct a survey of nearly 1000 yellow pages advertisements in the day-care industry. The goal is to determine whether non-profit firms signal their status – a fundamental assumption of the signaling theory.¹¹

We conclude that non-profit status may signal quality, but the value of the signal is very poor. We infer this from the fact that firms that have other signals of quality, such

⁹ Nor is evidence offered regarding the outcomes of residents with and without asymmetric information at non-profit homes. This would be another way to determine the credibility of the study's findings.

¹⁰ Lest the reader think this is silly, note that many law firms note their organizational form on their letterhead, e.g., McKee Nelson LLP. Further, many insurance companies do so even more prominently, e.g., the Mutual of Omaha.

¹¹ Two related studies attempt to determine whether consumers are aware of the non-profit status of firms. First, Mauser (1993) surveyed parents of children in non-profit day care centers. Only 56 percent of parents were able to correctly identify that their day-care center was non-profits and only 14 percent said this was an important consideration in their choice of day-care center. Second, the Roper Center conducted an opinion poll after a series of scandals at Columbia/HCA, a for-profit hospital chain. Thirty percent of respondents incorrectly identified the chain as non-profit, 12 percent correctly as for-profit, and the rest stated that they did not know. Although both studies suggest that consumers are not aware of the non-profit status of firms, they are not terribly compelling because Mauser does not survey for-profits and the Roper Center survey does not focus on consumers and would-be consumers of Columbia/HCA.

as a religious or academic affiliation, are less likely to signal that they are non-profit. However, firms only signal non-profit status when it is cheap to do so. The most costly signals are those on yellow pages, followed by home pages and then about-us pages on websites.¹² Yet less than 7.5 percent of non-profit firms signal their status in yellow pages advertisements; only 25 percent do so on their home pages and 30 percent on their about-us pages. Indeed, over 35 percent never signal their non-profit status. Even among firms that have no other indicators of quality, roughly 70 percent of hospitals and 30 percent of nursing homes never signal their status on their websites.

The remainder of this paper may be outlined as follows. Section I presents our sampling design and summarizes our data. Section II reports the results of our empirical analysis. The conclusion discusses the limitations of our study.

I. DATA

We collect data from three industries. The first is the hospital industry. For this industry we gather data about websites and yellow pages listings. The website data are a stratified sample of roughly 900 hospitals. The sampling methodology is as follows. We gathered the universe of hospitals from the 2003 American Hospital Association (AHA) annual survey. From each state we randomly drew 20 non-profit hospitals. (Non-profit status was verified in the AHA data. If there were less than 20, we took as many as we could find.) From this subsample we determined those that did and did not have websites. Of those that did, we checked whether the hospitals indicated that they were non-profit on their home page, their about-us page, anywhere else on the website or not at

¹² Home pages present visual images, information and links. Typically, their lengths do not exceed a single screen. “About us” pages, on the other hand, contain more detailed information and give users the option of scrolling down for more material.

all. (We also determined whether the hospitals indicated whether they were religious or academically affiliated on their websites.) We merged these data with AHA data on various hospital characteristics.

We also gathered data on yellow pages listings in this industry. For these data we gathered 2002 yellow pages for 10 medium-sized cities: Boston, MA; Denver, CO; Milwaukee, WI; Oklahoma City, OK; Phoenix, AZ; Providence, RI; Richmond, VA; Sacramento, CA; Seattle, WA, and Washington, DC. From these yellow pages, we randomly sampled roughly 10 non-profit hospitals per city. We checked if these hospitals indicated in their listings whether they were non-profit or whether they were religious in their yellow-pages listings.

For the most part, we replicated this methodology for gathering website and yellow-pages data for the nursing home industry. The salient differences in methodology are, first, that the universe of nursing homes was gathered from the Center for Medicare and Medicaid Services (CMS) website.¹³ (Non-profit status was verified from CMS data.) Second, the website signals data were merged with nursing home characteristic data from the Provider of Services file for fourth quarter 2002.

The third industry we examine is child-care (or day-care). Because these firms rarely have websites, we focus our analysis on their yellow-pages listings in the 10 cities listed above. There is no source that provides the universe of child-care providers and informs us which are non-profit. Therefore, we sampled roughly 100 firms with yellow-pages listings in each city. We called each provider to determine its non-profit status, its religious orientation, and whether it is state certified. Then we checked whether those that indicated they were non-profit, religious, or state-certified on the phone indicated

¹³ See www.medicare.gov/NHCompare/home.asp.

that they were non-profit, religious or state-certified, respectively, in their yellow-pages listings.

Our website data are fairly representative of the non-profit universe. In the hospital data, although we slightly oversample facilities in the West and smaller facilities (especially those that are also religious), these discrepancies basically disappear when the unit of analysis (or weighting) is non-profit beds. In the nursing home data, we oversample facilities in the South and the West, but it does not cause any disparity in the distribution of beds relative to the universe.

Table 1 provides summary statistics from the website samples for the hospital and nursing home industries.¹⁴ (Data from each facility are weighted by the probability of sampling a bed from that facility out of the universe of all non-profit beds in the state where that facility resides. This will be the practice throughout, unless otherwise indicated.) Although 39 percent of hospital beds and 74 percent of nursing home beds are in for-profit facilities, keep in mind that our sample contains no for-profit facilities. Our goal is to explore whether non-profit facilities signal their status, not compare non-profit and for-profit behavior. Facilities lacking websites are excluded from our analysis; this removes 17 percent of sampled hospitals and 19 percent of sampled nursing homes. Although the decision not to have a website includes the decision not to signal a facility's status on a website, we ignore that decision based on our prior belief that the decision to signal status did not motivate the decision to maintain a website.

Hospitals are roughly twice as large as nursing homes in our sample. Only a fraction of facilities are specialized: seven percent of hospitals are not general hospitals,

¹⁴ The statistics are weighted by the number of hospital or nursing home beds in each state, as appropriate. Alternative weighting schemes might focus on facilities or on non-profit beds only. Our findings are not, however, sensitive to our use or choice of weights.

three percent of nursing homes are self-standing skilled nursing facilities (SNFs) and 15 percent of homes focus on care for the mentally handicapped. Over one-half of hospitals and 40 percent of nursing homes are part of a system (or network) of hospitals and homes, respectively.

Examining potential indicators of quality besides non-profit status, we find that almost 20 percent of hospitals are religious, just over 10 percent are teaching facilities, and a quarter have resident-training programs. We check if hospitals are part of a Blue Cross/Blue Shield (Blue Cross for short) health plan because these plans impose some quality regulations on participating facilities. We also check if facilities report that they have a long-term plan to improve the quality of care they provide or cooperate with local agencies to improve the health of their communities. Over 90 percent of facilities indicate Blue Cross participation, a long-term plan, or a community-orientation. As for nursing homes, nearly a quarter are religious and 70 percent report Blue Cross participation.

Turning to websites, two-thirds and three-fifths of hospitals and nursing homes, respectively, operate their own sites. The remainder employ their system's websites. The two types of facilities have remarkably similar patterns of non-profit signaling. The home page is the most prominent place non-profits status is indicated for 20 - 25 percent of facilities. For a third, the about-us page is the most prominent placement. Overall roughly 65 percent of facilities of each type indicate their status somewhere on their websites.

Table 2 provides summary statistics from the yellow pages samples for all three industries we study. The information we gathered focuses on potential indicators of

quality. For example, roughly a quarter of non-profit hospitals and nursing homes and two-fifths of non-profit child care providers¹⁵ are religious. Nearly three-quarters of hospitals are academic or have an academic affiliation.¹⁶ Only three percent of non-profit child-care providers are state-certified.

II. EMPIRICAL ANALYSIS

Our analysis of signaling addresses three questions:

1. How frequently do non-profits tell consumers they are non-profit?
2. Are these communications intended as signals of quality?
3. What does the cost of these communications tell us about their value?

The first question focuses on the “prevalence” of signaling: the percentage of non-profits that indicate their status in communications with consumers. This can be viewed as a simple statistic with which to evaluate the signaling theory. If non-profits do not communicate their status, they cannot think their status signals quality.

The second question focuses on whether firms with other signals of quality – such as religious status, academic mission, or accreditation – are less likely to signal that they are non-profit. The logic is that, even if non-profit status is a signal of quality, it is one of several possible signals of quality. These signals are substitutes for one another. Unless signaling is costless (and neither prominent website space nor yellow pages text is), firms

¹⁵ Our random sampling of non-profit and for-profit listings suggests that just under one half of child-care providers are non-profit.

¹⁶ The difference in rates of academic-status in the website and yellow-pages sample can partly be explained by the fact that the yellow-pages sample focuses on medium-sized cities, which have a higher concentration of academic medical centers than the average community.

that invest in other signals are less likely to invest in the non-profit signal because of this substitutability. Therefore, if firms with other signals are less likely to communicate their non-profit status, that status is likely a signal of quality.¹⁷

The third question starts from the premise that the more firms are willing to spend to advertise their status, the greater the value of that status must be.¹⁸ Our prior is that, of the forms of communication we study, signaling via yellow-pages listings is the most costly (and productive). This is followed by signaling on a website's home page, and then by signaling on a website's about us page.

Before turning to our results, we pause to justify our analysis of yellow-pages listings and websites as opposed to other forms of communication by hospitals and nursing homes. Readers might naturally be concerned that there are other forms of communication that non-profits use to convey information about their status. Frankly, our focus is partly motivated by feasibility. There are four forms of communication that are amenable to formal data gathering: radio, TV, print and internet. Radio, TV and most print advertising are difficult to survey in a systematic fashion, especially for a national sample. The sole exceptions are yellow-page listings. Like websites, these listings are static: relatively permanent and easily found.

That said, our focus on these media is also motivated by our belief that websites and yellow-pages listings are commonly-used resources for selecting hospitals and nursing homes. For example, when one is selecting a doctor, an important consideration might be the hospital at which the doctor has privileges. In today's age, a natural source

¹⁷ We do not contend that religious status, academic affiliation, or accreditation is a signal of quality. We merely suggest that, if they were, and non-profit status were a signal, the former would trade-off with the latter.

¹⁸ The reverse may not be true if there is a cheap and ubiquitous form of communication.

for information about the quality of any of these hospitals is its websites. Moreover, it is reasonable to suppose that when one is beginning a search for nursing homes for one's parents, a common starting point is the yellow pages (if one is looking locally) or the web if one is looking in a more temperate location. The fact that CMS some years ago established a major website to help consumers locate nursing homes (and the facilities' websites) validates the assumption that consumers are turning to the internet to search for these facilities.¹⁹

A. Propensity to signal

Tables 1 and 2 reveal that only 2.5 percent of non-profit hospitals communicate their status in yellow pages listings, only 17 percent communicate this status on the home page of their website, and 31 percent do not communicate this information at all on their websites. The numbers for nursing homes and child-care providers are similar. Only 7.2 percent of nursing homes and 2.8 percent of child-care providers communicate their status in yellow pages listings. Among nursing homes, only 20 percent communicate their status on their home pages, and 33 percent do not reveal their status anywhere on their websites.

The tables also provide baselines for judging exactly how uncommon the non-profit signal is. Table 1 suggests, for example, that nearly 80 percent of religious hospitals and 65 percent of religious nursing homes indicate that they are religious on their home pages. Yet only 25 percent of non-profits indicate that they are non-profit on their homepage. Table 2 reports that all hospitals, about 50 percent of child-care

¹⁹ We might add that our own personal experiences suggest that neither word-of-mouth recommendations of nor radio and TV advertisements for hospitals and nursing homes contain references to non-profit status (though they do contain reference to academic status).

providers, and 25 percent of nursing homes that are religious indicate this in their listings (and not merely by their name, e.g., St. Joseph's Hospital). Moreover, roughly a fifth of academic hospitals and three-quarters of accredited child-care providers indicate this in their listings. Yet less than 7.5 percent of non-profit facilities indicate their non-profit status in their listings. The contrast is quite stark. With the broadest brush, these data suggest that non-profit status is not an important signal of anything positive, let alone quality.

B. Substitution of signals

Are non-profit firms with other quality characteristics less likely to communicate their non-profit status? Direct comparisons of the probability of signaling status among hospitals with religious orientation, academic affiliation, Blue-Cross participation, or a long-term plan and hospitals without such characteristics suggest that they are less likely to signal status, and that this difference is significant. See Table 3 (hospital homepage column). For nursing homes, however, differences in the signaling behavior of religious and Blue-Cross participating facilities are insignificant.

The usual caveat to such comparisons is that they may lead to spurious correlations. For example, if academic affiliation is correlated with location in the east region, and location in the east region is responsible for the signaling behavior, we would draw the wrong conclusion from Table 3. Our solution is a multivariate logistic regression where the dependent variable is the most prominent web page on which a non-profit facility communicates its status. The independent variables include measures of quality and characteristics such as size, scope, system-affiliation, and region. We also

include controls for the market concentration in and non-profit share of the local market (defined as the county). The rationale for including a measure of concentration (the Herfindahl-Hirschman or HHI index) is that, if non-profit status is a signal of quality, this signal is not necessary in markets where a facility enjoys a near monopoly anyway, i.e., markets with high market concentration. The rationale for including non-profit share is that if all firms are non-profit, there is no need to signal non-profit status because it would not differentiate a facility from its competitors.²⁰

The results, which are reported as odds-ratios in Table 4, suggest that non-profit hospitals are less likely to communicate their status on their about-page (column 2) if they are religious. They are also less likely to communicate their status on pages other than home or about-use pages (column 3) or anywhere on their websites if they are teaching hospitals or affiliated with a medical school, respectively.²¹ Finally, hospitals that participate in Blue Cross plans are less likely to communicate their status anywhere on their websites. Other quality characteristics, market concentration, and non-profit share, however, do not appear to influence such communication. As for nursing homes, none of the obvious quality characteristics appear to significantly influence the propensity to communicate non-profit status.²²

²⁰ Although our samples of hospitals and nursing homes are limited to non-profits, the non-profit share and HHI covariates track for-profit and public competitors.

²¹ They are, however, more likely to signal their non-profit status on a page other than the home or about-us pages if they have a residency program.

²² We replicated this analysis accounting for whether religious or academic facilities were more or less likely to signal non-profit status based on whether they signaled their religious or academic status, respectively. (This was implemented by replacing, e.g., the religious-orientation indicator with indicators for religious facility signaling it's religious and for religious entity not signaling it's religious.) Although these results are not reported in our tables, we found that religious hospitals that signal their religious status on their homepage are less likely to signal their non-profit status on the their homepage, but only if the analysis did not weight for sampling probabilities. Further undermining the result is that both religious hospitals and nursing homes that did not signal their religious status on their about-us pages were less (not more) likely to signal their non-profit status on about-us pages.

These results provide evidence – but not very strong evidence – that non-profit status is a substitute for other signals of quality. They are robust to different specifications of covariates (including dropping covariates that cannibalize sample size, state fixed effects, and different weighting schemes).

C. Cost of communication

The most revealing aspect of the results summarized above is where non-profits communicate their status. They are least likely to do so in yellow-pages listings, somewhat more likely on the home-pages of their websites, and significantly more likely (though not significantly likely) to do so on about-us pages. Yet yellow pages listings are more important communications than websites and home pages are more important than about-us pages, if not in terms of dollar cost, then certainly in terms of the amount of information they can convey to consumers or how frequently they are viewed by consumers. The fact that non-profit communications trade-off with other quality characteristics more frequently in about-us and other web pages than in home pages reinforces this conclusion. Communication of non-profit status acts more like a signal of quality in less significant modes of communication. Our conclusion is that, even if non-profit status is a signal of quality, it is not a very valuable one given that non-profit firms are not willing to invest very much in that signal.

CONCLUSION

This paper examines whether non-profit firms in the hospital, nursing home, and child-care industries communicate their status to consumers. That they do is a key

assumption of the theory that non-profit status is a signal of non-contractible quality. Our analysis of firms' web sites and yellow-pages listings suggest that non-profits do not often communicate their status and that, although these communications may behave like quality signals might, that they do not attract much investment from non-profit firms.

There are important limitations to our analysis. First, we test whether non-profits send a signal, not whether consumers receive that signal. (We review a literature that examines what consumers think about non-profits, but not whether consumers know firms' non-profit status.) Second, we do not examine certain modes of communication that are as significant as yellow pages listings and websites. These include word-of-mouth, radio and TV advertising, and other print media such as newspapers and magazines.²³ Third, although our methodology could easily be extended to other markets with mixed for-profit and non-profit production, it cannot be extended to pure non-profit markets, such as charities. In these markets firms may take non-profit status to signal quality but do not have to communicate this because all firms are non-profit and consumers know this. Finally, our analysis has limited power if non-profit status means different things to different consumers. If some feel that non-profit status is a signal of non-contractible quality, while others believe it is a signal of inefficiency, then it is possible that the signaling theory has some validity, but that non-profit firms do not broadcast their status because doing so turns off consumers who see that trait as a black mark.

²³ An interesting idea would be to examine the print ads in, e.g., Washingtonian magazine's annual list to the top hospitals in the city.

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Table 1. Summary statistics for website data, weighted by probability of sampling a bed in the same state.

	Hospitals			Nursing homes		
	Obs.	Mean	SD	Obs.	Mean	SD
Non-profit signal						
If facility has a website, most prominent page on which NP status is indicated:						
- Home page	741	0.18	0.38	668	0.26	0.44
- About-us page	741	0.28	0.45	668	0.31	0.46
- Elsewhere on website	741	0.16	0.36	668	0.08	0.27
- NP status is indicated anywhere on website	741	0.61	0.49	668	0.65	0.48
Facility characteristics (quality)						
Religious (1 = yes)	741	0.17	0.38	668	0.24	0.43
Teaching	741	0.12	0.32			
Affiliated with medical school	737	0.30	0.46			
Resident training program	737	0.25	0.43			
Academic (i.e., any of the previous 3 characteristics)	741	0.30	0.46			
Blue Cross certified	741	0.95	0.22	668	0.69	0.46
Has long-term plan to improve quality	675	0.90	0.30			
Works with local agencies to improve care for community	677	0.90	0.30			
Facility characteristics (other)						
Beds (number)	741	204	206	668	108	81
Admissions (number)	741	9225	10188			
Specialized (1 = yes)	741	0.07	0.26			
Hospital-based nursing home				668	0.22	0.41
Self-standing SNF				668	0.03	0.16
Intermediate care facility for the mentally retarded				668	0.15	0.36
Part of a system	728	0.52	0.50	668	0.41	0.49
Part of a system (according to AHA)	741	0.54	0.50			
Part of a network	741	0.33	0.47			
Use system website	736	0.33	0.47	653	0.44	0.50
East	741	0.14	0.35	668	0.16	0.37
South	741	0.40	0.49	668	0.34	0.47
Midwest	741	0.28	0.45	668	0.35	0.48
West	741	0.18	0.38	668	0.15	0.35
Non-profit market share (by beds in county)	741	0.79	0.24	645	0.26	0.07
Market concentration (HHI by bed in county)	741	0.55	0.35	668	0.15	0.14
Religious signal (among religious facilities only)						
If facility has a website, most prominent page on which religious status is indicated:						
- Home page	128	0.70	0.46	150	0.62	0.48
- About-us page	128	0.02	0.14	150	0.64	0.48
- Elsewhere on website	128	0.00	0.00	150	0.06	0.24
- Religious status is indicated anywhere on website	128	0.72	0.45	150	0.86	0.35
Academic signal (among academic facilities only)						
If facility has a website, most prominent page on which academic status is indicated:						
- Home page	232	0.18	0.38			
- About-us page	232	0.11	0.31			
- Elsewhere on website	232	0.03	0.18			
- Academic status is indicated anywhere on website	232	0.32	0.47			

Notes. Observations are weighted by the inverse of the probability of selecting a bed from that facility from all non-profit beds in that state. Academic hospitals are those that either are teaching, are affiliated with a medical school, or have a resident training program.

Table 2. Summary of data on signaling in yellow-pages listings for 10 medium-sized cities in 2002.

	Hospitals (non-profit)	Nursing homes (non-profit)	Child-care providers		
			Non-profit	For-Profit	Total
Number of facilities, total	80	97	467	519	986
Accreditation (# facilities)					
- Number of facilities			13	30	43
- Fraction of all facilities			2.8%	5.8%	4.4%
Accreditation indicated in listing					
- Number of facilities			9	24	33
- Fraction of all accredited facilities			69%	80%	77%
Religious affiliation (# facilities)					
- Number of facilities	22	23	185	17	202
- Fraction of all facilities	27.5%	23.7%	39.6%	3.3%	20.5%
Religious affiliation indicated in listing					
- Number of facilities	22	6	104	8	112
- Fraction of all religious facilities	100.0%	26.1%	56%	47%	55%
Academic status or affiliation (# facilities)					
- Number of facilities	59				
- Fraction of all facilities	73.8%				
Academic status/affiliation indicated in listing					
- Number of facilities	12				
- Fraction of all academic facilities	20.3%				
Non-profit status indicated in listing	2	7	13		
Fraction with nonprofit status in ad	2.5%	7.2%	2.8%		

Notes. The 10 cities are: Boston, MA; Denver, CO; Milwaukee, WI; Oklahoma City, OK; Phoenix, AZ; Providence, RI; Richmond, VA; Sacramento, CA; Seattle, WA, and Washington, DC. A hospital is tagged as academically affiliated if it is associated with a medical school in the AHA data.

Table 3. Effect of various facility characteristics on propensity to indicate non-profit status on different parts of facility websites.

covariate	Hospitals				Nursing homes			
	Homepage	About Us	Elsewhere	Anywhere	Homepage	About Us	Elsewhere	Anywhere
Religious	-0.009 (0.807)	-0.078 (0.069)	-0.013 (0.708)	-0.099 (0.040)	-0.034 (0.384)	0.011 (0.806)	0.039 (0.148)	0.016 (0.717)
Teaching	-0.096 (0.004)	0.109 (0.047)	-0.033 (0.391)	-0.020 (0.715)				
Medical school	-0.085 (0.002)	0.077 (0.043)	-0.012 (0.681)	-0.020 (0.602)				
Resident training	-0.079 (0.006)	0.118 (0.004)	0.000 (0.989)	0.039 (0.328)				
Academic	-(0.080) (0.004)	(0.075) (0.046)	-(0.012) (0.671)	-(0.017) (0.649)				
Blue Cross	-0.162 (0.039)	0.139 (0.033)	-0.017 (0.791)	-0.040 (0.605)	-0.042 (0.265)	-0.021 (0.602)	0.011 (0.603)	-0.052 (0.198)
Long-term Plan	-0.111 (0.049)	0.016 (0.791)	0.026 (0.559)	-0.070 (0.244)				
Community-oriented	-0.054 (0.283)	0.004 (0.945)	-0.065 (0.192)	-0.115 (0.039)				
No other quality feature	-0.072 (0.491)	-0.006 (0.968)	-0.060 (0.566)	-0.139 (0.428)	0.018 (0.677)	0.004 (0.933)	-0.041 (0.180)	-0.019 (0.699)
Not religious or academic	-(0.005) (0.967)	-(0.057) (0.672)	-(0.077) (0.379)	-(0.139) (0.378)				

Notes. Each cell contains differences in the probability of signaling non-profit status given the facility is, e.g., religious or not. P-value for each difference is in parentheses below the differences. Observations are weighted by the inverse of the probability of selecting a bed from that facility from all non-profit beds in that state.

Table 4. Results (odds ratios) from logistic regression of whether a non-profit facility signals their status at the website, on various facility characteristics.

	Hospitals				Nursing homes			
	Home-page	About Us	Else-where	Any-where	Home-page	About Us	Else-where	Any-where
Religious	1.119 (0.26)	0.479 * (1.85)	0.99 (0.02)	0.589 * (1.94)	0.901 (0.47)	0.981 (0.09)	1.792 * (1.84)	1.084 (0.39)
Teaching	0.652 (0.70)	0.906 (0.24)	0.585 (1.15)	0.513 ** (2.00)				
Medical school	1.016 (0.02)	0.975 (0.04)	0.185 *** (2.78)	0.582 (1.14)				
Residency program	0.889 (0.12)	1.367 (0.49)	4.737 ** (2.30)	1.903 (1.11)				
Blue Cross	0.486 (1.53)	0.744 (0.39)	0.815 (0.29)	0.258 ** (2.10)	0.824 (0.69)	1.103 (0.30)	0.648 (0.97)	0.801 (0.69)
Long-term plan	0.55 (1.24)	0.759 (0.53)	1.514 (0.64)	0.577 (1.32)				
Community-oriented	1.915 (1.51)	0.965 (0.09)	0.572 (1.31)	0.924 (0.25)				
Beds	1.001 (0.48)	0.996 ** (2.00)	1.002 (0.88)	0.999 (1.06)	0.998 * (1.68)	0.997 * (1.80)	1 (0.08)	0.996 ** (2.33)
Admissions	1.000 (0.71)	1.000 ** (2.54)	1.000 (0.36)	1.000 ** (2.29)				
Specialized	1.33 (0.57)	0.198 * (1.82)	2.33 (1.40)	0.813 (0.44)				
Hospital-based					0.317 (4.50)	1.264 (0.73)	1.371 (0.55)	0.58 (1.75)
Self-standing SNF					1.49 (1.72)	0.82 (0.49)	0.587 (0.83)	1.006 (0.01)
ICFMR					1.003 (0.00)	0.227 (1.90)		0.297 (1.71)
Part of system†	0.967 (0.10)	1.039 (0.20)	0.719 (0.91)	0.892 (0.41)	1.004 (0.01)	0.985 (0.05)	1.805 (1.13)	1.172 (0.76)
Part of network	1.282 (0.82)	0.759 (1.63)	1.39 (0.91)	1.088 (0.31)				
Uses system website	1.345 (0.96)	1.599 (1.55)	0.452 ** (1.99)	1.306 (1.10)	0.677 (1.11)	1.765 ** (2.50)	1.353 (1.18)	1.377 (1.37)
Midwest	1.37 (0.60)	1.927 (1.34)	1.628 (1.27)	2.149 ** (2.12)	0.942 (0.23)	1.611 (1.24)	0.374 * (1.80)	0.958 (0.12)
South	3.486 *** (2.96)	3.816 *** (3.25)	0.621 (0.95)	3.975 *** (3.53)	1.735 * (1.67)	1.281 (0.57)	0.295 * (1.92)	1.257 (0.92)
West	5.754 *** (3.76)	2.324 (1.35)	1.597 (1.13)	6.98 *** (3.90)	1.659 ** (1.99)	1.228 (0.67)	0.22 *** (2.60)	1.082 (0.39)
NFP share	1.679 (0.86)	1.739 (1.12)	0.808 (0.26)	1.943 (1.35)	0.61 (0.49)	0.933 (0.05)	24.97 (1.10)	1.512 (0.32)
HHI	1.000 (0.62)	1.000 (0.65)	1.000 * (1.91)	1.000 (1.62)	0.21 * (1.79)	0.55 (0.62)	2.237 (0.48)	0.213 (1.49)
Observations	667	667	667	667	627	627	627	627

Notes. Each cell contains an odd ratio and its corresponding z-statistic in brackets. An ***/** indicates significance at 10/5/1% level. Observations are weighted by the inverse of the probability of selecting a bed from that facility from all non-profit beds in that state. (†) System variable for hospitals is based on AHA estimates.