The dilemma of vacant beds: Did lenient CON policies toward hospitals make nursing homes 'sick'?

Gary M Fournier^{a,*} and Jennifer L Troyer^b

^aProfessor, Department of Economics, Florida State University, Tallahassee, FL 32306-2180 Tel (850)644-5001

^bAssociate Professor, Department of Economics, University of North Carolina at Charlotte, Charlotte, NC 28223 Tel (704) 687-7599

March 4, 2008

Abstract

Government regulators use certificate-of-need (CON) licensing for multiple purposes and objectives. This study examines an initiative in Florida during much of the 1990s when CON restrictions on skilled nursing home care were greatly relaxed in an attempt to relieve financial distress of acute care hospitals in Florida. The policy shift freed hospitals to provide lucrative post-discharge care under Medicare at their in-house skilled nursing units. The consequences of this policy for freestanding skilled nursing facilities are examined in this paper. For the analysis, we create two measures of hospital-based skilled nursing facility (SNF) activity within each health service area: an annual measure of the total number of hospital-based SNF days and an annual measure of hospital-based SNF revenue in the health service area. Under the assumption that the amount of hospital-based SNF care in a market is endogenous, we instrument it using two measures: the number of patients discharged from hospitals in the health service area to SNF care and the weighted average of occupancy rates for acute care in hospitals within a health service area. Panel regression models of freestanding skilled nursing facility performance are estimated with spatial effects and nursing home fixed effects that control for unspecified sources of performance variation across homes within the industry. We find that, in the period 1991 to 1997, the freestanding nursing home industry was deprived of Medicare admissions and revenue from post-discharge patients as a result of the growth in hospital-based skilled nursing care. This policy, together with other unfavorable industry trends, increased the financial distress of Floridas nursing home industry.

[†]For presentation at the University of Chicago Health Economics Workshop, March 2008. We wish to thank participants of the Triangle Health Economics Workshop, Ed Schumacher, Farasat Bokhari, and Jane Ruseski for helpful feedback on an earlier drafts of this paper. Please do not cite without permission from authors.

^{*}Corresponding author (Fax (850) 644-4535)

EMAIL ADDRESSES: gfournier@fsu.edu (Gary M Fournier), jtroyer@uncc.edu (Jennifer L Troyer).

The dilemma of vacant beds: Did lenient CON policies toward hospitals make nursing homes 'sick'?

Abstract

Government regulators use certificate-of-need (CON) licensing for multiple purposes and objectives. This study examines an initiative in Florida during much of the 1990s when CON restrictions on skilled nursing home care were greatly relaxed in an attempt to relieve financial distress of acute care hospitals in Florida. The policy shift freed hospitals to provide lucrative post-discharge care under Medicare at their in-house skilled nursing units. The consequences of this policy for freestanding skilled nursing facilities are examined in this paper. For the analysis, we create two measures of hospital-based skilled nursing facility (SNF) activity within each health service area: an annual measure of the total number of hospital-based SNF days and an annual measure of hospital-based SNF revenue in the health service area. Under the assumption that the amount of hospital-based SNF care in a market is endogenous, we instrument it using two measures: the number of patients discharged from hospitals in the health service area to SNF care and the weighted average of occupancy rates for acute care in hospitals within a health service area. Panel regression models of freestanding skilled nursing facility performance are estimated with spatial effects and nursing home fixed effects that control for unspecified sources of performance variation across homes within the industry. We find that, in the period 1991 to 1997, the freestanding nursing home industry was deprived of Medicare admissions and revenue from post-discharge patients as a result of the growth in hospital-based skilled nursing care. This policy, together with other unfavorable industry trends, increased the financial distress of Floridas nursing home industry.

1. INTRODUCTION

In most states, firms in the nursing home industry must obtain a state license, which is known as a Certificate of Need, prior to constructing or expanding a skilled nursing facility, i.e. nursing home. The federal Certificate of Need (CON) program was implemented in 1974, with the passage of the National Health Planning and Resources Development Act, which mandated state CON approval on all new construction or expansion of healthcare facilities, including skilled nursing facilities (Harrington et al., 1997). In part, the legislation was intended to control the nursing home bed supply and the rapid growth in expenditures occurring in this segment of the healthcare market. Although the Federal requirements for CON programs were removed in 1986, Harrington et al. (2004) reported 8 states without a nursing home CON policy or moratorium on freestanding nursing home bed construction in 2002 (Harrington et al., 2004). They also found that the conversion of acute care hospital beds to hospital-based SNF beds was less regulated, with 13 states lacking regulation on the conversion of hspital beds in 2002.

In U.S. nursing facilities, there are three major payer-types: private-pay, Medicaid-funded, and Medicare-funded. Private-pay residents pay for nursing facility expenses without government assistance. The Medicaid program covers long-term care for the poor, subject to eligibility standards set at the federal and state levels. The third major source of financing for skilled nursing care is the Medicare program, a federal program that pays for short-term convalescent or terminal care. In 1987, the shares of nursing home care paid for privately, by Medicaid, and by Medicare were 45 percent, 49 percent, and 2 percent, respectively (Rhoades and Sommers, 2003). By 1996, the proportion of expenses paid for by Medicare had increased to 19 percent, and the share of total expenses paid for privately and by Medicaid had fallen to 44 percent and 30 percent, respectively. The reimbursement rates varied remarkably under the three payers. For example, in Florida, in 1996, the average Medicaid reimbursement rate was approximately \$92. In contrast, in 1996, the average reported daily rate paid by private-pay residents was \$127 for a semi-private room, and the equivalent rate for Medicare, the mean revenue per patient day, was \$372.⁴

The dramatic increase in Medicare-funded care was attributable to a specific patient type: eligible individuals with a hospitalization of three days or longer, who are in need of post-acute

¹Since Medicare patient care was reimbursed on a cost basis per patient in 1996, a Medicare "reimbursement rate" is not available. Medicare revenue per patient per day, while not equivalent to such a rate, may arguably serve as a reasonable proxy.

rehabilitative care. The Medicare skilled nursing facility (SNF) benefit is limited to a maximum of 100 days, with a significant co-payment required after 20 days of care. SNF care can be delivered by facilities that are located within, or on the same campus as, an acute care hospital, also know as a hospital-based SNF, or by traditional freestanding SNFs. The 1990s witnessed a trend toward more acute care hospitals participating in skilled nursing care. The number of hospital-based nursing home beds increased by 85.5 percent but the number of beds in freestanding homes only increased by 8 percent, from 1987 to 1996 (Rhoades and Sommers, 2003). Similarly, (Dalton and Howard, 2002) find that from 1985 to 1997, growth in hospital-based skilled nursing facilities exceeded growth in freestanding facilities, where hospital-based facilities increased from ten percent of all Medicare participating skilled nursing facilities to fifteen percent of all facilities.

Given the growth in hospital-based skilled nursing facility care, we posit that Florida government regulators favored hospitals over freestanding nursing homes in the awarding of new skilled nursing facility bed capacity from the early to late 1990s. This growth in hospital-based SNF awards may have been an attempt by regulators to relieve the apparent financial distress of acute care hospitals faced with prospective payment for acute care from Medicare, beginning in 1983. The practical impact of the prospective payment system for hospitals was a dramatic fall in hospital occupancy rates and a surplus of bed capacity. As noted above, the reimbursement for Medicare patients in 1997 was nearly triple the daily reimbursement rate for private-pay patients and nearly four times the rate paid by Medicaid. Given that hospitals with hospital-based SNFs began providing more lucrative post-discharge care under Medicare, freestanding facilities were less able to attract Medicare patients. The effect of hospital-based SNF growth on the performance of freestanding SNFs is the focus of this paper.

2. Background and Literature

2.1. CON Regulation and the Nursing Home Industry. There are two competing theoretical justifications for the regulation of the supply of nursing home beds in the economics literature. The public interest justification for CON regulation is based upon the theory that unregulated competition will result in the construction of unnecessary facilities and raise the cost of providing care for state-funded Medicaid patients. In addition, CON regulations may contain conditions to ensure a supply of beds for poor elderly through the state-funded Medicaid program, in spite of relatively low Medicaid reimbursement rates, or may award capacity to firms that the regulators

view as being financially troubled. As such, the public interest theory of regulation would assert that CON regulation may increase social welfare. In contrast, proponents of the special interest theory of regulation suggest that CON construction controls provide a mechanism for barring new entry into a cartelized industry for rewarding certain classes of firms over others. By controlling entry, the state provides existing skilled nursing facilities with a buffer from competition. This control of entry may foster above-normal economic profits if firms are able to charge higher prices to private-pay nursing home residents (i.e. residents paying out of pocket for nursing home care) or, alternatively, if firms are better able to fill beds with more lucrative Medicare nursing home residents.

Other authors ((Harrington et al., 2004), (Wiener et al., 1999)) have interviewed state officials regarding the motivation behind CON programs for skilled nursing facilities. In a 2003 survey of state officials, Harrington et al. (2004) found that approximately three quarters of all respondents indicated that the CON program was used both to reduce the growth of the bed supply and to control Medicaid expenditures for skilled nursing care. Similarly, Wiener et al. (1999) in interviews in 1998, found that CON programs for SNFs were primarily intended to contain costs. In this qualitative study, the authors found evidence that freestanding SNFs were concerned about the effect of the growing hospital-based SNF sector on their market share and ability to attract Medicare patients. It is important to note that the multiple payers for nursing home care provide conflicting incentives for state regulators. (Grabowski, 2007) discusses this issue in detail. Nursing home patients with stays funded primarily by Medicaid profoundly affect state budgets, but have less impact on federal budgets. In contrast, short-term Medicare-funded residents are largely federally financed. As such, the state CON boards focus on regulation of the SNF bed supply is likely to dwell on freestanding homes with high Medicaid populations and not hospital-based SNFs that serve primarily Medicarefunded patients.

In the case of nursing home CONs, the actions of regulators indicate that several competing motivations for awarding skilled nursing facility capacity may have existed during the 1990s. In an attempt at cost containment, states may limit nursing home expenditures by limiting reimbursement rates, by limiting the bed supply for Medicaid patients explicitly, or by limiting the overall bed supply through a CON program. Of the three options, CON regulation to limit the bed supply is a more subtle, less visible form of expenditure limitation than explicitly setting spending caps or limits on the number of Medicaid funded beds (Feder and Scanlon, 1980). There is some evidence that CON policies have been effective in reducing Medicaid nursing home expenditures (Harrington and Swan, 1987). But more recent work on the effects of repeal of nursing home CON laws has found no statistically significant effect of the repeal of CON legislation on Medicaid nursing home expenditures (Grabowski et al., 2003).

In addition, CON regulation may be used to award capacity to facilities viewed by the regulators as working in the best interest of the public, such as hospitals facing financial pressure due to the change in federal reimbursement for acute care Medicare patients. If regulators view hospitals as being financially troubled, they may view awarding them CONs as a way to aid in ensuring their financial viability and reducing the probability of closure, where hospital closure may be viewed as having a potentially negative effect on the health of the general population in the hospital's market. Special interest theory argues that, "An even more important anti-competitive consequence of construction controls is that they provide a means of barring new entry into the cartelized industry" (Posner, 1974). Thus, CON awards can be used to increase the financial viability of one group of health care providers at the expense of other providers. Arguing that hospitals should be viewed as such a special interest group, Joskow notes that hospital associations were among the supporters of federal CON legislation (Joskow, 1981). Similarly, (Wiener et al., 1999) found that nursing home associations in the thirteen states they studied (including Florida), were supportive of CON and/or moratoria for SNF beds.

2.2. Empirical Studies on the Effects of CONs. Most previous studies of nursing home regulation have been based upon Scanlon's model of a monopolistically competitive nursing home that provides a common level of quality to both Medicaid and private-pay nursing home residents (Scanlon, 1980). Scanlon hypothesizes that CON and moratoria policies impose a binding bed constraint on the market for nursing home care under which Medicaid-funded patients may be unable to gain access to care. Whether CON and moratoria policies actually produce a binding bed constraint has been an important empirical issue given that a bed constraint is likely to influence the effectiveness of increases in Medicaid reimbursement rates in improving nursing home quality. Several studies ((Gertler, 1992) (Gertler, 1989) (Nyman, 1985) (Nyman, 1988b) (Nyman, 1988a) (Nyman, 1989) (Gertler, 1989) and (Grabowski, 2001a)) examine the empirical relationship between Medicaid reimbursement rates and nursing home quality under CON policies. Using 1980 data from New York, both Nyman and Gertler's results support the hypothesis that changes in reimbursement rates may decrease quality in nursing homes. However, more recent work by Cohen and Spector (Cohen and Spector, 1996) and Grabowski (Grabowski, 2001a,b) found the opposite, that an increase in reimbursement has a positive effect on measured quality. Grabowski (Grabowski, 2001b) suggests that a decline in nursing home utilization over the two decades in which these studies were conducted has shifted the market, to one where the characterizations of high occupancy rates and extended waiting times for Medicaid recipients are less pervasive, i.e. a non-binding bed constraint.

Several authors have also considered the effect of the Balanced Budget Act of 1997 on nursing homes, which mandated prospective payment for Medicare-funded SNF residents. While this change occurred after the endpoint for our data, research regarding this issue mirrors the work that has looked at the effect of Medicaid reimbursement rate changes on nursing home resident quality. Most relevant to our work are two papers that consider the effect of the Medicare payment change on facility-wide quality. (White, 2005-2006) found that prospective payment for Medicare residents caused decreases in several quality indicators, including staffing. Perhaps more relevant is work by (Konetzka et al., 2006), which examines the effect of prospective payment for Medicare on long-stay nursing home residents, who are much less likely to be Medicare-funded. They find decreases in resident-level quality, suggesting spillover effects from a policy intended to affect one group of residents (Medicare-funded) on other residents (long-stayers).

Other research has examined the effect of CON and moratoria policies on the change in bed growth and the number of residents in nursing home facilities throughout the United States. Using state-level data, Harrington and colleagues found that the presence of a CON or moratoria policy effectively reduced the growth in nursing home beds in states (Harrington et al., 1997). In contrast, using county-level data and the number of years that a state has had a CON program as the measure of CON restrictiveness, Gulley and Santerre found the same number of nursing home beds and residents in otherwise comparable counties with and without CON policies (Gulley and Santerre, 2003).

To our knowledge there have been no studies that examine how the application of CON awards to one segment of the skilled nursing care market affects another segment of the market.

2.3. CON Regulation in Florida. In mid-2001, Florida implemented a moratorium that prohibits CON approval of any additional community nursing home beds not already in the CON approved pipeline. It is important to note that the moratorium does not apply to hospital-based SNFs. Prior to the implementation of the moratorium, Florida exercised strong controls on the skilled nursing facility bed supply (ACHA, 2002). Our study considers the pre-moratorium period of 1991-1997. In Florida, during the period from which data for this study are derived, before bed capacity could be added to an existing skilled nursing facility or before facility construction could begin, a Certificate-of-Need had to be obtained from the state's Agency for Health Care Administration (AHCA). The agency awarded such a certificate to applicants if the agency determined that there is a "need" for nursing home beds in the market area, where Florida's CON program has three stated policy goals: cost containment of overall health care expenditures, ensuring a minimum level of quality of health care, and ensuring access to health care goods and services.

3. Theoretical Model

Individuals needing skilled nursing care may be divided into the three primary payer categories discussed in the Introduction: Medicare, self-pay (e.g. private-pay), and Medicaid. Of these three payment types, Medicaid has traditionally reimbursed facilities at the lowest level, while, prior to the implementation of prospective payment for skilled nursing care beginning mid-1998, Medicare traditionally paid the most per skilled nursing facility day. While prices to self-pay residents are determined by the market, in Florida, Medicaid rates are set prospectively. In contrast, during the period under consideration, Medicare reimbursement rates were based on the cost of services provided to individuals requiring skilled nursing care. For the purposes of our model, the SNF capacity in a market may be thought of as exogenous and a function of the political/regulatory Certificateof-Need process. In addition, the skilled nursing Medicare caseload in a market is set exogenously, where Medicare caseloads vary across markets based on the age and health profile of individuals living in a community. As noted above, Medicare-qualified skilled nursing care in Florida is provided in two types of settings: hospital-based skilled nursing facilities (HBSNFs) and freestanding skilled nursing facilities (FSNFs). The traditional, freestanding SNFs may be thought of as the dominant firm, providing the lion's share of skilled nursing care in most markets. Hospital-based SNFs may be thought of as a competitive fringe, facing a direct pipeline of Medicare-qualified patients leaving the acute-care hospital setting. Our assumption is consistent with findings by Stearns et al. (2006), who show that 51 percent of Medicare patients being referred to SNF care from a hospital with a hospital-based SNF are discharged to a hospital-based SNF (Stearns et al., 2006). If the discharging hospital does not have a hospital-based SNF, only 9 percent of such patients are discharged to a hospital-based SNF. Their research also shows that hospitals are selective in terms of patients. Those who are good candidates for faster recovery and discharge to the community are more likely to end up in hospital-based SNFs. In markets with both hospital-based and freestanding SNFs, the total Medicare skilled nursing resident caseload (\mathcal{Q}_{MCR}) is divided between the two types of providers:

$$Q_{mcr} = Q_{mcr}(FSNF) + S_{mcr}(HBSNF)$$
(1)

Costs of care provided are assumed to be the same for the dominant firm and fringe competitors. The aggregate demand for the homogenous product (Medicare funded skilled nursing days), Q(FSNF), is not a function of price, given that Medicare skilled nursing care is reimbursed on a cost basis. The aggregate fringe supply from hospital-based SNFs, S(HBSNF), is a function of the number of hospital-based SNF beds licensed by CON regulators in a market:

$$\mathcal{S}_{mcr}(HBSNF) = f(licensedbeds) = \alpha + \beta \cdot licensedbeds + \varepsilon$$
⁽²⁾

The fringe supply from hospital-based SNFs in a market depends on the exogenous actions by regulators, where some proportion of the licensed beds ($0 \le \beta \le 1$) are supplied to the market. Using the equations above, the residual demand from Medicare patients facing freestanding SNFs (the dominant firm) in the market, $Q_{mcr}(FSNF)$, may be rewritten as the difference between aggregate Medicare demand and aggregate fringe supply:

$$\mathcal{Q}_{mcr}(FSNSF) = \mathcal{Q}_{mcr} - \mathcal{S}_{mcr}(HBSNF) = \mathcal{Q}_{mcr} - \alpha - \beta \cdot licensedbeds - \varepsilon$$
(3)

For simplicity, we will assume that providers face two different types of residents: those funded by Medicare and self-pay residents. Given that Medicaid reimbursement rates are considerably lower than self-pay, which are lower than Medicare reimbursement rates, in a static model, one can think of beds in freestanding facilities not filled by Medicare as going to self-pay residents. By design, the hospital-based SNFs specialize in recently discharged short-stay Medicare patients. In 1997, 98 percent of all residents in Florida hospital-based SNFs entered the unit from a hospital and 92 percent were Medicare funded. As such, we assume that hospital-based SNFs only supply beds to Medicare-funded residents, and freestanding SNFs are the sole-supplier of beds to self-pay patients. Alternatively, we can assume that the price charged to self-pay residents is below a level that would entice hospital-based SNFs to serve this patient population. The total demand for skilled nursing care by these two types of patients (Q_{TOT}) in a given market, is as follows:

$$Q_{TOT} = Q_{mcr} + Q_{SP}(P_{SP}) \tag{4}$$

where the quantity of self-pay residents (\mathcal{Q}_{SP}) is a function of the price charged to self-pay residents (\mathcal{P}_{SP}) . The demand facing the dominant firm (freestanding SNFs) in the market is:

$$\mathcal{Q}_{TOT}(FSNF) = [\mathcal{Q}_{mcr} - \alpha - \beta \cdot licensedbeds - \varepsilon] + \mathcal{Q}_{SP}(P_{SP})$$
(5)

The term in brackets is the residual demand from Medicare-funded residents facing the dominant freestanding SNFs. The regulated dominant firm chooses \mathcal{P}_{SP} to maximize profits, subject to the supply of licensed hospital-based SNF beds in the market and the Medicare caseload.

Figure 1 shows a graph of the situation faced by a dominant firm, a freestanding SNF, facing no competition from hospital-based SNFs. This firm takes the Medicare reimbursement rate (\mathcal{P}_{MCR}) as given and accepts all Medicare qualified residents \mathcal{Q}_{MCR} , given the high price offered for these residents. The demand from Medicare residents is represented by **AB** on the demand curve. The demand from self-pay residents, segment BC of the demand curve, is a function of the price charged by the nursing home. To maximize profits, which are indicated by the shaded area, the home will charge price \mathcal{P}_{SP} and accept $(\mathcal{Q}_{TOT} - \mathcal{Q}_{mcr})$ self-pay residents.

When the hospital-based SNF enters the market, it has a natural advantage with respect to recruiting Medicare residents for post-acute care, and it is able to be the provider of choice for a portion of Medicare recipients who qualify for skilled nursing care in the market. As shown in Figure 2, the residual demand facing the dominant firm is A'B'C'. The entry of the competitive fringe reduces the number of Medicare residents available to the dominant firm by the difference between B' and B, increases the proportion of self-pay residents in freestanding homes, and results in smaller profits for the freestanding facilities. Clearly, more competitive fringe entry in this model continues to erode profits and increase the non-Medicare population of freestanding nursing homes.

As noted above, our model assumes that the cost of care is the same for the competitive and fringe firms and that hospital-based SNFs and freestanding SNFs are providing a homogeneous product. These assumptions warrant further discussion, based on the empirical literature. Liu and Black use Medicare claims data from 1999 to examine differences between patients in hospitalbased and freestanding SNFs (Liu and Black, 2003). They find that freestanding SNFs had a higher proportion of patient days in the "Ultra high" and "very high" RUG-III rehabilitation categories and had more patient days in the "clinically complex" and "special care" categories. In contrast, hospital-based SNFs had a higher proportion of patient days in the "extensive services" category, which is associated with the highest level of nursing time, and patients in hospital-based SNFs had higher hospital DRG weights in the hospitalization prior to entry into skilled nursing care covered by Medicare. These findings are reinforced by (Tucker and Decker, 2003) and (Stearns et al., 2006). In sum, all three studies show that hospital-based facilities appear to have somewhat more medically complex caseloads and freestanding facilities have more rehab-intensive caseloads, which suggests that there are some differences between patients in the two types of SNFS, but hospital-based SNFs are not clearly providing more intensive services.

Liu and Black (2003) do show that costs per day of hospital-based SNFs were twice that of freestanding SNFs in 1999. However, one must keep in mind that cost allocation to the HBSNF by the hospital makes it difficult to trust accounting data on costs to adequately reflect the cost of HBSNF care. Pizer and colleagues carefully consider the higher costs incurred by hospital-based SNFs (Pizer et al., 2002). They find that almost all of the higher cost of hospital-based SNFs is due to the fact they they are located in a higher cost setting, where resident characteristics play a very minor role in the higher cost of these facilities. This finding is consistent with work reported by (, MedPAC), which considers how the closure of a hospital-based SNFs in a market is associated with a decrease in Medicare spending per patient discharged from an acute care hospital of \$186, while spending for freestanding SNF services increased by \$125 per acute care discharge.

Using nursing home facility-level data for nursing homes in Florida from 1991-1997, market demographic data, and hospital skilled nursing care data, we consider the impact of hospital-based SNF activity in a market, which is a direct consequence of CON awards for SNF care to hospitals, on freestanding SNFs. Allowing for the possibility in changes in patient mix over time, we control for case-mix explicitly. We also control for facility quality.



Figure 1: Dominant Firm (SNF) with No Competitive Fringe (SNU)



Figure 2: Dominant Firm (Freestanding SNF) with Fringe (Hospital-Based SNF) Competition

4. Empirical Analysis

Data on SNF resident patient days, Medicare-funded resident admissions to each freestanding SNF, hospital revenue, hospital discharges to SNF care, and nursing home financial data (including revenue measures), were obtained from Florida's Agency for Health Care Administration. Data allowing us to group counties into health service areas was taken from the Area Resource File, and quality and case-mix data come from the federal Online Survey Certification and Reporting (OSCAR) System. A description of the variables used in the empirical models and descriptive statistics are presented in Table 1.

4.1. Estimation Methods. We use measures of revenue from each freestanding SNF in a given year to measure the facility's performance. Measuring performance is difficult because accounting profits can be misleading when dealing with cost allocation by multi-product firms. We can, however, reliably track total revenue from private-pay residents, total revenue from Medicare, and Medicare residents admitted to the freestanding SNF from the hospital. This allows us to examine the impact of hospital-based SNF activity in a market on the revenue generated from Medicare recipients, the ability of freestanding SNFs to attract Medicare patients discharged from the hospital, and revenue from private-pay residents. We expect that hospital-based SNF days will affect Medicare admissions to freestanding SNFs and Medicare revenue. Unless Medicare residents convert to private-pay patients and spend a lot of time post-coversion in the SNF, we do not expect there to be a strong relationship between private-pay revenues and hospital-based SNF activity.

Cross sectional methods may not fully account for differences in latent factors that vary across markets and freestanding nursing homes. In this paper, we consider two sets of models of freestanding SNF performance. First, we estimate models with nursing home fixed effects that control for unspecified sources of performance variation across homes within the industry and time fixed effects that control for unspecified factors that vary across time but are common across homes in the industry. These models also account for the endogeneity of hospital-based SNF activity in the market. The second set of models does not treat hospital-based activity as endogenous but recognizes that freestanding SNF performance depends on nearby competitor freestanding SNF performance. By including a spatially lagged dependent variable, we are able to capture the intensity of the interdependence between the performance of a single freestanding SNF and the weighted average of freestanding performance of neighboring SNFs, where the weights decay with distance. The general form of the freestanding SNF performance model is:

$$\mathcal{P}_{rt} = \alpha_r + \delta_t + \mathcal{X}_{rt}\beta + \eta \tag{6}$$

for r = 1, ..., R and t = 1, ..., T. The time period for this study is 1991 to 1997, the δ_t are the time-specific effects and the α_r are the home-specific effects. \mathcal{P}_{rt} denotes the performance of the freestanding nursing home r at time t, and \mathcal{X}_{rt} denotes regressors with both home-specific and time variation. The typical estimation procedure is to difference each observation from its sample mean in order to eliminate the home-specific effects from the estimating equation, and to include a temporal dummy variable to capture the time-specific effect. This estimating equation would produce the familiar "Difference-in-Differences" estimator in the restricted case of two time periods and no regressors.

4.2. Instrumental Variables model. A key methodological point is the potential endogeneity of hospital-based SNF activity in the equation explaining the performance of nursing homes. The total demand for skilled nursing care is being jointly determined and allocated between freestanding homes, on the one hand, and hospital-based SNFs, who act as new fringe competitors. The services provided by the two industry groups are similar, although hospitals have an advantage in referring discharges to their own facilities because of the in-house connections, one-stop service, and ease of provision of post-acute rehabilitative care. We create two alternative measures of the influence of hospital-based SNF care in a market: the annual number of hospital-based SNF days of care provided in the health service area and an annual measure of hospital-based SNF revenue in the health service area. Under an assumption of the endogeneity of hospital-based SNF care, we estimate the following equations in two stages:

$$S_{rt} = \alpha_r + \delta_t + Z_{rt}\lambda + \mathcal{X}_{rt}\beta + \xi \tag{7}$$

$$\mathcal{P}_{rt} = \alpha_r + \delta_t + \hat{S}_{rt}\gamma + \mathcal{X}_{rt}\beta + \nu \tag{8}$$

for r = 1, ..., R and t = 1, ..., T. The instrumental variable for hospital-based SNF care, \hat{S}_{rt} , is identified by two instruments, Z_{rt} , in the first stage regression: the number of patients discharged from hospitals in the health service area to SNF care and the weighted average of occupancy rates for acute care in hospitals within a health service area. These instruments reflect the potential demand for hospital-based SNF care from Medicare-funded individuals and the degree of excess capacity hospitals have on the acute care side.

In addition to facility and time fixed effects, a number of time-varying control variables that vary across facilities are required for the model. Home-specific variables that change over time include case-mix, distance to the nearest hospital-based SNF, and quality. Our measure of case-mix is constructed following Katz et al. (1963) and expressed in per capita terms, where higher values indicate more restrictions on activities of daily living for residents in the freestanding SNF (Katz et al., 1963). The smaller the number, the more healthy the SNF's population. To get more a more accurate spatial measure of competition from hospital-based SNF. To control for quality driven differences in nursing home revenue measures, one measure of quality is used: the number of cited inspection violations, i.e. inspection deficiencies, per patient. The average daily census is used to construct this measure, where a higher quality nursing home has fewer inspection violations per resident.

4.3. **Spatial Econometric model.** In addition to considering the influence of hospital-based SNF's on performance in nursing homes, it is useful to recognize the spatial dependency due to nearby freestanding homes. To this end, the following spatial autoregression (SAR) model is estimated:

$$\mathcal{P}_{rt} = \alpha + \delta_t + \rho W P_{rt} + \mathcal{S}_{rt} \gamma + \mathcal{X}_{rt} \beta + \eta \tag{9}$$

The RxR matrix W is the spatial contiguity matrix that indicates the inverse distance between pairs of nursing homes in this study. ² The coefficient ρ is the spatial correlation coefficient. The elements of the spatial weighting matrix are denoted w_{ij} . Specifically, for any alternate pairs i and j, the elements of the W matrix are:

$$w_{ij} = \begin{cases} d_{ij}^{-1} & \text{if i and j are within 30 miles} \\ 0 & \text{if otherwise} \end{cases}$$

 $^{^{2}}$ See (Anselin, 1988) for an exposition on the typology of spatial weight matrices.

where d_{ij} is the distance between the pair of homes. The degree of spatial dependence is determined by the spatial correlation coefficient, ρ , and the elements of the spatial weighting matrix, W. Spatial correlation will be greater as the homes are closer in distance.³

³This choice of spatial weighting matrix is consistent with (Anselin, 1988, pg. 21) who notes that "the weight matrix should bear a direct relation to a theoretical conceptualization of the structure of dependence, rather than reflecting an ad hoc description of spatial pattern."

5. Empirical Results

As Figure 3 shows, average revenue per Medicare patient day in freestanding Florida nursing homes increased at a much faster rate than private-pay patient revenue per day from 1991-1997. In addition, average revenue per day from Medicaid patients was consistently below that of private and Medicare patients.

The factors behind the rapid growth in Medicare spending for skilled nursing facility care has been documented elsewhere ((Street et al., 2003)). From 1989 to 1997, the average annual increase in Medicare's average payment per patient day was 12 percent. Much of the increase was driven by the cost-based reimbursement by Medicare for ancillary therapeutic services, such as occupational therapy, physical therapy, and speech therapy. The dramatic increase did not go unnoticed by policymakers. As noted above, the Balanced Budget Act of 1997 changed Medicare reimbursement for SNF care from a cost-based program to prospective payment system (PPS). Under PPS, rates for SNF care were determined prior to a resident stay, providing an incentive for providers to attempt to control costs. The Medicare PPS program was phased in over four years (1998-2001), and it allows for differential payments for higher resource use patients identified using the RUG-III patient classification system. In Florida, SNFs faced relatively little competition from hospital-based SNFs in the 1980s and early 1990s, but the competition grew dramatically over the mid 1990s.

As noted by other authors, as the supply of beds in hospital-based SNFs grew, the proportion of resident days funded by Medicare also grew. In 1991, Medicare days accounted for approximately 6.5 percent of all occupied bed days in skilled nursing facilities in Florida. By 1997, Medicare days made up approximately 22 percent of all days. This dramatic growth in the demand for care by relatively lucrative Medicare residents did not increase the Medicare populations of hospital-based SNFs and freestanding SNFs equally. By 1997, only approximately 13 percent of freestanding SNFs beds were filled by Medicare residents. In contrast, in 1997, nearly 92 percent of days in hospital-based SNFs were attributable to Medicare funded residents. This differential is reflecting the Medicare revenue generated by each bed in each facility per year, as shown in Figure 4. In the mid to late 1990s, the Medicare revenue generated per bed in hospital-based SNFs far exceeded the Medicare revenue generated per bed by freestanding SNFs in Florida. Finally, of the Medicare patients attracted by skilled nursing facilities, nearly all (over 98 percent) of all hospital-based SNF residents entered the hospital-based SNF from directly from the hospital. For freestanding homes, the proportion was somewhat smaller (92.6 percent), suggesting a more direct conduit between hospitals and hospital-based SNFs than between hospitals and freestanding SNFs for Medicare patients.

Tables 2 and 3 present the basic results of our fixed effects instrumental variables panel models. It is important to note that the results are based on models where all unspecified facility characteristics that do not change over time are captured in the facility fixed effects, allowing us to control for many sources of variations in facility performance that cannot be readily observed. In addition, the time fixed affect account for industry trends that affected all facilities equally. Controlling for these effects, the negative impact of hospital-based SNF activity is shown to be significant for both models involving Medicare patients: Medicare-funded admissions to the free-standing SNF and total annual revenue from Medicare-funded residents. We do not see a significant effect of hospital-based SNF activity (measured in days or revenues) on private-pay patient revenue, despite the fact that prior research has indicated that nearly half of all SNF stays that begin as Medicare-funded involve a transition to private-pay ((Troyer, 2002)).

The coefficient estimates on the instruments in the first stage (not shown) are all significant. In addition, we use the Anderson canonical correlation likelihood ratio test to consider whether our instruments are sufficiently correlated with our endogenous explanatory variable ((Anderson, 1984)). The null hypothesis is that the model is unidentified. We reject the null in all cases, which suggests that our instruments are relevant. We also consider the exogeneity of our instruments, using the Sargan overidentification test. The null hypothesis is that the instruments are exogenous and not correlated with the disturbance term in the performance models. In all cases, we fail to reject the null. Thus, we are confident that we are able to construct instruments that are meaningfully correlated with the hospital-based SNF activity measures while uncorrelated with the error terms in the second stage regression models reported in Tables 2 and 3.

Turning to the other explanatory variables, the case-mix measure is not a statistically significant predictor of Medicare admissions from the hospital but it is associated with higher levels of total Medicare revenue. This may be due to the importance of rehabilitative services in generating Medicare revenue. The measure of quality is only significant in the total private-pay revenue model. This suggests that inspection violations are not closely linked to the inflow of Medicare patients into a freestanding SNF. Given the short stays of many of these patients, they may shop less for quality than longer-stay residents. Distance to the nearest hospital-based skilled nursing facility is positively related to both Medicare admissions from the hospital and Medicare revenue for freestanding SNFs. This variable may be picking up, in part, changes in the market for Medicare skilled nursing care over time that do not uniformly affect all facilities in the same way, such as changes in local market conditions at a geographic level that is smaller than the health service are level. Finally, the time fixed effects indicate increases in Medicare admissions and Medicare revenue from 1991-1997 and decreases in private-pay revenue, as expected.

The spatial autoregressive models are found in Tables 4 and 5. Hospital-based SNF days and revenue are strong negative predictors of Medicare revenue but have no significant effect on private-pay revenue. This finding coincides with the IV results shown above. Like the IV results, hospital-based SNF days have a negative effect on Medicare admissions. However, hospital-based SNF revenue does not have a significant effect on Medicare admissions to freestanding SNFs.

The results in Tables 4 and 5 indicate that the estimate of the spatial dependence parameter is statistically significant and positive in all cases, confirming the idea that performance of nearby freestanding SNFs is correlated. The spatial dependency regressor is likely to be capturing local market conditions that are changing over time. In the spatial model, unlike the IV estimates, distance to the nearest hospital-based SNF is negatively related to freestanding facility performance, as expected. In addition, quality and case-mix are significant predictors of all of the performance measures, with the expected signs.

6. Conclusions

Hospital CON policies were relaxed in the 1990s in Florida in a manner that was intended both to alleviate the hospital industry's problem of high vacancy and in response to criticisms of the restrictiveness of CON barriers to entry. One area where hospitals found lucrative revenue potential was in the conversion of acute care beds to post-acute skilled nursing beds. In this paper, we find that CON awards to hospitals for hospital-based SNFs harmed the freestanding nursing home industry in the 1991-1997 period.

The benefit to the hospital of a CON award for a hospital-based SNF would be simultaneously to obtain reimbursement from Medicare for fixed costs and to reduce the inpatient length of stay by transferring Medicare patients to the hospital-based SNF (Fogel, 1994). The first objective, of allocating fixed costs to the hospital-based SNF, is consistent with estimates by (, MedPAC), indicating that hospital cost allocations to hospital-based SNFs increase reported costs for these units by an estimated 15 to 20 percent.

Hospitals were happy to handle a segment of the Medicare population upon discharge for the transitional period following hospitalization. Until changes in Medicare reimbursement put in place in 1998, hospitals were aggressive in expanding this service. From 1990 through 1996 the number of hospital-based SNFs increased 82 percent nationwide, and, at the same time, average Medicare payment per day of skilled nursing facility care climbed from \$98 to \$292 (, MedPAC). Meanwhile, the ability of stand-alone nursing homes to balance its resident mix and offset unremunerative service to Medicaid patients with the more attractive Medicare population was severely compromised. We show, in a panel analysis covering 1991 to 1997, that a significant explanation for the wide-spread financial distress of nursing homes points to the siphoning of Medicare residents from homes by acute care hospitals. Thus, regulators provided relief to one special-interest industry group by neglecting to consider the broader effects on nursing homes, which are vital and complementary health care providers.

The realities of low reimbursement rates for Medicaid residents contribute to the dilemma of nursing homes. A study using Florida data from approximately the same time period found that Medicaid reimbursement rates were lower than the average incremental cost of care for Medicaid patients in approximately one quarter to one third of SNFs (Troyer, 2002). Legally, nursing homes face an explicit responsibility to continue to provide unremunerative services to a resident that converts to Medicaid after entering the nursing home. There is often considerable uncertainty with respect to whether a nursing home resident is going to convert to Medicaid. Thus, nursing homes must accept a self-pay or Medicare patient without certainty about how the individual's care will be funded for the duration of his/her stay. As a hedge against this obligation, the nursing home may impose a "surcharge" on all self-pay residents to compensate for the risk of conversion to Medicaid. The ability to do so is limited by competition in the market. Medicare reimbursement prior to 1998 was one way to offset the unremunerative service to other payers; however this offset has been nullified, to a large extent, with the rush toward CON awards for hospital-based SNFs.



Figure 3: Average Revenue per Patient Day in Freestanding SNFs



References

- ACHA, Florida, "Proposals to reduce medicaid-funded nursing home bed days in Florida," Technical Report, Agency for Healthcare Administration December 2002.
- Anderson, T. W., Introduction to Multivariate Statistical Analysis, 2nd ed., New York: John Wiley & Sons, 1984.
- **Anselin, Luc**, *Spatial Econometrics: Methods and Models*, Dordrecht: Kluwer Academic Press, 1988.
- Cohen, J. W. and W. D. Spector, "The effect of medicaid reimbursement on quality of care in nursing homes," *Journal of Health Economics*, 1996, 15 (1), 23–48.
- Dalton, K. and H. A. Howard, "Market entry and exit in long-term care: 1985-2000," Health Care Financing Review, 2002, 24 (2), 17–32.
- Feder, J. and W. Scanlon, "Regulating the bed supply in nursing homes," Milbank Memorial Fund Quarterly/Health and Society, 1980, 58 (1), 54–88.
- Fogel, L. A., "Financial advantages of operating a hospital-based snf," Healthcare Financial Management, 1994, 48 (7), 50–55.
- Gertler, P. J., "Medicaid and the cost of improving access to nursing home care," *NBER Working Paper*, 1989, *Working Paper No. 2851* (February), 1–23.

_____, "Medicaid and the cost of improving access to nursing home care," *The Review of Economics and Statistics*, 1992, 74 (2), 338–345.

- Grabowski, D. C., "Does an increase in Medicaid reimbursement rate improve nursing home quality?," *Journal of Gerontology: Social Sciences*, 2001, 56B (2), S84–S93.
 - ______, "Medicaid reimbursement and the quality of nursing home care," *Journal of Health Economics*, 2001, 20, 549–569.
- _____, "Medicare and Medicaid: Conflicting Incentives for Long-Term Care," Milbank Memorial Fund Quarterly/Health and Society, 2007, 85(4), 579–610.
- Grabowski, D., R. Ohsfeldt, and M. Morrisey, "The Effects of CON Repeal on Medicaid Nursing Home and Long-Term Care Expenditures," *Inquiry*, 2003, 40(2), 146–157.
- Gulley, O. D. and R. E. Santerre, "The effect of public policies on nursing home care in the united states," *Eastern Economic Journal*, 2003, 29 (1), 93–104.
- Harrington, C. and J. H. Swan, "The impact of state Medicaid nursing home policies on utilization and expenditures," *Inquiry*, 1987, 24 (2), 157–172.

_____, ____, J. A. Nyman, and H. Carrillo, "The effect of certificate of need and moratoria policy on change in nursing home beds in the united states," *Medical Care*, 1997, 35 (6), 574–588.

- , S. Anzaldo, A. Burdin, M. Kitchener, and N. Miller, "Trends in State Certificate of Need and Moratoria Programs for Long-Term Care Providers," *Journal of Health and Social Policy*, 2004, 19(2), 31–57.
- **Joskow, P. L.**, Controlling hospital cost: The role of government regulation, Cambridge, Massachusetts: The MIT Press, 1981.
- Konetzka, R. T.;, E. C.; Norton, and S. C. Stearns, "Medicare payment changes and nursing home quality: effects on long-stay residents," *International Journal of Health Care Finance and Economics*, 2006, 6(3), 173–189.
- Liu, K. and K. J. Black, "Hospital-based and freestanding skilled nursing facilities: Any cause for differential medicare payments," *Inquiry-Excellus Health Plan*, 2003, 40 (1), 94–104.
- (MedPAC), Medicare Payment Advisory Commission, "Medicare and the american health care system: Report to congress," Technical Report June 1997.
- _____, "Report to the congress: Medicare payment policy," Technical Report 2002.
 - _____, "Report to the congress: Medicare payment policy," Technical Report March 2004.
- Nyman, J. A., "Prospective and 'cost-plus' medicaid reimbursement, excess medicaid demand, and the quality of nursing home care," *Journal of Health Economics*, 1985, 4 (3), 237–259.
- _____, "The effect of competition on nursing home expenditures under prospective reimbursement," *Health Services Research*, 1988, 23 (4), 555–574.
- _____, "Excess demand, the percentage of medicaid patients and the quality of nursing home care settings," *Journal of Human Resources*, 1988, 23 (1), 76–92.
- _____, "The private demand for nursing home care," *Journal of Health Economics*, 1989, 8 (2), 209–231.
- Pizer, S. D., A. J. White, and C. White, "Why are hospital-based nursing homes so costly?: Relative importance of acuity and treatment setting," *Medical Care*, 2002, 40 (5), 405–415.
- Posner, R. A., "Certificates of need for health care facilities: A dissenting view," in C. C. Havighurst, ed., Regulating health facilities construction: Proceedings of a conference on health planning, certificates of need, and market entry, Washington, D.C.: American Enterprise Institute for Public Policy Research, 1974, pp. 113–121.

- Rhoades, J. A. and J. P. Sommers, "Trends in nursing home expenses, 1987 to 1996," Health Care Financing Review, 2003, 25 (1), 99–114.
- S., A. Katz, B. Ford, R. W. Moskowitz, B. A. Jackson, and M. W. Jaffe, "Studies of Illness in the Aged. The Index of ADL: A Standardized Measure of Biological and Psychosocial Function," *Journal of the American Medical Association*, 1963, 185, 914–919.
- Scanlon, W. J., "A theory of the nursing home market," Inquiry, 1980, 17 (1), 25–41.
- Stearns, S. C., K. Dalton, M. Holmes G, and S. M. Seagrave, "Using Propensity Stratification to Compare Patient Outcomes in Hospital-Based versus Freestanding Skilled-Nursing Facilities," *Medical Care Research and Review*, 2006, 63, 599–622.
- Street, D., J. Quadagno, L. Parham, and S. McDonald, "Reinventing long-term care: The effect of policy changes on trends in nursing home reimbursement and resident characteristicsflorida, 19891997," *The Gerontologist*, 2003, 43 (Special Issue II), 118–131.
- Troyer, J. L., "Cross-Subsidization in Nursing Homes: Explaining Rate Differentials Among Payer Types," Southern Economic Journal, 2002, 68(4), 750–774.
- Tucker, A. M. and F. H. Decker, "Case-mix comparison between hospital-based and freestanding skilled nursing facilities: A review of the evidence," Technical Report, American Health Care Association 2003.
- White, C., "Medicare's prospective payment system for skilled nursing facilities: effects on staffing and quality of care," *Inquiry*, 2005-2006, 42(4), 351–366.
- Wiener, J. M., D.G. Stevenson, and S. M. Goldensen, "Controling the Supply of Long-Term Care Providers in Thirteen States," *Journal of Aging & Social Policy*, 1999, 10(4), 51–72.

Variable	Mean	Std Dev		
Dependent Variables				
Medicare Residents Admitted from the Hospital (Medicare				
Admissions)	115.2400	112.2700		
Total Revenue from Medicare Residents (Tot Medicare Revenue)	1291121	1262424		
Total Revenue from Private-Pay Residents (Tot Private Revenue)	1105228	1097332		
Measures of Hospital-Based SNF Activity				
Hospital-Based SNF Days in the HSA (Hospital-Based Days)	23303.2200	26776.52		
Hospital-Based SNF Revenue in the HSA (Hospital-Based Revenue)	10341218	13006229		
Freestanding SNF Characteristics				
Deficiencies per Resident (Deficiencies)	0.0766	0.0808		
Case-mix per Resident (Case-Mix)	4.4445	0.6089		
Distance in Miles to the Nearest Hospital-Based SNF (Distance HB				
SNF)	18.3213	20.0639		
Instruments for Hospital-Based SNF Care				
Number of Medicare Patients Discharged from Hospitals to SNF Care				
in the HSA (Medicare Discharges)	2834.60	2488.44		
Weighted Average of Acute Care Occupancy Rates for Hospitals				
within the HSA (Occupancy Rate)	55.9968	7.3460		
Number of Observations	3262			
Number of Freestanding Facilities	466			

Table 1: Summary Statistics on Freestanding SNFs

Note: The values above are in original units.

	Medicare		· ·		Tot Pri	vate
Variable	Admissions		Tot Medicare	Revenue	Revenue	
	Coeff	P-value	Coeff	P-value	Coeff	P-value
IV Hospital-Based SNF						
Days	-0.001	0.000	-12.6	0.001	2.5	0.294
Deficiencies	-15.539	0.237	-304380.2	0.077	357731.5	0.002
Case-Mix	1.268	0.477	53289.3	0.023	-8015.5	0.601
Distance HB SNF	0.377	0.000	2922.2	0.017	-2229.4	0.006
Year 1992	5.889	0.081	65078.2	0.141	-33360.6	0.249
Year 1993	12.006	0.004	130316.8	0.017	-49248.1	0.168
Year 1994	23.065	0.000	244022.3	0.002	-90235.5	0.087
Year 1995	31.664	0.000	342401.5	0.001	-113522.6	0.098
Year 1996	42.191	0.000	468181.7	0.001	-137364.8	0.125
Year 1997	48.951	0.000	540211.4	0.001	-157953.7	0.125
Anderson LR Test for						
Instrument Relevance	245.598	0.000	245.598	0.000	245.598	0.000
Exogeneity of						
Instruments	0.020	0.888	1.901	0.168	0.129	0.719

 Table 2: IV Estimates of Freestanding SNF Performance: Panel Regression with Facility

 Fixed Effect and Hospital-Based SNF Activity Measured by Days

•	MedicareTot MedAdmissionsReven		Tot Medicare		Tot Private Revenue	
Variable			ue			
	Coeff	P-value	Coeff	P-value	Coeff	P-value
IV Hospital-Based SNF						
Revenue	-0.00002	0.000	-0.02246	0.000	0.00433	0.306
Deficiencies	-14.814	0.258	-296862.9	0.084	355897.8	0.002
Case-Mix	1.199	0.500	52705.7	0.024	-7816.6	0.609
Distance HB SNF	0.346	0.000	2625.7	0.024	-2147.4	0.005
Year 1992	5.803	0.084	65429.9	0.137	-32886.7	0.255
Year 1993	11.954	0.004	132741.4	0.014	-48499.9	0.174
Year 1994	20.554	0.000	220421.1	0.003	-83379.3	0.084
Year 1995	28.163	0.000	309524.3	0.001	-103959.1	0.092
Year 1996	36.535	0.000	413049.0	0.000	-122333.6	0.117
Year 1997	42.007	0.000	471830.2	0.000	-139642.7	0.115
Anderson LR Test for						
Instrument Relevance	334.456	0.000	334.456	0.000	334.456	0.000
Exogeneity of						
Instruments	0.016	0.901	1.318	0.251	0.185	0.667

 Table 3: IV Estimates of Freestanding SNF Performance: Panel Regression with

 Facility Fixed Effect and Hospital-Based SNF Activity Measured by Revenue

Spatial and Time Tixed Effects and Hospital Dased SNT Activity Measured by Days							
	Medicare Admissions		Tot Medicare Revenue		Tot Private Revenue		
Variable							
	Coeff	P-value	Coeff	P-value	Coeff	P-value	
Hospital-Based SNF							
Days	-0.046	0.040	-0.070	0.002	-0.008	0.708	
Deficiencies	-0.122	0.000	-0.108	0.000	-0.118	0.000	
Case-Mix	0.137	0.000	0.138	0.000	0.061	0.000	
Distance HB SNF	-0.072	0.000	-0.097	0.000	-0.071	0.000	
Spatial Dep. Param.	2.5E-05	0.000	2.5E-05	0.000	-1.3E-05	0.063	
R-Squared	0.200		0.202		0.252		

 Table 4: SAR Estimates of Freestanding SNF Performance: Panel Regression with

 Spatial and Time Fixed Effects and Hospital-Based SNF Activity Measured by Days

Kevenue							
Medicare Admissions		Tot Medicare Revenue		Tot Private Revenue			
Coeff	P-value	Coeff	P-value	Coeff	P-value		
-0.029	0.256	-0.064	0.011	-0.003	0.881		
-0.126	0.000	-0.108	0.000	-0.118	0.000		
0.144	0.000	0.138	0.000	0.060	0.000		
-0.085	0.000	-0.108	0.000	-0.069	0.000		
1.8E-05	0.000	1.8E-05	0.000	-1.4E-05	0.000		
0.029		0.006		0.209			
	Media Admiss Coeff -0.029 -0.126 0.144 -0.085 1.8E-05 0.029	Medicare Admissions Coeff P-value -0.029 0.256 -0.126 0.000 0.144 0.000 -0.085 0.000 1.8E-05 0.000 0.029 0.256	Medicare Admissions Tot Medicare Rever Coeff P-value Coeff -0.029 0.256 -0.064 -0.126 0.000 -0.108 0.144 0.000 0.138 -0.085 0.000 -0.108 1.8E-05 0.000 1.8E-05 0.029 0.006 0.006	Medicare Admissions Tot Medicare Revenue Coeff P-value Coeff P-value -0.029 0.256 -0.064 0.011 -0.126 0.000 -0.108 0.000 0.144 0.000 0.138 0.000 -0.085 0.000 -0.108 0.000 1.8E-05 0.000 1.8E-05 0.000 0.029 0.006 0.006	Medicare Admissions Tot Medicare Revenue Tot Pr Revenue Coeff P-value Coeff P-value Coeff -0.029 0.256 -0.064 0.011 -0.003 -0.126 0.000 -0.108 0.000 -0.118 0.144 0.000 0.138 0.000 -0.069 1.8E-05 0.000 1.8E-05 0.000 -1.4E-05 0.029 0.006 0.209 0.209		

 Table 5: SAR Estimates of Freestanding SNF Performance: Panel Regression with

 Spatial and Time Fixed Effects and Hospital-Based SNF Activity Measured by

 Revenue