Consumer Welfare Implications of the Nursing Home Ownership Mix

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Abstract

This paper compares the likely consumer benefits of higher quality with the potentially higher production costs that result from increased not-for-profit activity in a nursing home services market area. The comparison of consumer benefits and costs is made by observing empirically how an increased market penetration of not-for-profit facilities affects the utilization of private-pay nursing home care. Increased (decreased) utilization of nursing home care reflects that the consumer benefits associated with additional not-for-profit nursing homes are greater (less) than consumer costs. The empirical results indicate that, from a consumer's perspective, too few not-for-profit nursing homes exist in the typical market area of the U.S. The policy implication is that more quality of care per dollar might be obtained by attracting a greater percentage of not-for-profit nursing homes into most market areas.

I. Introduction

As is the case with many other health care industries, organizations of different ownership forms characterize the nursing home industry in the U.S. In fact, national estimates indicate that 66 percent of all nursing homes are organized on a for-profit basis. Private not-for-profits make up another 27 percent of all nursing homes, and public nursing homes account for the remaining 7 percent (CMS 2003). Analysts continue to explore and debate the economic rationale for the existence of so many nonprofit healthcare organizations.[1]

Among the rationales offered, Arrow (1963) points out that medical care is a very complex personal service and considerable uncertainty surrounds quality of care. Uncertainty places consumers in a vulnerable bargaining position when negotiating with health care providers; particularly when the latter are organized on a for-profit basis and possess relatively more information about quality. The general idea is that imperfectly informed consumers perceive that for-profit organizations may skimp on the quality of care they provide because of the financial incentive for-profit providers face to satisfy the demands of residual claimants for maximum profits. This concern is particularly worrisome in the case of non-contractible quality because of measurement and enforcement issues.[2]

In contrast, nonprofit organizations confront "softer" incentives to compromise the quality of care they provide (Glaeser and Shleifer, 1998). Nonprofit incentives are

[1] By the term, nonprofit, we are referring to both private not-for-profit and public organizations.

[2] Nursing home care examples of non-contractible quality include, but are not limited to, residents receiving constant monitoring, warm smiles, and comforting words from the nursing staff and the delivery of hot, nourishing and timely meals from the kitchen help.

blunted because a non-distribution constraint binds a nonprofit organization "from distributing any profits it earns to persons who exercise control over the firm, such as its members, officers, directors, or trustees" (Hansmann, 1996; p. 228). Instead, nonprofit organizations are legally required to dispense their residual earnings for the express educational, charitable, or religious purposes for which they were formed. For example, nonprofit nursing homes are allowed to use their surplus earnings to enlarge their facilities, provide more services, and lower prices to attract more residents. Thus, the non-distribution constraint implies that nonprofit organizations do not face the same pressure from residual claimants, as for-profits do, to exploit any informational asymmetries that may exist. It follows that the nonprofit designation often serves as a trademark, signal, or guarantee that quality of care will not be unnecessarily sacrificed.[3]

Following this line of reasoning, contemporary theory suggests that an isolated nonprofit healthcare organization may offer higher levels of quality than an otherwise comparable for-profit organization. Within the context of nursing home care, empirical studies have generally supported this theory. As Hansmann (1996; p. 241) notes: "Nursing care, in particular, is arguably an industry where the potential for customer exploitation is large and is not always adequately dealt with by regulatory and reputational constraints on for-profit firms".

Representative of the empirical literature, Harrington, Woolhandler, Mullan, Carillo, and Himmelstein (2001) use a large sample of nursing facilities for 1998 and examine if the level of quality varies systematically across nursing homes with respect to different

[3] Among the other rationales offered for nonprofit healthcare organizations, Weisbrod (1988) offers externality and equity explanations.

ownership structures. As a measure of quality, the authors use the number of deficiencies, as revealed by state inspections, at the nearly 14 thousand nursing homes in their sample. According to their results, investor-owned nursing facilities average 5.89 deficiencies per home compared to 4.02 at not-for-profit homes, and 4.12 at public nursing homes. After controlling for other determinants of quality, such as patient case-mix, in a multiple regression model, the authors find that a for-profit nursing home is associated with 0.679 more deficiencies than an otherwise comparable not-for-profit nursing home.

Chou (2002) takes the analysis a step further by comparing the effect of ownership status on the quality of nursing home care in the presence and non-presence of asymmetric information. For the test, Chou measures quality of care by mortality and several adverse health outcome measures (decubitus ulcers, dehydration, and urinary tract infection). Asymmetric information is defined to exist when nursing home residents have no spouse or child visiting within a month after admission. Chou argues that nursing home residents are usually frail and disabled; therefore, family members often serve as representatives to monitor or evaluate their quality of care.

Chou's empirical findings prove to be very interesting. The results for two of the four quality indicators suggest that not-for-profit nursing homes provide better quality than for-profits when asymmetric information exists. That is, when the residents lack family members to monitor their services, for-profit nursing homes face less incentive to maintain the quality of care. Chou's empirical results support the theory that for-profit nursing homes practice opportunistic behavior and sacrifice quality of care for more profits when asymmetric information exists.

However, given the possible attenuation of property rights caused by the non-distribution constraint, economists are quick to point out that nonprofit organizations are also likely to face a more severe principal-agent problem. In particular, the absence of a residual claimant with a financial interest in the organization means that no one individual, or group of individuals, has strong incentives to monitor the behavior of the organization. Therefore, in a nonprofit healthcare organization, the divergence between the interests of the principal(s) and the agent(s) often leads to the inefficient production and provision of medical care services. This is because unconstrained managers of not-for-profit organizations will be more inclined to pursue personal goals and objectives, which are likely to conflict with minimum cost production, *ceteris paribus*. For example, decision-makers in not-for-profit nursing homes may use any residual earnings to pursue the 5 "Ps" of increased power, prestige, pay, perquisites, and patronage (Santerre and Neun, 1993). This type of expense preference behavior is consistent with not-for-profit decision-makers receiving personal utility from higher levels of structural quality, including such things as large staffs, beautiful sunrooms, and plush office accommodations. Quality enhancing behavior of that kind may improve care but it may also result in higher costs and prices (Newhouse, 1970). Thus, property-rights theory predicts that, in isolation, a nonprofit healthcare organization produces at higher costs than an otherwise comparable for-profit organization.

Studies concerning production efficiency in the nursing home industry tend to confirm this prediction of property rights theory. For example, Nyman and Bricker (1989) compare the technical efficiency of not-for-profit and for-profit nursing homes. Technical efficiency exists when a given amount of output is produced with the fewest

inputs. The authors use data envelopment analysis to measure technical efficiency and multiple regression analysis to identify the reasons why technical efficiency varies across a sample of Wisconsin nursing homes. Nyman and Bricker's findings indicate that for-profit nursing homes employ 4.5 percent fewer inputs per patient day than otherwise comparable not-for-profit homes. The general conclusions of this study have been corroborated by a host of studies including Nyman, Bricker, and Link (1990), Fizel and Nunnikhoven (1992), and Chattopadhyay and Heffley (1994).

While theory tends to be unambiguous in predicting that an "isolated"not-for-profit organization produces medical care with higher quality and greater production costs than an otherwise similar for-profit organization, not-for-profit and for-profit organizations rarely operate in isolation. Weisbrod (1988) notes that a mixture of ownership types exists because some people are reasonably informed and find attractive the relatively low prices offered by for-profits. Glaeser and Shleifer (2001) point to for-profit and not-for-profits satisfying heterogeneous demands for quality. Specifically, not-for-profits offer high quality at high prices and for-profits enter the market to fill demands for lower quality.

Grabowski and Hirth (2003) hypothesize that competition among for-profit and not-for-profit organizations benefits society. They predict that competitive spillover effects from not-for-profits lead to a higher quality of care in for-profit nursing homes. In support of their theory, they find empirical evidence indicating that a marginal increase in the not-for-profit market share improves for-profit, and overall, nursing home quality.

Moreover, Grabowski and Hirth, and much earlier, Tuckman and Chang (1988), note that competitive spillovers from for-profits may influence the behavior of not-for-profit

nursing homes. In particular, they argue that competition from for-profit organizations limits the production inefficiency of not-for-profits. Production inefficiency is limited because not-for-profits have to be more concerned with the costs of producing medical care when facing competition from the more cost-conscious for-profit organizations.[4] Tuckman and Chang show empirically that competition from for-profits lowers the costs of providing nursing home care in not-for-profit nursing homes. Grabowski and Hirth conclude (p. 19) that 'If non-profits have a competitive advantage in "trustworthiness" while for-profits have greater incentives for efficiency, intersectoral competition can yield better outcomes than a market consisting exclusively of one type of firm.'

Based upon this notion that for-profit and not-for-profit organizations may coexist to balance costs and quality concerns, this paper develops and conducts a unique empirical test to assess whether or not a marginal change in the ownership mix improves the welfare of nursing home care consumers. As previously discussed, the existence of both not-for-profit and for-profit nursing homes in a single market area can be expected to generate both market benefits and costs. The test shows that consumer welfare improves if a marginal change in the ownership mix leads to an increase in nursing home utilization, *ceteris paribus*. We discuss this in the next section of this paper and also explain how we plan to conduct the empirical test. Section III describes the data and sample used in the empirical analysis. Section IV presents the empirical findings and the last section offers conclusions.

[4] Glaeser (2002) also notes that competition in product markets keeps not-for-profit organizations in line even though their governance structures may be weak.

II. Conceptual Model

Svorney (1987) provides the underlying model used to test the consumer welfare implications of the mix of for-profit and not-for-profit nursing homes in a geographical market. She examines the role of professional interests in establishing physician licensure. Svorney notes that physician licensure potentially raises costs through higher wages because it acts as an entry barrier, but, she emphasizes, it may also provide greater benefits in the form of quality assurance. The ultimate test of the efficiency of professional licensure, she argues, depends on whether or not the favorable demand response outweighs the undesirable supply response. For example, if the benefit of quality assurance causes demand to increase (i.e., shift the demand curve to the right) more than higher wages cause supply to decrease (i.e., shift the supply curve to the left), then the utilization of physician services increases, and this reflects the net benefit that physician licensure offers.[5] Hence, one may observe the impact of a regulation (or type of institution) on the utilization of a particular good or service, and from that draw an inference about its effect on welfare.

The consumer welfare implications of a *mix* of health care organizations with different ownership forms can be analyzed in a similar manner. For example, and in the context of our research, suppose we are comparing two similar nursing home markets that differ in the following respect: for-profit facilities completely dominate market area "A" whereas an equal distribution of market share across for-profit and not-for-profit facilities

[5] Svorney finds empirically that physician licensure leads to a reduced consumption of physician services. That is, physician licensure increased entry costs (supply) by more than it increased consumer benefits from quality assurance (demand). Thus her results provide support for the special interest theory of physician licensure.

characterizes market area "B". A graphical exposition of this comparison is presented in figure 1 for a competitive marketplace.

The curves D_A and S_A represent the demand for and supply of nursing home care in market A where for-profit facilities completely dominate. Similarly, the curves D_B and S_B represent the demand and supply for nursing home care in area B where both for-profit not-for-profit nursing homes equally share the market. Notice that Q_A and Q_B measure the market clearing quantity of nursing home care in markets A and B, respectively.

Given the different ownership mixes, the two markets are likely to differ in two principle respects, *ceteris paribus*. First, a greater demand for nursing home care may exist in market area B because of the increased quality assurance resulting directly or indirectly, through competitive spillover effects, from the greater prevalence of not-for-profit nursing homes. The demand curve in market area B may also be greater because of the quality maximizing behavior in not-for-profit nursing homes. The greater quality (both actual and perceived) is captured by demand curve D_B in figure 1.

Second, the supply of nursing home care may be less in area B because of the higher production costs resulting from the diminished property-rights incentives since more not-for-profit nursing homes operate in the market. In addition, the supply may be less in market B because of the higher costs associated with producing greater quality. Higher production costs are reflected in supply curve S_B in figure 1. However, we cannot overlook that not-for-profit nursing homes are exempted from paying corporate income, property, and sales taxes. To the extent that tax exemptions lower the variable costs of production, they lead to an increased supply of nursing home care in market B. Because

the demand (quality) effect is assumed to be stronger than the cost effect in our example, the equilibrium quantity of nursing home care, Q_B, is greater in market B than market A.

Thus, the analysis suggests that we can examine the impact of ownership mix on utilization to infer its consumer welfare implications. More specifically, the test can be conducted by observing the impact that the not-for-profit (or for-profit) market share has on nursing home care utilization, while carefully controlling for a host of other supply and demand factors. This approach of focusing on utilization, as a gauge of consumer welfare, offers two advantages to the researcher.

First, changes in utilization reflect how consumer benefits from any quality adjustments (or any other benefits resulting from not-for-profits) compare to any concomitant changes in consumer prices. Consequently, the value (benefit to price ratio) associated with any change in quality can be inferred from the empirical analysis. Given the difficulty of directly measuring the consumer benefits and costs of quality improvements in practice, indirect inference is particularly attractive and valuable. Second, data for quality is unnecessary to perform this test. As Glaeser and Shleifer (2001; p.107) note: "Even when markets are divided between for-profit and non-profit firms, it will be difficult to distinguish empirically between the quality of their output. The reason is that both types of firms may well produce output of the same contractible quality, but non-profit firms would choose higher non-contractible quality. To the extent that non-contractible quality is hard to put in a contract and verify in court, it may also be difficult for an econometrician to measure".

Equation 1 represents the general reduced-form model used in the forthcoming statistical estimations. In equation 1, Q_i represents the equilibrium quantity of nursing

home care in market *i*; NPS_i represents the market share held by not-for-profit nursing homes in market *i*; D_{ij} is a vector of *j* additional variables that are expected to influence the demand for nursing home care in market *i*; and S_{ik} is a vector of *k* additional variables hypothesized to affect the supply of nursing home care in market *i*. The error term, μ_i, is assumed, for now, to be independent and normally distributed with constant variance and a mean of zero (constant terms and/or fixed effects in equation 1 have been suppressed for algebraic convenience).

$$Q_i = \phi(NPS_i) + \sum_{n=1}^{j} \gamma_n D_{in} + \sum_{n=1}^{k} \gamma_{j+n} S_{in} + \mu_i \qquad (1)$$

Because theory alone cannot identify the precise empirical relationship, a general specification is assumed between the not-for-profit market share and utilization in equation (1) and linear and unrestricted specifications are explored in the following multiple regression analysis. The empirical relation between the not-for-profit share and utilization indicates if a marginal increase in the market penetration rate improves or worsens consumer welfare. If an inverse relation holds empirically between the not-for-profit share and utilization at the margin, then further penetration of not-for-profit nursing homes generates costs in excess of consumer benefits. Oppositely, if a direct relation holds empirically between the not-for-profit share and utilization, then further penetration of not-for-profit nursing homes yields more benefits than costs at the margin.

Of course, we cannot rule out the possibility that demand or supply effects may not occur in practice. For example, consumers may not value the signaling and/or better quality offered by not-for-profits but face the higher price brought on by their greater production costs. If so, the supply effect solely determines the influence of the ownership

mix on consumer welfare. Another possibility is that ownership mix does not matter at all to consumers. For example, following Glaeser and Shleifer (2001, for-profit and not-for-profits may satisfy different demands for quality and the cross price effects across the markets may be minimal. If that is the case, the empirical results will show a statistically insignificant relation between the ownership mix variable and utilization. However, a statistically insignificant relation may also indicate that the observed ownership mix maximizes consumer welfare (i.e., marginal benefit equals marginal cost). Hence, the empirical results will be inconclusive in that case.

Before moving on to the next section, it should be noted that we are not alone in using quantity adjustments as a barometer of consumer welfare in the health care industry. For example, Abraham, Gaynor, and Vogt (2005) use quantity information to view how the market entry of new hospitals affects consumer welfare. They find that entry, of the second and third firms, increases quantity, which allows them to infer that market entry increases consumer welfare in the hospital services industry. Moreover, Santerre and Vernon (forthcoming) use information on the utilization of various types of hospital services to infer how ownership mix affects consumer welfare. From a consumer perspective, they find that nonprofit hospitals are overrepresented in the inpatient sector whereas for-profit hospitals are overrepresented in the outpatient sector of the typical hospital services industry.

III. Data and Empirical Test

Data are gathered for each of the 2,939 nursing home markets in the U.S. to implement our ownership-welfare test**.** Because of missing data, 2,573 market observations are used

in the empirical analysis. In our test, the county is assumed to be a reasonable approximation of the relevant geographical market for nursing home care. Previous studies strongly support the county as a proxy for the relevant geographical market in the nursing home industry (e.g., Nyman, 1985; Cohen and Spector, 1996; Grabowski and Hirth, 2003; Gulley and Santerre, 2003). The data used in our empirical analysis are for the year 1996, or as close to that year as possible, and come from four different sources. Table 1 reports the mean value, standard deviation, and data source for each of the variables used in our empirical analysis.

The conceptual model indicates that a measure of nursing home care utilization, or quantity, Q_i, is necessary to conduct the empirical test. Because our analysis, as reflected in figure 1, assumes flexible prices, we measure utilization by the number of private-pay nursing home residents in each county. To directly control for the size of the market across observations, the number of private-pay residents is divided by the number of people aged 65 years and older in each county.

For comparative purposes, we also examine how not-for-profit market penetration influences the utilization of nursing home care by Medicaid recipients. Hence, another measure of utilization is the number of Medicaid residents per 10,000 elderly persons in the county. Nursing homes are reimbursed at an administered (rather than negotiated) rate by state governments when providing care to Medicaid residents. The impact of greater not-for-profit market penetration on the utilization of nursing home services by Medicaid recipients is unclear a priori, and depends on the net effect of three influences.

First, as a Scanlon (1980) type dual market model predicts, Medicaid residents may be squeezed out of nursing home beds if private demand grows because of greater quality

offered by not-for-profit nursing homes, assuming the Medicaid reimbursement rate remains constant. Second, that same model predicts that higher quality-induced marginal costs result in less nursing home services supplied to Medicaid recipients for a given Medicaid reimbursement rate. These first two influences suggest that increased not-for-profit penetration leads to less utilization of nursing home care by Medicaid recipients, all other factors held constant.

However, Medicaid recipients personally face a zero out-of-pocket price, so they essentially "shop with their feet" when choosing among nursing home care and other alternatives, such as home health care. As a result, any change in nursing home care use by Medicaid recipients reflects only their demand effect and not any personal cost effect resulting from increased not-for-profit activity. This "shop with their feet" mechanism conflicts with the two prior influences because it implies that greater not-for-profit penetration increases the utilization of nursing home care by Medicaid beneficiaries. The potential magnitude of this third influence depends on (1): how much excess capacity exists in the industry at the prevailing Medicaid reimbursement rate and; (2): the number of Medicaid-eligible individuals relative to the number already receiving nursing home services in the market area.

As previously mentioned, in an effort to isolate the impact of ownership mix on consumer welfare, we must also control for other factors that could result in utilization differences across market areas. Otherwise, the omission of variables that are correlated with both ownership mix and the number of residents could lead us to draw incorrect inferences from our empirical results. Following the conceptual model, these other influences are broken down into the aforementioned demand-side variables, D_j and

supply-side variables S_k . The demand-side variables affecting nursing home care utilization include: public nursing home share, population (in logs), population density, the median income (in logs), the poverty rate, the percentage of the population aged 65 years and older, the ratio of the population aged 85 years and older to the population aged 65 years and older, the percentage of the population that is white, the percentage of the female population unemployed, the percentage of the female population divorced, the number of doctors and hospitals per capita, and the percentage of residents requiring assistance with daily living activities.

These demand-side variables are intended to control for differences in the willingness and ability to purchase nursing home care across market areas. Except for a few, the rationale for including most of these demand-side variables should be self-evident. The female unemployment and divorce rates are intended to capture the availability of informal care outside nursing facilities. The number of doctors and hospitals serve to capture potential referral sources. Given that the market share of public nursing homes is relatively low and has been relatively constant over time (at about 6 percent from 1986 to 2005), it is assumed to be exogenously determined. That is, local and state fiscal policies likely influence the availability of public nursing home beds more than market forces. Hansmann (1987) assumes an exogenous public market share in his study of the determinants of the not-for-profit nursing home share in different areas of the U.S. over time.

The supply-side variables are intended to capture relative differences in the costs of providing, and the willingness to offer, nursing home care across the various market areas. As such, they include: the CMS area wage index (in logs), the number of nursing

homes per capita, the Herfindahl-Hirschmann index of the market concentration of nursing homes, and the percentage of nursing homes that are hospital based or belong to a chain. We also include state fixed effects to capture the net effect of important differences like the presence of certificate of need laws (CON), the type and generosity of Medicaid reimbursement, and other fiscal differences.

The primary focus of our paper is on the impact of ownership mix on consumer welfare in the nursing home industry. As a result, the aggregate market share of not-for-profit nursing homes is specified in the regression model to capture varying degrees of competitive spillovers in the various nursing home markets. Theoretically, the market share of not-for-profit nursing homes may be endogenous. For example, residents may be drawn to not-for-profit nursing homes because managers set aside extra beds in pursuit of the personal utility derived from operating larger organizations (e.g., Newhouse, 1970). In addition, David (2003), Glaeser and Shleifer (2001), and Lakdawalla and Philipson (1998) develop models in which organizations choose the form of ownership that provides benefits in excess of costs. Consequently, theory dictates that we test whether the not-for-profit share can be treated as exogenous.

Following Grabowski and Hirth (2003), the not-for-profit share of *hospital* beds in 1986 is one of the instruments used in the test of exogeneity. In their study, Grabowski and Hirth make a compelling theoretical and empirical case for this particular instrument.[6] Theoretically, they argue that the lagged value of the not-for-profit hospital

[6] Grabowski and Hirth also specify the growth of the elderly population for the 5-year period from 1991 to 1996 as an additional instrument. Given that our dependent variable is the number of residents, this instrument is much less ideal than the lagged nonprofit hospital share. In any case, this variable proved to be statistically insignificant.

market share serves as a plausible instrument because it captures those areas that have historically been more favorable for the development of not-for-profit health care organizations. In addition, the relative share of not-for-profits in different parts of the country may be deeply rooted in historical factors such as the age of the city and different patterns of voluntarism and charitable provision that have little to do with the advanced technology and prevalence of third party payment that characterize the current health care environment. Grabowski and Hirth's statistical analysis provided strong support for the suitability of the lagged not-for-profit hospital market share as an instrument.

The change in the poverty rate between 1991 and 1997 in each county serves as our second instrumental variable. Hansmann (1987, 1996), among others, argues that for-profit organizations are better able to react to changes in demand given that they are more entrepreneurial than not-for-profits. In addition, not-for-profits are relatively locked-in to their existing capital because of legal barriers to raising equity capital. As a result, for-profit nursing homes exit markets where poverty is rising and enter markets where poverty is falling, with the not-for-profit market shares adjusting accordingly. Moreover, a commitment to servicing areas where poverty is worsening over time may agree with the charitable mission of a not-for-profit nursing home, giving them reason to stay when for-profits are leaving. For these two reasons, the market share of not-for-profit nursing homes is likely to be higher in market areas in which poverty increases over time.

The first stage multiple regression results are reported in Table 2. As expected, the coefficient estimates are positive and statistically significant on both of the instrumental variables. According to the regression results, the not-for-profit nursing home share is greater in those market areas where the poverty rate has increased over the previous six

years and where not-for-profit *hospitals* traditionally have dominated. Using the approach suggested by Davidson and MacKinnon (1993), we employ the Hausman (1978) test for the exogeneity of the not-for-profit share. The null hypothesis of exogeneity is rejected by the Hausman test and we therefore examine the relationship between the not-for-profit share and utilization using the two stage least squares (TSLS) procedure.

IV. Empirical Results

Multiple regression results associated with a linear specification are reported in Table 3. The first set of results summarizes the findings for private-pay utilization and the second set reports the results for Medicaid utilization. Each independent variable's coefficient estimate and its corresponding t-statistic (in absolute terms and in parentheses) are reported in the table. White's test (1980) identified the presence of heteroscedasticity, so the estimates in our models are made heteroscedastic-consistent following his procedure.

The regression results reveal that the right-hand-side variables explain a sizeable proportion of the variation in both the private pay and Medicaid utilization of nursing home care across counties in the U.S. Although not appearing to be very robust across the two measures of utilization, some of the results for the control variables are worth noting. On the demand side, income is found to directly impact private pay but not Medicaid utilization. The lack of an inverse income effect on Medicaid utilization is a little surprising, but this may reflect that moderately wealthy individuals eventually spend down their assets before becoming eligible for Medicaid nursing home care services. Also, doctors evidently serve as an important referral source for both private pay and Medicaid nursing home services given the positive and statistically significant estimate on the number of doctors per capita in both equations. On the supply-side of the market,

some evidence indicates that the area medical wage rate and the number of nursing homes per capita influence utilization. Interestingly, adjustments in the area medical wage rate appear to have a greater impact on the utilization of private care than on Medicaid care utilization.

More important for the research at hand, is the finding that the coefficient estimates on the not-for-profit market share are positive in both regression equations. However, the coefficient estimate on the not-for-profit share is only statistically different from zero in the private pay utilization equation. These findings imply that a one percentage point increase in the not-for-profit market share results in nearly 1.5 additional private-pay residents per 10,000 elderly individuals in the typical market area. This result suggests that a marginal increase in not-for-profit activity in the nursing home care industry generates more benefits than costs from a private pay consumer's perspective.

As mentioned previously, theory alone cannot identify the precise empirical relationship between the not-for-profit share and utilization over the entire range of the not-for-profit share. Therefore, we examine the relationship between the not-for-profit market share and utilization with a less restrictive specification. Specifically, we use the predicted values of the not-for-profit share from the first stage regression results are used to create ten cells of 10 percentage point widths (e.g., 0 to 10 percent, 10 to 20 percent, and so on.). Each of the deciles takes on a value of one if the predicted not-for-profit share of a county falls within that particular decile, or zero otherwise. The regression results are shown in Table 4 for this less restrictive specification. The very first decile, a not-for-profit share of 10 percent or less, is treated as the default, or reference category.

Based on the statistical significance of the various coefficient estimates on the decile dummy variables, it appears that the penetration of not-for-profit nursing homes does not influence private nursing home utilization until a market share of approximately 40 percent is reached. Similarly, the results imply that a 50 percent market share is required before not-for-profit activity results in consumer benefits in excess of costs in the case of Medicaid utilization. Moreover, beyond the minimum value of 40 percent, it appears that greater market penetration of not-for-profit nursing homes leads to increasing greater private pay utilization, as reflected in the progressively higher values of the estimated coefficients on the cell dummy variables. The findings are slightly different for Medicaid utilization, however. According to the regression results, greater market penetration of not-for-profit nursing home is associated with increased Medicaid utilization beyond the 50 percent minimum, but only up to a 90 percent market share.

An important policy implication can be drawn from these findings. According to our data, the actual not-for-profit market share falls below 40 percent in slightly over three-quarters of the market areas in the sample. Consequently, not-for-profit nursing homes are significantly underrepresented from a consumer's perspective in most nursing home markets of the U.S. It follows from this, therefore, that more quality of care per dollar can be obtained through an increase in the market penetration of not-for-profit organizations in most market areas.

These findings are certainly intriguing because they suggest ownership conversion and the encouragement of new not-for-profit nursing homes may be necessary to improve consumer welfare in many market areas. At the same time, the results are not surprising given the attention paid to allegations of inferior quality of care in the nursing home

industry (Institute of Medicine, 2001). Of course, one may wonder why more not-for-profit organizations are not naturally drawn to the nursing home industry by normal market forces. A couple of reasons come to mind.

First, regulatory factors such as the presence of CON laws may provide some explanation for the under allocation of not-for-profit organizations to the nursing home industry. In the context of the hospital services industry, Gulley and Santerre (1993) find that the for-profit market share is greater in states with certificate of need (CON) laws. They argue that for-profit hospitals face a greater incentive to jump the hurdle created by CON laws because of the economic rents generated by that entry barrier. Lakdawalla and Philipson (1998) find empirically that CON laws have led to a larger for-profit share in the nursing home industry for that same reason. Second, as mentioned previously, Hansmann (1987; 1996) argues that, compared to for-profit organizations, not-for-profit nursing homes are less mobile because of the inability to raise equity capital. Hence, not-for-profit nursing homes are unable to react to imbalances in supply and demand in the same way, and as quickly as, for-profits often can.

V. Conclusion

This paper offers a test of the welfare implications of the ownership mix in various nursing home markets across the U.S. When consumers lack sufficient information about nursing home quality, the general notion is that nonprofit organizations generate societal benefits by offering (and signaling) quality assurance, but they may simultaneously result in higher production costs because of less attention devoted to production efficiency. The opposite scenario holds for for-profit organizations. Thus, a mixture of ownership types

in the marketplace may keep quality and costs under control as a result of competitive spillovers.

In this study we propose that the welfare implications of the ownership mix might be inferred by using multiple regression analysis to view how a change in ownership mix affects utilization, or quantity, of nursing home care. If a small increase in one type of ownership results in greater utilization, then consumer benefits outweigh consumer costs at the margin. Our empirical results suggest that too few not-for-profit nursing homes characterize the typical nursing home market (county) of the U.S., at least in 1996. As a result, greater quality of care per dollar could be achieved by encouraging more not-for-profit nursing homes into most market areas of the U.S.

Local and state policy makers may want to offer inducements such as zoning waivers, and construction bond subsidies to attract more not-for-profit nursing homes into their areas. In addition, government subsidized financing may also be made available for converting for-profit nursing homes into not-for-profit status. Moreover, CON laws might be enforced to selectively encourage more not-for-profit and less for-profit nursing homes into areas in which for-profit nursing homes already have a significant presence. For extreme cases, where the for-profit market share is already well above 60 percent, a moratorium might be imposed on the construction of new for-profit nursing homes and the for-profit conversion of existing not-for-profit nursing homes.

Figure 1:

Impact of Not-for-Profit Organizations in a Market Area

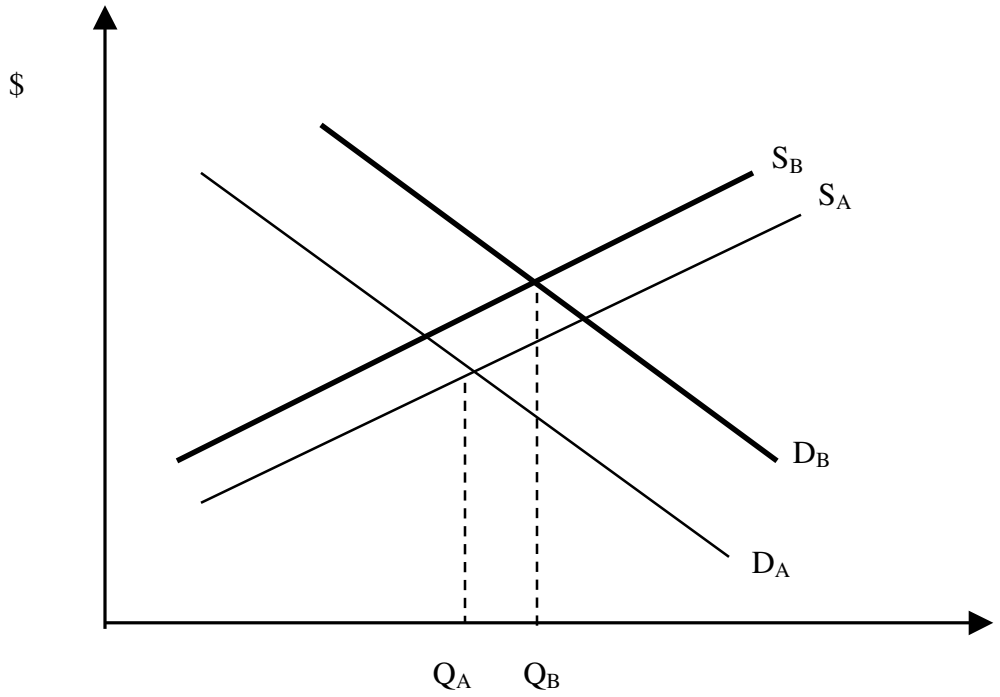


Table I. Descriptive Statistics

Variables	Mean	S.D.	Source
Private pay residents per 10,000 elderly population	195	204	1995-1996 Online Survey, Certification and Reporting (OSCAR)
Medicaid residents per 10,000 elderly population	453	741	OSCAR
Public Nursing Home Share (in terms of beds)	0.045	0.022	OSCAR
Log of Population	10.45	1.31	2003 Area Resource File (ARF)
Population density	240	1053	ARF
Log of Median county income	9.86	0.21	ARF
Female divorce rate (interpolated 1990, 2000)	0.09	0.020	ARF
Female unemployment rate (interpolated 1990, 2000)	0.058	0.027	ARF
Proportion of population that is white	0.84	0.180	ARF
Proportion of population in poverty (1997)	14.90	6.11	ARF
Log of CMS wage index	9.01	0.141	The Centers for Medicare and Medicaid Services (CMS)
Proportion of Pop. 65 and older (interpolated 1990, 2000)	0.148	0.042	ARF
Proportion of Pop. 85 and older as a fraction of percent elderly (interpolated 1990, 2000)	0.12	0.046	ARF
Percentage requiring assistance with activities of daily living (ADLS)	3.63	0	OSCAR
Fraction of skilled nursing facilities	0.30	0.196	OSCAR
Fraction of nursing homes belonging to a chain	0.52	0.335	OSCAR
Herfindahl-Hirschmann index of market concentration	0.45	0.317	OSCAR
Doctors per 10,000 population	12.25	14.17	ARF
Hospitals per capita	0.63	0.81	ARF
Nursing Homes per 10,000 population	1.39	1.47	OSCAR
Percent of Hospitals with nursing beds	0.176	0.265	OSCAR
Market Share of Not-for-Profit Nursing Homes (in terms of beds)	23.96	30.36	OSCAR
Percent of Not-for-Profit hospital days in 1986	0.466	0.448	AHA
Change in Poverty 1991 to 1997	-0.922	8.03	ARF

Table 2
Dependent Variable: Not-for-Profit Market Share

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-15.21625	64.46123	-0.236053	0.8134
Change in Poverty Rate	**0.398640**	**0.126624**	**3.148208**	**0.0017**
Not-for Profit Hospital Share in 1986	**9.376982**	**1.447800**	**6.476713**	**0.0000**
Public Share	0.785895	0.429137	1.831336	0.0672
Log of population	1.927334	1.155981	1.667272	0.0956
Density	0.000694	0.000413	1.681345	0.0928
Log of Income	-4.472247	4.492087	-0.995583	0.3195
Female divorce rate	-45.85810	41.49216	-1.105223	0.2692
Female Unemployment rate	-6.756025	27.76168	-0.243358	0.8077
Proportion of pop that is white	-5.701380	4.730944	-1.205125	0.2283
Poverty rate	-0.292618	0.161485	-1.812043	0.0701
Percent elderly	30.93545	19.60027	1.578318	0.1146
Percent elderly 85 years old and above	162.3921	44.76947	3.627297	0.0003
Log of CMS area wage	4.796236	7.168458	0.669075	0.5035
ADLS	-2.613335	2.310496	-1.131071	0.2581
Percent skilled nursing facilities	-1.090728	3.656789	-0.298275	0.7655
Percent of nursing homes in chain	-3.453946	2.098286	-1.646080	0.0999
HHI	7.886580	3.737252	2.110262	0.0349
Doctors per 10,000	0.001884	0.030628	0.061504	0.9510
Hospitals per capita	-3.369490	1.251217	-2.692970	0.0071
Nursing homes per capita	-0.688659	0.546620	-1.259849	0.2078
Percent of hospital-based nursing homes	12.08384	3.236523	3.733588	0.0002

Adjusted R-squared 0.281519
White Heteroskedasticity-Consistent Standard Errors & Covariance
Sample Size = 2,573 counties
State fixed effects are also specified

Table 3
Dependent Variable: Private nursing home residents per 10,000 elderly population

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-147.3699	336.6992	-0.437690	0.6616
Not-for-Profit Share	**1.480477**	**0.531383**	**2.786086**	**0.0054**
Public Share	-19.08343	5.575499	-3.422730	0.0006
Log of Population	-17.02309	10.27413	-1.656888	0.0977
Density	-0.001319	0.005128	-0.257301	0.7970
Log of Income	118.7963	25.75688	4.612214	0.0000
Female divorce rate	-701.4774	201.5473	-3.480461	0.0005
Female Unemployment rate	300.2324	225.4742	1.331560	0.1831
Proportion of pop that is white	76.05542	28.04091	2.712303	0.0067
Poverty rate	0.118627	0.466822	0.254115	0.7994
Percent elderly	-1209.617	135.0654	-8.955784	0.0000
Percent elderly 85 years old and above	-2.658482	264.9628	-0.010033	0.9920
Log of CMS area wage	-83.07998	37.69764	-2.203851	0.0276
ADLS	44.22051	11.04263	4.004529	0.0001
Percent skilled nursing facilities	11.73585	13.27520	0.884043	0.3768
Percent of nursing homes in chain	-12.74571	7.085565	-1.798827	0.0722
HHI	-22.91561	31.88916	-0.718602	0.4725
Doctors per 10,000	1.117843	0.425812	2.625201	0.0087
Hospitals per capita	-37.71836	11.86079	-3.180087	0.0015
Nursing homes per capita	116.9836	18.75612	6.237088	0.0000
Percent of hospital-based nursing homes	-16.81771	13.38350	-1.256600	0.2090

Adjusted R-squared 0.733014
Two Stage Least Squares
White Heteroscedasticity-Consistent Standard Errors & Covariance
Sample Size = 2,573 counties
State fixed effects are also specified

Table 3 (continued)

Dependent Variable: Medicaid nursing home residents per 10,000 elderly population

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	1909.838	906.1022	2.107751	0.0352
Not-for-Profit Share	**2.800359**	**1.793609**	**1.561298**	**0.1186**
Public Share	-62.96467	18.48314	-3.406601	0.0007
Log of Population	-18.74334	28.40565	-0.659845	0.5094
Density	0.005345	0.018130	0.294847	0.7681
Log of Income	-40.76102	61.56091	-0.662125	0.5080
Female divorce rate	1256.054	578.3156	2.171919	0.0300
Female Unemployment rate	1685.622	542.8944	3.104881	0.0019
Proportion of pop that is white	-72.99660	83.35257	-0.875757	0.3812
Poverty rate	2.017069	1.280013	1.575819	0.1152
Percent elderly	-3823.402	452.0294	-8.458304	0.0000
Percent elderly 85 years old and above	-2916.028	945.9805	-3.082546	0.0021
Log of CMS area wage	-107.6487	85.17392	-1.263870	0.2064
ADLS	123.2275	35.36279	3.484664	0.0005
Percent skilled nursing facilities	12.80214	35.58922	0.359720	0.7191
Percent of nursing homes in chain	17.27474	20.06545	0.860920	0.3894
HHI	157.5952	84.86069	1.857105	0.0634
Doctors per 10,000	2.793570	0.910544	3.068022	0.0022
Hospitals per capita	-127.9163	38.72256	-3.303405	0.0010
Nursing homes per capita	449.1742	49.49610	9.074943	0.0000
Percent of hospital-based nursing homes	-28.15383	37.69173	-0.746950	0.4552

Adjusted R-squared 0.848151
Two-Stage Least Squares
Sample Size = 2,573 counties
White Heteroscedasticity-Consistent Standard Errors & Covariance
State fixed effects are also specified

Table 4

Dependent Variable: Private nursing home residents per 10,000 elderly population

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-171.5669	319.9759	-0.536187	0.5919
10 < Pred NFP ≤ 20	**7.618751**	**7.429744**	**1.025439**	**0.3053**
20 < Pred NFP ≤ 30	**12.92812**	**9.557273**	**1.352700**	**0.1763**
30 < Pred NFP ≤ 40	**26.12731**	**15.56340**	**1.678765**	**0.0933**
40 < Pred NFP ≤ 50	**45.27439**	**21.24533**	**2.131028**	**0.0332**
50 < Pred NFP ≤ 60	**89.79223**	**29.14343**	**3.081045**	**0.0021**
60 < Pred NFP ≤ 70	**137.5802**	**43.70769**	**3.147734**	**0.0017**
70 < Pred NFP ≤ 80	**188.0388**	**50.16474**	**3.748426**	**0.0002**
80 < Pred NFP ≤ 90	**251.5870**	**103.2083**	**2.437662**	**0.0149**
90 < Pred NFP	**292.2590**	**142.6202**	**2.049211**	**0.0405**
Public Share	-19.32858	5.585691	-3.460375	0.0005
Log of population	-14.77625	10.42054	-1.417992	0.1563
Density	-0.001444	0.005462	-0.264392	0.7915
Log of Income	119.7194	24.93295	4.801655	0.0000
Female divorce rate	-728.7624	197.9765	-3.681055	0.0002
Female unemployment rate	281.6042	219.7953	1.281211	0.2002
Proportion of pop that is white	73.45183	27.04642	2.715769	0.0067
Poverty rate	0.143895	0.438336	0.328275	0.7427
Percent elderly	-1192.447	140.2666	-8.501290	0.0000
Percent elderly 85 years old and above	6.652320	283.5123	0.023464	0.9813
Log of CMS area wage	-82.65294	36.96558	-2.235944	0.0254
ADLS	43.43561	11.33929	3.830541	0.0001
Percent skilled nursing facilities	9.543756	13.12397	0.727200	0.4672
Percent of nursing homes in chain	-14.29705	6.469916	-2.209773	0.0272
HHI	-18.95443	31.57336	-0.600330	0.5483
Doctors per 10,000	1.114764	0.435105	2.562059	0.0105
Hospitals per capita	-38.35774	11.10465	-3.454206	0.0006
Nursing homes per capita	118.3079	19.97726	5.922127	0.0000
Percent of hospital-based nursing homes	-15.34652	11.81346	-1.299071	0.1940

Adjusted R-squared 0.751607
Sample Size = 2,573 counties
White Heteroscedasticity-Consistent Standard Errors & Covariance
State fixed effects are specified

Table 4 (continued)

Dependent Variable: Medicaid nursing home residents per 10,000 elderly population

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	1857.366	846.9488	2.193008	0.0284
10 < Pred NFP ≤ 20	**-23.41576**	**17.39183**	**-1.346366**	**0.1783**
20 < Pred NFP ≤ 30	**-1.685983**	**25.14481**	**-0.067051**	**0.9465**
30 < Pred NFP ≤ 40	**20.08294**	**39.40227**	**0.509690**	**0.6103**
40 < Pred NFP ≤ 50	**49.39372**	**56.21354**	**0.878680**	**0.3797**
50 < Pred NFP ≤ 60	**233.7605**	**87.48832**	**2.671906**	**0.0076**
60 < Pred NFP ≤ 70	**371.6952**	**132.9466**	**2.795823**	**0.0052**
70 < Pred NFP ≤ 80	**399.1647**	**160.1810**	**2.491960**	**0.0128**
80 < Pred NFP ≤ 90	**716.7830**	**343.3755**	**2.087461**	**0.0369**
90 < Pred NFP	**156.9356**	**554.1639**	**0.283193**	**0.7771**
Public Share	-63.26231	17.16084	-3.686435	0.0002
Log of population	-14.55617	27.94423	-0.520901	0.6025
Density	0.004831	0.019001	0.254233	0.7993
Log of Income	-37.74299	60.73446	-0.621443	0.5344
Female divorce rate	1011.509	531.7841	1.902105	0.0573
Female unemployment rate	1592.658	525.5340	3.030552	0.0025
Proportion of pop that is white	-80.24730	82.62420	-0.971232	0.3315
Poverty rate	2.077192	1.262600	1.645171	0.1001
Percent elderly	-3675.683	433.4144	-8.480759	0.0000
Percent elderly 85 years old and above	-2682.048	828.4890	-3.237276	0.0012
Log of CMS area wage	-106.2664	81.69705	-1.300738	0.1935
ADLS	117.7716	33.06459	3.561865	0.0004
Percent skilled nursing facilities	16.58399	34.03703	0.487234	0.6261
Percent of nursing homes in chain	15.70862	17.88151	0.878484	0.3798
HHI	163.4249	81.06371	2.016005	0.0439
Doctors per 10,000	2.819149	0.925449	3.046249	0.0023
Hospitals per capita	-131.8623	36.48334	-3.614316	0.0003
Nursing homes per capita	442.2127	48.51644	9.114699	0.0000
Percent of hospital-based nursing homes	-11.86751	33.85754	-0.350513	0.7260

Adjusted R-squared 0.857806
Sample Size = 2,573 counties
White Heteroscedasticity-Consistent Standard Errors & Covariance
State fixed effects are specified

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