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HOSPITAL OWNERSHIP AND COST AND QUALITY OF CARE: IS THERE A DIME'S WORTH OF DIFFERENCE?

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ABSTRACT

This paper compares cost and quality of care for Medicare patients hospitalized in for-profit hospitals contrasted with those in nonprofit and government hospitals following admission for hip fracture, stroke, coronary heart disease, or congestive heart failure. Cost of care in for-profit hospitals was similar to that of nonprofits, but patients admitted to government hospitals incurred less Medicare payments on average. There were only small differences in survival between for-profit, nonprofit, and government hospitals. Other measures of quality, including living in the community and activity of daily living limitations after index admission, show trivial differences by hospital ownership type. Between private sector hospital types (for-profit and nonprofit) there is indeed not a dime's worth of difference between the two in terms of cost to Medicare and patient outcome.

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1. Introduction

Unlike most other sectors, for-profit organizations constitute a tiny minority of firms supplying hospital care in the United States and in all developed countries. In the United States, such hospitals constituted only 15 percent of all nonfederal short-term general hospitals in 1996 (American Hospital Association 1998). By contrast, 59 percent of hospitals were organized as private nonprofits, and the rest were operated by governments, primarily local governments, or special government authorities. [1]

Another stylized fact is that growth for-profit hospitals' market share has been moderate, although for-profit chains have grown both numerically and in influence since they first appeared in the late 1960s while the share of small independent for-profit hospitals has declined. Growth in the chain for-profit share has not been steady, but rather there have been cycles in growth (Gray and Schlesinger 1997). Various critics have voiced concern that consolidation of hospitals under the aegis of publicly-traded corporations will mean higher priced and lower quality care, and lower rates of production of unprofitable outputs, including provision of care to persons without health insurance (see, e.g., Kuttner 1997).

The hospital industry provides a useful laboratory for comparing behavior of organizations having different ownership forms. Nonprofit firms may earn profits. In fact, many, including hospitals, do. Rather nonprofit firms are precluded from distributing profits to persons who exercise control over the firm. Although such firms can pay reasonable compensation to

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[1]In terms of average daily patient census adjusted for outpatient output, shares in 1996 were: 71 percent private nonprofit; 10 percent for-profit and 18 percent government (American Hospital Association 1998).

suppliers of inputs, resulting earnings cannot be distributed. Such earnings must be retained and used by the firm. Because of the nondistribution constraint, nonprofit firms have no owners, that is, persons who control and share in residual earnings (Hansmann 1996, p. 228).

Since the early 1980s, U.S. hospitals, and more recently physicians, have lost a great deal of their power to set price. This change reflects the changes in government insurance payment practices and growth of various forms of managed care. These firms as price takers still have latitude in selecting patient mix, in the quantities of services used to treat specific conditions (quality), and in accounting practices that potentially affect the amounts they are paid. Most recently, it has been alleged that the largest for-profit hospital firm, Columbia-HCA, has bilked the Medicare program by billing for services that were not provided or not needed and by using various accounting loopholes to increase payments from Medicare. Also by aligning itself with local physicians and other suppliers of service, referral patterns and cash flows to other health care providers have changed (increased) as well.[2] This issue is not only important because of the specific allegations made against this firm, but also there is some concern that this behavior may generalize to other for-profit hospital companies. For this reason among others, hospital conversions to the for-profit form are receiving much greater scrutiny by state attorneys' general and others than heretofore (Horwitz 1997).

This study reasks an old question with much better data: how does hospital ownership affect performance in terms of cost and quality? In this analysis, we use data on a national sample of 2,700 elderly patients who were hospitalized in 1,400 facilities for one of four major

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[2]See e.g., Eichenwald (1997).

health shocks. We obtained Medicare data for these patients for a period up to 11 years following the shock. With household survey data, we were able to measure health before and after the shock. Further, the data allowed us to identify the hospital to which the patient was admitted following the shock.

Section 2 describes property rights theory and its link to our study. In Section 3, we discuss our data and in Section 4 and 5, our empirical specification and estimation methods. Section 6 presents our empirical findings. Section 7 concludes the study.

2. Property Rights Theory and Hospital Behavior

The owner of a profit-seeking firm seeks to maximize utility by selecting levels of money and nonpecuniary benefits (nice offices, less supervision of employees, prestige, etc.) necessary to achieve such maximization, recognizing that nonpecuniary benefits must be paid in the form of lost earnings. Under conditions that attenuate property rights, the price of nonpecuniary benefits is reduced, leading the manager to purchase more of such benefits. Property rights are attenuated in nonprofit firms, both private and public. In the context of a nonprofit hospital, a nonpecuniary benefit may be not maximizing cash flows from payers, providing higher patient care quality than a profit-seeking hospital would (Newhouse 1970), or providing more charity care (Frank and Salkever 1991; Norton and Staiger 1994). Increasingly, hospitals are effectively price-takers from various public and private payers. In the context of Medicare, which we study in this article, hospitals can increase Medicare payments by the way they classify diagnoses of hospitalized patients and by increasing use of services not covered by Medicare's fixed per case payment but rather reimbursed on a cost basis, such as for rehabilitation.

Organizations of all types face the problem of monitoring the performance of managers. The owners may solve the problem in part by instituting various rules and regulations by which appointed managers must abide. However, when performance is difficult to monitor by outsiders, owners of a profit-seeking firm may assign some of the residual claim to managers, the amount being contingent on the profitability of the firm.[3] Charters of nonprofit organizations preclude compensation arrangements based on the firm's profits (preclude "private inurement").

A special characteristic of hospitals is the relationship of hospitals and doctors. The latter are typically not employees of the hospital when they work in the hospital, but rather are granted privileges to work there (Pauly 1980). The alignment of incentives is somewhat different -profit hospitals. Some for-profit hospitals are owned outright by doctors. More recently, hospital companies have given local doctors an explicit share of residual hospital income.

Further, hospitals of all ownership types are integrating vertically, buying or forming other contractual relationships with facilities who treat patients downstream, such as home health agencies and skilled nursing facilities. To the extent that for-profit hospitals are ahead in this, downstream payments from payers such as Medicare should be higher.

3. Data

The study sample was drawn from the National Long-Term Care Survey (NLTCS) which is a panel study fielded in 1982, 1984, 1989, and 1994. Overall, 35,800 Medicare beneficiaries were included in the data base for at least some time. NLTCS drew its sample from Medicare

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[3]Incentive pay schemes can help align managers incentives to those of the owners. See e.g., Jensen and Murphy (1990).

enrollment records for persons 65 years of age and older. A screener interview was administered to all beneficiaries. Based on responses to the screener, full interviews were conducted with persons who reported having at least one limitation in activities of daily living (ADLs) or in instrumental activities of daily living (IADLs).[4] Respondents lived in the community or in other facilities, most notably in nursing homes. The NLTCS collected detailed information on functional and cognitive status, health conditions, demographic characteristics of the family including potential caregivers, education, race/ethnicity, and income, including sources of income and wealth.

NLTCS was merged with data from other sources. First, data on all Medicare claims, inpatient, outpatient, Part B physician, home health, skilled nursing facility, and hospice from 1982 through 1995 were merged with all individuals screened by NLTCS in any year (Manton et al. 1995). Each claim included information on diagnoses and amounts billed and paid by Medicare. Using hospital identifiers on the claim, we could identify the hospitals which in turn allowed us to assign ownership codes using data from the American Hospital Association. Also using AHA data, we assigned values of the resident-to-bed ratio by hospital and year as a measure of the intensity of teaching activity at the hospital. Dates of deaths for all NLTCS respondents have been verified by using Medicare enrollment records, the National Death Index, and state vital records systems for all NLTCS respondents.

For purposes of this analysis, we selected persons who were admitted to hospitals for

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[4] The ADLs were using help eating, getting in or out of bed, moving around inside, dressing, bathing, and using the toilet (maximum of six). The IADLs were using help in less personal ways, such as doing housework and preparing meals (maximum of six).

stays of 91 days or less with primary diagnoses of hip fracture, stroke, coronary heart disease, or congestive heart failure; individuals dying on date of index admission were included. We selected the first admission for these conditions that occurred starting in 1984. Since we had Medicare claims data starting in 1982 and the NLTCS asked about conditions during the preceding year, we had a minimum of a three-year look-back period for ascertaining "first" admissions for a particular condition. A purpose for limiting the empirical analysis to first shocks was to reduce omitted heterogeneity, such as persons who select a hospital for a hard-to-treat condition after care at other hospitals failed to yield desired results. For measuring first rehospitalization, there had to be at least three days between a discharge and a subsequent admission. This criterion was selected because preliminary analysis revealed that same Medicare patients were discharged and readmitted to the same hospital on the same day; these cases likely represented transfers between units within the same hospital, or transfers to other types of facilities to continue care (such as a rehabilitation hospital).

Our case selection process resulted in a pooled analysis sample of 2,674 patients who were admitted to 1,378 different hospitals throughout the United States. Once a case was selected, it was followed through the end of 1995 or death whichever occurred first. The full pooled sample was used to analyze Medicare payments, survival and rehospitalization. Numbers of observations for analysis of the probability of remaining a community resident post-health shock (N=1,836), activities of daily living limitation (1,406), instrumental activities of daily living limitation (1,070) and cognitive status (1,510) were appreciably lower since we required information from interviews both before and after the health shock in such analyses (for example,

the prior community resident status in the case of probability of residing in the community after a health shock).

To assess differences in performance by ownership, we classified hospitals into three mutually exclusive categories with numbers of index admissions in parentheses: for-profit (259), government (500), and private nonprofit hospitals (1,915).[5]

4. Empirical Specification

Overview. Our empirical analysis assessed the effect of ownership on Medicare payments and on quality of care. Our payment measures included not only the amount paid for the index admission but downstream payments up to six months following the health shock. On quality, we examined the effect of ownership on mortality and readmission to a hospital as well as other measures of functioning for those who survived to the next interview.

Dependent Variables. To measure Medicare payments, we specified three dependent variables: (1) total Medicare payments during the first six months after the shock; (2) total Medicare payments during the first six months less Medicare payments to the first hospital to which the beneficiary was admitted; and (3) total Medicare payments per week during the first six months following the shock. All monetarily-expressed variables were converted to 1994 dollars using the Consumer Price Index, all items.

The second dependent variable was analyzed to study the impact of initial hospitalization on downstream payments. Some hospitals may offer more intensive care which produces savings

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[5] In terms of ownership shares, the split by ownership in our sample is almost identical to the national distribution. See footnote 1.

in care, such as lower rehospitalization rates or institutional care, following discharge from the first hospital. Alternatively, such hospitals may not offer higher intensity, but rather may refer patients to service providers with which they have contractual relationships, thus raising Medicare payments after discharge. When beneficiaries survived for 26 weeks, the third dependent variable was only the first dependent variable divided by 26. However, many beneficiaries did not survive the first six months. In such cases, we calculated the length of time (in days) from the index admission to the date of death in weeks. Total Medicare payments over the same period were then divided by the number of weeks to construct the third dependent variable.

We measured time to death and readmission to a hospital with the same diagnoses. Although the data identified dates of death and readmission, for computational reasons, we converted the data into quarters. In our sample, 1,924 (72%) died during the study period; 1,776 (66%) were readmitted.

To gauge whether some types of hospitals were more successful in keeping patients out of nursing homes, we specified a binary dependent variable equal to one if the beneficiary lived in the community at the NLTCS interview after the shock. We included a variable for the person's living arrangement at the NLTCS interview before the shock as an explanatory variable. Thus, our analysis assessed the extent to which the shock, ownership of the hospital to which the patient was initially admitted, and other factors affected living arrangements.

Similarly, to investigate changes in functional status from the date of NLTCS interview before the index shock to date of the interview after this shock, we specified equations with

dependent variables for the number of dependencies in ADLs and IADLs (maximum of six for each). To measure mental status, we estimated an equation with a binary dependent variable to represent cognitive functioning. We used the 10 question Short Portable Mental Status Questionnaire administered as part of the NLTCS interview as a measure of cognitive status (Pfeiffer 1975). We considered a person to be "cognitively aware" if s/he answered seven or more questions correctly. Questions dealt with orientation in time (what is today's date) and place (what is the name of this place) and ability to perform simple calculations (count backwards in threes starting with 20). Otherwise or if a proxy respondent was used, this binary was set equal to zero.

Ownership. Our analysis focused on the role of ownership of the hospital to which the beneficiary was first admitted. We used the three categories described above, with for-profit, nonteaching hospitals, the omitted reference group.

Other Explanatory Variables. Other explanatory fell into four categories: hospital teaching status; demographic/income; health pre-shock; primary diagnosis at index admission; and other.

Teaching is associated with higher cost (Sloan et al. 1983; Garber et al. 1984; Iezzoni et al. 1990) and differences in casemix (Sloan and Valvona 1986). We distinguished between minor teaching and major teaching hospitals. We classified such hospitals on the basis of whether or not the resident-to-bed ratio in the year the beneficiary was admitted was below or above the median ratio (0.097 residents per hospital bed set up and staffed according to AHA data using all hospitals with an index admission). Medicare has used the ratio of residents per bed as a measure of teaching intensity for purposes of subsidizing teaching hospitals (Iglehart

1998). Of the minor teaching hospitals, 86 percent of our sample were in nonprofit, 6 percent in government and 8 percent in for-profit facilities. For major teaching hospitals, the distribution was 86 percent nonprofit and 14 percent government.

Demographic variables were age at the date of the index shock, gender, years of schooling, race, being married at the NLTCS interview before the shock, and a binary variable indicating beneficiaries first screened after 1984 ("new cohort"). We also included a variable for total household income at the NLTCS interview before the shock, inflated to 1994 dollars using the CPI, all items.

Included in health pre-shock category were a binary variable indicating whether the person lived in the community (versus a nursing home), number of ADLs, whether or not the person was cognitively aware, and a binary for lack of bowel and/or bladder control, all as reported at the NLTCS interview before the shock. As noted above, the analysis of functional and cognitive status included lagged values of the dependent variable.

For primary diagnosis at index admission, we included a risk-adjuster ("comorbidity index") used by Medicare and others to forecast future payments on behalf of the individual (DxCG 1996; Ellis et al. 1996). The comorbidity index classified patients on the basis of age, sex and diagnoses contained in the index admission hospital claims record using ICD-9-CM diagnosis and procedure codes. Diagnoses other than the primary reason for the index admission were reflected in this comorbidity score which allowed for comparison of patients with divergent conditions in terms of future expected Medicare-financed resource use. We also included binary variables to account for heterogeneity among primary diagnoses within the four broad diagnostic

categories.[6]

Other explanatory variables were a variable for the year in which the index event occurred ("time"), the number of years between the year of the index shock and the previous NLTCS interview ("NLTCS year"), and population per square mile in the Primary Sampling Unit in which the person resided.[7] The rationale for including NLTCS year was that outcomes measured after the index event plausibly reflect time elapsed between the shock and the interview. Thus, in general, outcomes should be worse if the interview occurred soon after the shock. Likewise, the pre-shock information from the previous NLTCS interview should be relatively imprecise in such cases.

Estimation.

For the payment analysis, the dependent variables were specified as the natural logarithm of payments and estimated using ordinary least squares. Because payments are strongly right-skewed, we specified the dependent variables by their national logarithms in the payment analysis. We estimated the model using ordinary least squares, and the variance - covariance

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[6] For stroke, we distinguished between hemorraghic and ischemic strokes. Likewise, for coronary heart disease, separate binary variables were specified for heart attacks, angina pectoris/unstable angina, and other ischemic heart disease. For congestive heart failure, we distinguished between congestive heart failure that was not associated with another underlying ailment as the primary diagnosis ("uncomplicated congestive heart failure"), and congestive heart failure that was associated with renal disease and/or hypertension (congestive heart failure with renal/hypertensive disease"). For hip fractures we distinguished between petrochanteric hip fractures and other fractures which included transcervical fractures and unspecified hip fracture locations, the former being the omitted reference group.

[7] Standard Metropolitan Statistical Areas for persons in metropolitan and counties for persons living in nonmetropolitan areas.

matrix was estimated using the White method. When making predictions in models with logarithmic dependent variables, special attention should be paid to heteroschedsticity of the error terms because it could bias the predictions. If the error terms are normally distributed and homoscedastic within treatment groups, then the expected percentage effect of a dummy variable is given by exp $(d+0.5(\sigma_1^2+\sigma^2))-1$, where d is the coefficient of the dummy variable, J_{12} is the variance of the treatment group and σ_0^2 is the variance of the control group.[8] (See Manning 1998). In our discussion of the percentage effects of ownership on payments, we accounted for heteroscedasticity using the previous formula.

For mortality and readmission, we used hazard models. Readmissions are conceptually different from death in that early death may foreclose a readmission. We estimated a hazard model with only one outcome (death) for mortality and for readmission a hazard model with two competing outcomes, readmission or death, whichever occurred first. For the rest of the analysis, we used logit or ordered logit, depending on whether the dependent variable was a simple binary or an ordered variable.

For the hazard model, let *t* be time "alive" following the date of the shock of an individual with observed characteristics *X* and unobserved characteristics ϵ. We assumed that the probability that an individual dies at t, given that the person survived to t (the hazard function) is given by

$$h(t) = e^{x'\beta} e^{\gamma_1 t + \gamma_2 t^2} e^{\epsilon}$$

In our proportional hazard model, time dependence is expressed quadratically. This

[8] See Manning (1998).

specification allows for individual (X) and unmeasured heterogeneity (ϵ). For the maximum likelihood estimation, one must integrate out the unmeasured heterogeneity term. We used the semiparametric approach proposed by Heckman and Singer (1984) and assumed the distribution function of ϵ can be approximated by a step function.[9]

To estimate the time to readmission, we used a hazard model with multiple destinations (competing risk model). Let t be time spent from the date of the shock until being readmitted (r) or death (d), whichever came first. The hazard functions can be written as

$$h_r(t) = e^{x'\beta_r} e^{\gamma_{1r}t + \gamma_{2r}t^2} e^{\epsilon_r}$$

and

$$h_d(t) = e^{x'\beta_d} e^{\gamma_{1d}t + \gamma_{2d}t^2} e^{\epsilon_d}$$

Again, to estimate this model, the unmeasured heterogeneity terms ϵ_r and ϵ_d must be integrated. We assumed that their joint distribution function could be approximated by a discrete distribution function. The strategy was to fix a number of points that ϵ_r and ϵ_d could take and estimate the weight given to these points in two dimensions (see Butler et al. (1989)). An advantage of this method is that allows correlated competing risks without assuming a parametric distribution function for ϵ_r and $_d$.

To assess the importance of hospital ownership on survival we estimated survival probabilities at different times. Because we model the distribution function of the error term

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[9]To estimate the hazard models, we used the Butler et al. (1989) strategy of estimating the weight by fixing all of the points a priori and using the standard points Hermit integration. We used four points. This strategy is asymptotically equivalent to the original strategy proposed by Heckman and Singer (1984).

using a step function and because the integral of our baseline hazard does not have a simple closed form solution we obtained the survival probabilities using simulations. For an individual with measured characteristics valued at the means (except for hospital ownership), we simulated the unmeasured heterogeneity point and then obtained the survival probability from the hazard function by numerical integration. We simulated the model 1000 times.

In analysis of the number of ADLs and IADLs, we assumed that if the level of "disability" of the individual exceeded some threshold the individual reported an extra ADL or IADL. These "threshold" levels do not have to be symmetric. This implies that having two ADLs rather than one does not mean that the individual was twice as disabled, but only that she was more disabled. Thus, the number of ADLs and IADLs are categorically dependent variables and were estimated using ordered logit regressions. Dranove et al. (1992) discussed in detail the advantages of ordered logits or probits to estimate categorical variable models in detail.

6. Empirical Results

Payments. There were no statistically significant differences in Medicare payments during the first six months between for-profit and private nonprofit hospitals (Table 1). On average, payments made on behalf of patients in nonprofit facilities were 7.2 percent lower.[10]

For government hospitals, we found a statistically significant difference. Payments on average were 19 percent lower, cet. par. than for patients admitted to for-profit hospitals. Such payment for patients admitted to minor and major teaching hospitals were higher than for-profit nonteaching hospitals, the omitted reference group.

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[10] The percentage differences reported in this subsection were created for heteroschedasticity.

Many of the other factors had statistically significant impacts on such payments: age (-), education (+), and being white (-), living in the community before the shock (+), increased total and Medicare payments as did lack of bladder or bowel control before the shock (+). Most of the variables describing primary diagnosis were statistically significantly different from the omitted reference group, petrochanteric hip fractures. Patients admitted with diagnoses giving them a higher value on the comorbidity index had higher payments on average. Both the trend and the population density coefficients are positive and statistically significant, showing higher Medicare payments in more urban areas and increasing payments in real terms over time for the treatment of these common sources of morbidity and mortality among the elderly.

With the dependent variable defined as Medicare payments less Medicare payments for the index hospital stay, payments on behalf of beneficiaries admitted to for-profit hospitals were higher than for the other tow ownership types, but again the only difference that was statistically significant at conventional levels was between beneficiaries admitted to for-profit versus public hospitals. Payments were 23 percent lower for the latter than for the former group.

When total Medicare payments during the first six months following the health shock were expressed on a weekly basis, neither of the ownership coefficients were statistically significant. This suggests that the source of the difference in total Medicare payments between the for-profit and public sectors was higher rates of survival in for-profit facilities.

Mortality. Ranked in terms of survival, there were no statistical differences by ownership. (Table 2). Simulation of the effect of ownership on mortality also revealed only small differences by ownership category (Table 3). Two years after admission, the probability of survival was 0.67

for persons admitted to for-profit facilities, holding other characteristics constant. For the other ownership types, corresponding probabilities were 0.67 for government and 0.69 for nonprofit ownership. Patients at both minor and major teaching hospitals had higher survival rates than did the for-profits. The coefficient for major teaching is estimated much more precisely than its counterpart for minor teaching hospitals.

Many of the other coefficients are plausible and statistically significant: age (+); male (+); number of ADLs before the shock (+); several variables for primary diagnosis at index admission; and the comorbidity index (+). Other statistically significant findings, having lived in the community and having been cognitively aware, both defined before the health shock, seem implausible at first glance, but many of these differences can be explained by considering many deaths occur before a patient reaches a hospital.[11] These results suggest a pattern of more aggressive treatment of a health shock for those with higher baseline health status.

Rehospitalization. We found no statistically significant results by ownership of the hospital at which the patient went for the index admission in time to rehospitalization for the primary diagnosis for which they were first admitted. However, the minus signs on the ownership coefficients imply a higher rate of readmission on average for patients first admitted to for-profit facilities. Statistically significant determinants of readmission were: age (+); male gender (+); white (-); married before the shock (-); lived in community (+), number of ADLs (+), cognitively

[11]Deaths occurring before the person arrived at a hospital for an index admission were excluded from our sample. To further investigate the selection process, we specified a logit model of all deaths occurring among NLTCS respondents from 1984 through 1995 that were not included in our study sample. Those persons living in the community at the NLTCS prior to their death were more likely to die in a hospital. Those who were cognitively aware at the NLTCS prior to death were found to be more likely to die in a hospital, but this result was not statistically significant at conventional levels.

aware (+), all measured before the shock; several variables for primary diagnosis at index admission; and the time trend (-).

The final column in Table 2 analyzes deaths that occurred before readmission could occur. Here we found no effects of ownership on mortality; but for purposes of examining quality differences by ownership, the evidence on mortality in the first column is more pertinent. Outcomes of death and readmission were not highly correlated ($r = 0.09$), suggesting that we could have simplified the analysis by treating the deaths as censored observations in the readmission analysis.

Probability of Living in the Community After the Shock. Persons who lived in the community before the index health shock were 0.4 times more likely to have lived in the community at the interview date after the shock occurred (Table 4). Since some of the coefficients were sensitive to inclusion of this variable, particularly disease-specific binary variables, results from the logit analysis are shown with and without this variable.

We found no statistically significant differences in the probability of being in the community at the NLTCS interview following the index shock between patients admitted to for-profit versus the other types of hospitals. Marginal effects imply that patients from for-profit facilities were 0.02 more likely to be in the community than the others, controlling for pre-shock living arrangement, and about 0.04 more likely to be community based without this control. Patients initially admitted to major teaching hospitals had a 0.090 higher probability of being in the community than did those who went to for-profit hospitals, holding living arrangement prior to the shock constant. Younger, married, and low income patients and those who did not have stroke or hip fracture were more likely to be in the community at the post-shock interview.

Activities of Daily Living, Instrumental Activities of Daily Living, and Being Cognitively Aware. Our results from ordered logit analysis of activities of daily living (ADL) and instrumental activities of daily living (IADL), and logit analysis of being cognitively aware at the post-shock interview date are consistent with those from our logit analysis of being in the community (Table 5). Marginal effects from the ordered logit analysis are for probabilities of having no ADLs or IADLs.

Patients who went to nonprofit hospitals were more likely to report an IADL at the next NLTCS interview than were those admitted to for-profit facilities. Otherwise, there were no statistically significant differences by ownership.

On average, patients at major teaching hospitals were 0.07 more likely to report no ADLs than were patients admitted to for-profit hospitals. Having been admitted to a major teaching hospital increased the probability of having no IADLs at the interview after the shock relative to for-profit hospitals by 0.10 on average. Patients admitted to for-profit facilities were more likely than their counterparts to be admitted to public or nonprofit hospitals.

As before, functional and cognitive status and living arrangements before the shock were highly predictive of status five years later and post shock. Depending on the regression, many of the demographic variables had statistically significant impacts. For example, more educated persons had lower rates of cognitive decline.

6. Conclusion

According to property rights theory, for-profit facilities should work harder to achieve higher levels of cash flow, including revenues from payers such as Medicare. The observed difference in Medicare payments between for-profit and public facilities is consistent with this

view. The result for-profit hospitals held not only for total Medicare payments but even more so for Medicare payments other than for the index admission. In particular, payments on behalf of patients admitted to for profit facilities were higher for physician's services and for home health care, suggesting either that vertical arrangements may have influenced referred decisions.

On the whole, there were trivial differences in outcomes among the three ownership types. An exception were instrumental activities of daily living for which for-profit hospitals performed better than nonprofits. But considering all the measures, a conclusion of no difference in quality outcomes by ownership is warranted.

That Medicare paid more for care on behalf of patients admitted to for-profit hospitals other than for the index admission could be consistent with the property rights hypothesis and certainly is of interest to policy makers. More needs to be known about contractual arrangements between nonhospital sellers and hospitals to determine the extent to which there is greater effective vertical integration in the for-profit, as is often alleged.

Compared to nonteaching, nonprofit hospitals, total Medicare payments to for-profit hospitals were only slightly higher for the latter. Our finding of similarity in payments between these two types of organizations is consistent with the results of previous comparative research on hospital efficiency which did not demonstrate a striking difference between the two types of firm.[12]

Major teaching hospitals were superior on average to the for-profits in terms of patient survival. Major teaching hospitals performed better in terms keeping people out of nursing homes and in improving their functional status. Our data permitted us to analyze a much longer

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[12]See Institute of Medicine (1986), Gray (1991, ch. 5), and Sloan (1988, 1998).

follow up period than in past studies.

In general, our comparative evidence on quality of care is consistent with past work.[13] The vast majority of teaching hospitals to which the private nonprofit organization to which the patients were admitted were private nonprofit organizations. Such organizations probably used profits from patient care to cross-subsidize quality of care. Of course, nonprofits could cross-subsidize other outputs, such as care for the poor. Although not observed in this study, differences between nonteaching for-profit and nonprofit hospitals on this measure are minimal (Prospective Payment Assessment Commission 1996; Sloan 1988).

Finally, what are the implications of this empirical analysis? As far as the private sector is concerned, differences in cost and quality between for-profits and nonprofits other than the teaching facilities are on the whole minimal. There is indeed not a "dime's worth of difference" between the two. The remarkable stability in market shares of private for-profits and nonprofits is consistent with this evidence.

Empirical studies comparing public and private for-profit enterprises have been conducted for a variety of industries, especially electricity generation and distribution, water, and refuse collection. Overall, the evidence on comparative performance has been mixed.[14] Based on their review, Vickers and Yarrow (1988) concluded that competition in the enterprise's product market may be a more important determinant of performance than ownership *per se*.[15]

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[13] See especially Keeler et al. (1992).

[14]See Borcherding et al. (1982), Boardman and Vining (1989), Vickers and Yarrow (1988) and Vining and Boardman (1992) for reviews and references.

[15]Evidence on the cable television industry by Emmons and Prager (1997) is consistent with this view.

Unfortunately there is little evidence on comparative performance of private for-profit and nonprofit firms other than for hospitals since the latter are only highly represented in only a few sectors, such as health care and education.

From this perspective, public regulators, such as state attorneys general who review hospital ownership conversions, should not be concerned about the implications of changes in nonprofit to for-profit status as far as cash flows and quality of care is concerned. Such decisions should be scrutinized on the basis of details of the individual transaction rather than on indicators of average performance by ownership type.

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Table 1. Effect of Health Shock on Mean Household Wealth Change, 1992-96 (1994$)

Couples	N	1992 Wealth	P	1996 Wealth	P	Change 92-96	P
No health shock	2,561	269,862		303,414		33,552	
1 member shock	193	165,213	<0.001	152,870	<0.001	-12,324	0.04
Male shock	117	167,875	0.004	153,992	<0.001	-13,883	0.13
Female shock	106	161,116	<0.001	151,192	<0.001	-9,924	0.04
Singles							
Female							
No shock	1,002	81,540		96,928		15,388	
Shock	55	44,221	0.02	50,622	0.02	6,400	0.49
Male							
No shock	373	156,476		177,319		20,843	
Shock	32	156,305	0.99	134,254	0.62	-22,051	0.31

Note: t tests for the couple sample are calculated relative to the couples that did not experience a major health shock. For singles, the test was for those who experienced a shock versus those that did not.

Table 1: Medicare Payments

Explanatory Variables	Total First 6 Months (s.e.)		Total First 6 Months Less Index Admission (s.e.)		Total Weekly First 6 Months (s.e.)		Sample Means
Ownership							
Government	-0.20[a]	(0.061)	-0.42[b]	(0.21)	-0.093	(0.093)	0.19
Nonprofit	-0.070	(0.053)	-0.29	(0.18)	-0.047	(0.079)	0.72
Teaching							
Minor teaching	0.11[a]	(0.040)	-0.066	(0.16)	0.076	(0.063)	0.16
Major teaching	0.24[a]	(0.046)	0.27[c]	(0.16)	0.15[b]	(0.060)	0.15
Demographic/Income							
Age	-0.0095[a]	(0.0023)	-0.021[b]	(0.0083)	0.015[a]	(0.0035)	80.43
Male	0.066[c]	(0.038)	-0.16	(0.14)	0.15[a]	(0.055)	0.29
Education	0.010[b]	(0.0050)	-0.0079	(0.018)	0.0086	(0.0078)	9.29
White	-0.15[a]	(0.047)	-0.34[b]	(0.17)	-0.11[c]	(0.074)	0.90
Married	-0.031	(0.037)	-0.15	(0.13)	0.050	(0.052)	0.37
New Cohort	0.071	(0.094)	-0.16	(0.32)	0.10	(0.11)	0.035
Income ('0000)	0.0054	(0.010)	0.028	(0.042)	0.026	(0.017)	1.70
Health, Pre-shock							
Lived in Community	0.12[b]	(0.059)	0.41[b]	(0.20)	0.41[a]	(0.091)	0.83
No. ADLs	0.015	(0.012)	0.077[b]	(0.038)	0.11[a]	(0.017)	1.70
Cognitively Aware	-0.0045	(0.032)	0.013	(0.12)	0.17[a]	(0.048)	0.40
Lack bowel/bladder Control	0.24[a]	(0.079)	0.42[C]	(0.26)	0.20[c]	(0.11)	0.046
Primary Diagnosis at Index Admission							
Comorbidity index	0.038[a]	(0.013)	0.12[a]	(0.045)	0.092[a]	(0.020)	0.65
Hemorraghic stroke	-0.16[C]	(0.087)	-1.40[a]	(0.37)	0.71[a]	(0.16)	0.031
Ischemic stroke	-0.31[a]	(0.045)	-0.56[a]	(0.16)	0.14[c]	(0.067)	0.23
Other hip fractures	0.0072	(0.042)	-0.12	(0.15)	0.028	(0.062)	0.12
Congestive heart failure	-0.50[a]	(0.050)	-0.70[a]	(0.18)	-0.14[c]	(0.076)	0.15
Cong. heart failure/Other	-0.65[a]	(0.11)	-1.00[a]	(0.41)	-0.36[b]	(0.17)	0.014
Heart attack	-0.30[a]	(0.055)	-1.48[a]	(0.23)	0.61[a]	(0.010)	0.11
Angina pectoris/unstable	-0.83[a]	(0.058)	-1.28[a]	(0.20)	-0.80[a]	(0.073)	0.14
Ischemic heart disease	-0.24[c]	(0.013)	-0.82[b]	(0.36)	-0.063	(0.14)	0.039
Other							
Time trend	0.050[a]	(0.0060)	0.26[a]	(0.019)	0.013	(0.0094)	4.18
NLTCS year	-0.0051	(0.012)	-0.17[a]	(0.040)	0.046[b]	(0.017)	1.67
Population sq. mi. (000)	0.087[a]	(0.017)	0.15[a]	(0.057)	0.077[a]	(0.022)	0.65
Intercept	9.76[a]	(0.21)	8.45[a]	(0.80)	4.12[a]	(0.33)	--
Smear Factor	1.32		6.63		2.30		--
	R^2=0.20		R^2=0.11		R^2=0.17		
	R^2=0.19		R^2=0.10		R^2=0.17		
	F=24.2		F=11.9		F= 20.6		

Notes:

[a] Significant at the 1% level (two-tail test)

[b] Significant at the 5% level (two-tail test)

[c] Significant at the 10% level (two-tail test)

Table 2: Mortality and Rehospitalization

			Exit Destination			
Explanatory Variables	Mortality Only		Readmission		Mortality	
Ownership						
Government	0.020	(0.14)	-0.029	(0.11)	-0.0088	(0.20)
Nonprofit	-0.10	(0.12)	-0.080	(0.10)	-0.14	(0.18)
Teaching						
Minor	-0.063	(0.098)	-0.021	(0.087)	-0.0062	(0.14)
Major	-0.41[a]	(0.11)	0.11	(0.088)	-0.14	(0.16)
Demographic/Income						
Age	0.084[a]	(0.0054)	0.00063	(0.0045)	0.059[a]	(0.0083)
Male	0.51[a]	(0.084)	0.16[b]	(0.073)	0.15	(0.12)
Education	0.0026	(0.010)	0.0032	(0.0098)	0.035[b]	(0.014)
White	-0.16	(0.12)	-0.16[c]	(0.092)	-0.056	(0.18)
Married	-0.0035	(0.083)	-0.099	(0.074)	-0.12	(0.12)
Income ('0000)	-0.032	(0.031)	-0.0056	(0.024)	0.023	(0.037)
Health, Pre-shock						
Lived in community	0.46[a]	(0.12)	0.16[c]	(0.12)	0.53[a]	(0.17)
No. ADLs	0.32[a]	(0.023)	0.044[b]	(0.022)	0.24[a]	(0.034)
Cognitively aware	0.37[a]	(0.069)	0.10[c]	(0.062)	0.24[b]	(0.11)
Lack bowel/bladder control	0.16	(0.19)	0.12	(0.14)	-0.29	(0.28)
Primary Diagnosis at Index Admission						
Comorbidity index	0.15[a]	(0.025)	0.035	(0.025)	0.16[a]	(0.039)
Hemorraghic stroke	1.02[a]	(0.19)	0.065	(0.22)	1.26[a]	(0.24)
Ischemic stroke	0.78[a]	(0.12)	0.19[c]	(0.10)	0.87[a]	(0.18)
Other hip fracture	0.0083	(0.13)	-0.14	(0.12)	0.11	(0.19)
Congestive heart failure	0.96[a]	(0.12)	0.73[a]	(0.12)	0.64[a]	(0.19)
Congestive heart failure/other	0.99[a]	(0.35)	0.65[b]	(0.29)	0.71	(0.59)
Heart attack	0.63[a]	(0.12)	0.49[a]	(0.13)	0.12[a]	(0.20)
Angina pectoris/unstable	-0.25[c]	(0.15)	0.42[a]	(0.12)	-0.92[a]	(0.32)
Ischemic heart disease	-0.38	(0.26)	0.43[a]	(0.17)	-0.32	(0.44)
Other						
Time trend	0.042[a]	(0.015)	-0.068[a]	(0.016)	-0.057[a]	(0.022)
Population sq. mi. (000)	0.031	(0.038)	-0.020	(0.034)	-0.0079	(0.057)
Baseline Hazard Parameters						
Time	0.030[a]	(0.0091)	-0.17[a]	(0.020)	-0.20[a]	(0.026)
Time squared	0.00025[a]	(0.00020)	-0.0051[a]	(0.00067)	0.0065[a]	(0.00071)
Intercept	-10.57[a]	(0.56)	2.29[a]	(0.47)	9.69[a]	(0.83)
N	2,674		2,764		2,764	
N failures	1,924		1,766		653	
Log (likelihood)	-7364.12				-7741.56	

Notes:

[a] Significant at the 1% level (two-tail test)

[b] Significant at the 5% level (two-tail test)

[c] Significant at the 10% level (two-tail test)

Table 3: Simulation of the Effect of Ownership on Mortality

Duration	For Profit	Government	Nonprofit
6 Month	0.843	0.840	0.850
1 Year	0.773	0.770	0.787
2 Year	0.673	0.669	0.692

Note: Numbers are the predicted probability of survival to a given time after index admission.

Table 4: Probability of Being in Community

Explanatory Variables	Community (s.e.) [ME][d]			Community (s.e.) [ME][d]		
Ownership						
Government	-0.13	(0.24)	[-0.024]	-0.23	(0.23)	[-0.042]
Nonprofit	-0.12	(0.20)	[-0.023]	-0.21	(0.20)	[-0.037]
Teaching						
Minor	0.020	(0.17)	[-0.0036]	0.011	(0.16)	[-0.0020]
Major	0.49[a]	(0.19)	[0.088]	0.41[b]	(0.17)	[0.075]
Demographic/Income						
Age	-0.049[a]	(0.0098)	[-0.0090]	-0.052[a]	(0.0091)	[-0.0095]
Male	0.078	(0.16)	[0.014]	0.031	(0.15)	[0.0056]
Education	-0.0022	(0.021)	[-0.00040]	0.0025	(0.020)	[0.00046]
White	0.0093	(0.21)	[0.0017]	-0.066	(0.20)	[-0.012]
Married	0.64[a]	(0.15)	[0.12]	0.88[a]	(0.14)	[0.16]
New Cohort	-0.086	(0.41)	[-0.017]	-0.021	(0.34)	[-0.0039]
Income ('0000)	-0.096[b]	(0.045)	[-0.018]	-0.13[a]	(0.041)	[-0.024]
Health, Pre-shock						
Lagged Community	2.25[a]	(0.21)	[0.41]	--	(--)	[--]
Primary Diagnosis at Index Admission						
Comorbidity index	-0.028	(0.052)	[-0.0052]	-0.033	(0.048)	[-0.0059]
Hemorraghic stroke	0.36	(0.38)	[0.065]	0.48	(0.36)	[0.088]
Ischemic stroke	0.023	(0.18)	[0.0041]	0.17	(0.17)	[0.030]
Other hip fracture	0.25	(0.19)	[0.045]	0.24	(0.18)	[0.045]
Congestive heart failure	0.87[a]	(0.22)	[0.16]	0.84[a]	(0.21)	[0.15]
Congestive heart failure/other	0.71	(0.52)	[0.13]	0.80	(0.50)	[0.15]
Heart attack	1.10[a]	(0.27)	[0.23]	1.22[a]	(0.26)	[0.22]
Angina pectoris/unstable	1.24[a]	(0.24)	[0.22]	1.36[a]	(0.23)	[0.25]
Ischemic heart disease	1.68[a]	(0.53)	[0.31]	1.53[a]	(0.46)	[0.28]
Other						
Time	-0.0037	(0.026)	[-0.00067]	0.032	(0.024)	[0.0058]
NLTCS year	-0.052	(0.041)	[-0.0095]	-0.033	(0.039)	[-0.0060]
Population sq. mi. (000)	-0.038	(0.068)	[-0.0070]	-0.028	(0.064)	[-0.0051]
Intercept	2.64	(0.92)	[--]	4.69	(0.85)	[--]
N	1,796			1,836		
N in community	1,290			1,324		

[a]Significant at the 1% level (two-tail test)

[b]Significant at the 5% level (two-tail test)

[c]Significant at the 10% level (two-tail test)

[d]The marginal effect is for the probability of living in the community.

Table 5: Activities of Daily Living, Instrumental Activities of Daily Living, and Cognitive Status

Explanatory Variables	ADLs (s.e.) [ME][e]			IADLs (s.e.) [ME][e]			Cognition (aware) (s.e.) [ME][e]		
Ownership									
Government	0.24	(0.20)	[-0.048]	0.46	(0.26)	[-0.095]	-0.33	(0.24)	[-0.062]
Nonprofit	0.023	(0.17)	[-0.005]	0.51[b]	(0.22)	[-0.11]	-0.19	(0.20)	[-0.037]
Teaching									
Minor	0.043	(0.15)	[-0.009]	0.11	(0.19)	[-0.022]	-0.20	(0.18)	[-0.038]
Major	-0.34[b]	(0.15)	[0.069]	-0.48[b]	(0.20)	[0.10]	0.20	(0.18)	[0.038]
Demographic/Income									
Age	0.052[a]	(0.0085)	[-0.011]	0.059[a]	(0.011)	[-0.012]	-0.042[a]	(0.011)	[-0.0079]
Male	-0.14	(0.13)	[0.028]	0.31[c]	(0.18)	[-0.065]	-0.47[a]	(0.16)	[-0.090]
Education	0.033[c]	(0.019)	[-0.0066]	-0.0074	(0.023)	[0.0015]	0.065[a]	(0.022)	[0.012]
White	-0.091	(0.18)	[0.018]	-0.020	(0.23)	[0.0041]	0.58[b]	(0.24)	[0.11]
Married	-0.24[b]	(0.12)	[0.049]	-0.46[a]	(0.16)	[0.095]	0.26	(0.14)	[0.051]
New cohort	0.59[b]	(0.28)	[-0.12]	--	(--)	[--]	0.61[c]	(0.35)	[0.11]
Income ('0000)	0.0084	(0.036)	[-0.0017]	-0.063	(0.074)	[0.013]	-0.040	(0.055)	[-0.0076]
Health, Pre-shock									
Lived in community	-0.83[a]	(0.23)	[0.17]	-3.72[a]	(0.58)	[0.77]	1.05[a]	(0.26)	[0.20]
Lagged value	0.29[a]	(0.043)	[-0.059]	0.41[a]	(0.099)	[-0.084]	0.77[a]	(0.13)	[0.15]
Primary Diagnosis at Index Admission									
Comorbidity index	0.084[b]	(0.043)	[-0.017]	0.041	(0.058)	[-0.0085]	0.035	(0.052)	[0.0066]
Hemorraghic stroke	-0.074	(0.33)	[0.015]	-0.22	(0.48)	[0.045]	-0.26	(0.43)	[-0.050]
Ischemic stroke	0.14	(0.16)	[-0.027]	0.27	(0.21)	[-0.056]	-0.27	(0.21)	[-0.051]
Other hip fracture	0.007	(0.17)	[-0.0014]	-0.084	(0.23)	[0.018]	-0.21	(0.23)	[-0.040]
Congestive heart failure	-0.43[b]	(0.20)	[0.087]	-0.79[a]	(0.25)	[0.17]	0.019	(0.24)	[0.0037]
Cong. heart failure/other	-0.56	(0.41)	[0.11]	-0.94	(0.62)	[0.20]	-0.25	(0.55)	[-0.048]
Heart attack	-0.95[a]	(0.22)	[0.19]	-0.69[a]	(0.28)	[0.14]	0.26	(0.25)	[0.049]
Angina pectoris/unstable	-0.91[a]	(0.19)	[0.18]	-0.95[a]	(0.24)	[0.20]	0.30	(0.22)	[0.057]
Ischemic heart disease	-1.46[a]	(0.33)	[0.30]	-1.18[a]	(0.50)	[0.25]	0.45	(0.35)	[0.086]
Other									
Time	0.019	(0.023)	[-0.0040]	-0.13[a]	(0.032)	[0.027]	0.097[a]	(0.028)	[0.018]
NLTCS year	0.073[b]	(0.036)	[-0.015]	0.20[a]	(0.050)	[-0.041]	-0.068	(0.043)	[-0.013]
Population sq. mi. (000)	-0.019	(0.058)	[0.0039]	0.062	(0.074)	[-0.013]	-0.19[a]	(0.075)	[-0.036]
Intercept[d]	--	(--)	[--]	--	(--)	[--]	-0.044	(0.98)	[--]
N	1,406			1,070			1,510		

[a]Significant at the 1% level (two-tail test)

[b]Significant at the 5% level (two-tail test)

[c]Significant at the 10% level (two-tail test)

[d] Intercepts from ordered logit analysis not reported;

[e]The marginal effect is for the probability of having no ADLs or IADLs. For cognition, the marginal effect is in the probability of being cognitively aware at the interview after the shock.

Table A. Weight Assigned to Heteroscedasticity Points in the Hazard Models

		Univariate	Readmission (bivariate)			
		Mortality	2.33	0.74	-0.74	-2.33
Mortality	2.33	0.1519[a]	0.1470[a]			
		(0.0140)	(0.0440)			
	0.74			0.5340[a]		
				(0.1348)		
	-0.74	0.5219[a]				0.0015
		(0.0360)				(0.0150)
	-2.33	0.3262[a]	0.0990[a]	0.0475		
		(0.0380)	(0.0222)	(8.0800)		

Table 2. Sample Characteristics of Those With and Without A Shock

	Couples		Singles *			
			Male		Female	
	No Shock N=2,561 Mean	Shock N=223 Mean	No Shock N=373 Mean	Shock N=32 Mean	No Shock N=1,002 Mean	Shock N=55 Mean
Baseline self reported health						
Female						
excellent	0.25	0.19[b]	--	--	0.18	0.091[b]
very good	0.32	0.20[a]	--	--	0.24	0.13[b]
good	0.27	0.36[a]	--	--	0.27	0.14[b]
fair	0.12	0.14	--	--	0.19	0.31[b]
poor	0.043	0.11[a]	--	--	0.11	0.33[a]
Male						
excellent	0.24	0.12[a]	0.22	0.13	--	--
very good	0.32	0.22[a]	0.26	0.06[a]	--	--
good	0.27	0.30	0.27	0.19	--	--
fair	0.11	0.21[a]	0.16	0.28[c]	--	--
poor	0.051	0.16[a]	0.10	0.34[a]	--	--
Baseline Wealth						
Negative wealth, 1992	0.017	0.058[a]	0.051	0.13	0.074	0.15
Wealth to nonzero median	0.47	0.57[a]	0.41	0.5	0.43	0.55
Wealth greater than nonzero median	0.51	0.38[a]	0.54	0.38[c]	0.50	0.31
Proportion of gross wealth in:						
real estate/business	0.52	0.50	0.33	0.24	0.41	0.42
bonds	0.0059	0.004	0.0055	0.0032	0.0003	0.00
cash or equivalents	0.29	0.35[a]	0.52	0.69[b]	0.50	0.51
pension	0.083	0.066[a]	0.062	0.027[b]	0.045	0.06
stock	0.10	0.077[b]	0.082	0.035[b]	0.037	0.012[a]
Household income, 1992						
1st tercile	0.32	0.48[a]	0.26	0.44[b]	0.34	0.51[b]
2nd tercile	0.33	0.29	0.25	0.25	0.36	0.33
3rd tercile	0.35	0.23[a]	0.49	0.31[b]	0.29	0.16[b]
Nonhousing debt						
Nonhousing debt 0	0.61	0.55[c]	0.67	0.75	0.61	0.58
Nonhousing debt 1-10,000	0.34	0.40[c]	0.29	0.22	0.36	0.40
Nonhousing debt 10,000+	0.051	0.054	0.04	0.031	0.028	0.018
Health Insurance						
Female uninsured	0.20	0.22	--	--	0.28	0.25
Male uninsured	0.16	0.17	0.27	0.28	--	--
Demographic						
Race Black	0.11	0.13	0.28	0.25	0.31	0.33
Race Other	0.085	0.094	0.086	0.031	0.099	0.13
Race White	0.81	0.78	0.63	0.72	0.59	0.54
Female less than high school	0.22	0.31[a]	--	--	0.34	0.56[a]
Male less than high school	0.26	0.37[a]	0.28	0.31	--	--

Female high school	0.63	0.57	--	--	0.51	0.38[c]
Male high school	0.51	0.48	0.51	0.63	--	--
Female college education	0.15	0.12	--	--	0.16	0.055[b]
Male college education	0.23	0.16[a]	0.21	0.062[b]	--	--
Female 45-54	0.52	0.43[a]	--	--	0.38	0.16[a]
Female 55-60	0.32	0.39[b]	--	--	0.45	0.60[b]
Female 61-64	0.076	0.099	--	--	0.097	0.15
Female 65-70	0.084	0.081	--	--	0.073	0.09
Male 45-54	0.31	0.20[a]	0.40	0.41	--	--
Male 55-60	0.38	0.36	0.43	0.38	--	--
Male 61-64	0.21	0.31[a]	0.075	0.063	--	--
Male 65-70	0.10	0.13	0.10	0.15		
N	2,674		1,462			

Table 3. The Effect of Health Shocks on Wealth Change, 1992-96

	Couples			Singles		
	coeff.	(s.e.)	[m.e.]*	coeff.	(s.e.)	[m.e.]
Major Health Shock						
Female	-0.22[b]	(0.11)	[-0.04]	-0.28[c]	(0.16)	[-0.04]
Male	-0.052	(0.10)	[-0.01]	0.071	(0.22)	[0.00]
Minor Health Shock						
Female	-0.15[c]	(0.087)	[-0.02]	-0.11	(0.13)	[-0.02]
Male	0.034	(0.073)	[0.01]	0.098	(0.20)	[0.02]
Health Insurance						
Female uninsured	-0.078	(0.056)	[-0.01]	----	----	----
Male uninsured	0.021	(0.063)	[0.00]	----	----	----
uninsured, both genders	----	----	----	-0.042	(0.069)	[-0.01]
Baseline self reported health						
Female						
very good	-0.13[a]	(0.050)	[-0.02]	-0.077	(0.092)	[-0.01]
good	-0.097[c]	(0.056)	[-0.02]	-0.25[a]	(0.097)	[-0.04]
fair	-0.11	(0.0800	[-0.02]	-0.23[b]	(0.12)	[-0.04]
poor	-0.044	(0.13)	[-0.01]	-0.19	(0.16)	[-0.03]
Male						
very good	-0.011	(0.051)	[-0.00]	0.077[c]	(0.092)	[0.04]
good	-0.017	(0.055)	[-0.00]	-0.19	(0.14)	[-0.03]
fair	-0.0085	(0.081)	[-0.00]	-0.23	(0.17)	[-0.03]
poor	-0.075	(0.12)	[-0.01]	-0.25	(0.22)	[-0.04]
Baseline wealth, 1992						
Negative wealth	0.71[a]	(0.28)	[0.12]	0.49[a]	(0.19)	[0.08]
Wealth to non zero median	0.19[a]	(0.060)	[0.03]	0.23[a]	(0.089)	[0.04]
Proportion of gross wealth:						
real-estate	0.67[a]	(0.097)	[0.11]	0.20	(0.16)	[0.03]
bonds	1.08[b]	(0.54)	[0.18]	2.047[a]	(0.76)	[0.33]
cash	0.33[a]	(0.12)	[0.05]	0.10	(0.17)	[0.02]
pension	0.95[a]	(0.15)	[0.16]	0.63[a]	(0.22)	[0.10]
Household Income, 1992						
income 1st tercile	-0.24[a]	(0.058)	[-0.04]	-0.20[b]	(0.095)	[-0.03]
income 2nd tercile	-0.14[a]	(0.051)	[-0.02]	-0.21[a]	(0.067)	[-0.03]
Non-housing debt						
$1-10,000	-0.17[a]	(0.045)	[-0.03]	-0.089	(0.062)	[-0.01]
$10,000+	-0.21[b]	(0.094)	[-0.03]	-0.062	(0.16)	[-0.00]
Demographics						
Race, Black	-0.22[a]	(0.081)	[-0.04]	-0.071	(0.071)	[-0.01]
Race, Other	-0.14	(0.093)	[-0.02]	0.12	(0.12)	[0.02]
Female college education	0.077	(0.058)	[0.01]	----	----	----
Male college education	0.18[a]	(0.053)	[0.03]	----	----	----
College education	----	----	----	-0.0026	(0.067)	[-0.00]
Female < high school	-0.068	(0.064)	[-0.01]	----	----	----
Male < high school	-0.0068	(0.060)	[-0.00]	----	----	----

< high school	----	----	----	-0.14[c]	(0.077)	[-0.02]
Female 45-54	0.012	(0.080)	[0.00]	----	----	----
55-60	0.0088	(0.079)	[0.00]	----	----	----
61-64	-0.21[b]	(0.11)	[-0.04]	----	----	----
Male 45-54	0.096	(0.072)	[0.02]	----	----	----
55-60	0.18[a]	(0.069)	[0.03]	----	----	----
61-64	0.12	(0.077)	[0.02]	----	----	----
Male	----	----	----	-0.23[b]	(0.12)	[-0.04]
Age 45-54	----	----	----	-0.21[c]	(0.11)	[-0.03]
55-60	----	----	----	-0.19[c]	(0.11)	[-0.03]
61-64	----	----	----	-0.16	(0.14)	[-0.03]
Constant	0.92[a]	(0.13)	----	1.72[a]	(0.14)	[0.27]
N	2,784			1,462		

* Marginal effects are for the probability of being in the highest wealth change category.