
Excess Demand and Cost Relationships Among Kentucky Nursing Homes

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This article examines the influence of excess demand on nursing home costs. Previous work indicates that excess demand, reflected in a pervasive shortage of nursing home beds, constrains market competition and patient care expenditures. According to this view, nursing homes located in underbedded markets can reduce costs and quality with impunity because there is no pressure to compete for residents. Predictions based on the excess demand argument were tested using 1989 data from a sample of 179 Kentucky nursing homes. Overall, the results provide partial support for the excess demand argument. Factors that may counteract the influence of excess demand are considered. Finally, the role of competition in nursing home markets and difficulties associated with making it operational are discussed.

INTRODUCTION

In a previous survey of nursing home cost studies, Bishop (1980) discussed the influence of several key variables commonly linked to nursing home expenditures, including occupancy rate, ownership and provider type, location, and level of care. While the evidence for some cost factors was persuasive, Bishop concluded that existing studies provided a limited view of the determinants of nursing home costs. Among the limitations cited by Bishop were the failure to assess the impact of market variables (e.g., competition and

consumer demand) and the lack of adequate quality and case-mix measures.

Subsequent to Bishop's review, a spate of studies estimating nursing home cost functions were conducted (e.g., Birnbaum, et al., 1981; Caswell and Cleverly, 1983; Koetting, 1980; Lee and Birnbaum, 1983; Meiners, 1982; Nyman, 1988a,b; Palm and Nelson, 1984; Schlenker, 1986; Schlenker and Shaughnessy, 1984; Smith and Fottler, 1981; Smith, Fottler, and Saxberd, 1985; Tuckman and Chang, 1988; Ullmann, 1984, 1985). Although these studies certainly broadened our understanding of nursing home cost factors, the majority effectively ignored market influences.

Nyman's (1988a) comparison of underbedded and overbedded nursing home markets in Wisconsin is a striking exception to previous cost function studies. Using a proxy for excess demand or tight bed supplies, his analysis revealed lower patient-care expenditures in nursing homes located in underbedded markets. Given a pervasive shortage of beds in many nursing home markets, Nyman's findings invite specific policy responses designed to eliminate the problem of excess demand (e.g., relaxing certificate-of-need regulations).

Our investigation was prompted by the dearth of studies incorporating market variables in previous cost function estimates, as well as Nyman's distinctive research on excess demand. The policy implications stemming from an excess demand argument and the significant variability in nursing home markets warrant

The authors are with the University of Kentucky, and the views expressed are those of the authors and do not necessarily reflect those of the Health Care Financing Administration or the University of Kentucky.

additional study. Accordingly, this study tests excess demand hypotheses using 1989 data from a sample of Kentucky nursing homes.

In addition, many, but not all, nursing home cost function estimates employ average operating costs, rather than average total costs, as the dependent measure. Because average total costs include property costs (e.g., interest and depreciation), which are not directly tied to patient care, the factors associated with average operating costs may differ from those related to average total costs. As such, operating costs are probably more sensitive to the cost reduction efforts of nursing homes. Therefore, our analysis incorporates both average total costs and average operating costs.

EXCESS DEMAND ARGUMENT

Many researchers and policymakers acknowledge that bed shortages are characteristic of the nursing home industry in the United States (Harrington, Swan, and Grant, 1988; Scanlon, 1980; Vladeck, 1980). One estimate suggests a national shortage of 250,000 beds (Richardson, 1990). In part, the excess demand for beds may result from certificate-of-need legislation and construction moratoria aimed at controlling Medicaid expenditures, as well as policies that do not encourage alternatives to nursing homes, such as home care or enhanced community services. This shortage of beds is the basis for Nyman's (1988a) excess demand argument, which is offered as a fundamental cause of the quality problems plaguing the industry.

The basic premises of the excess demand argument are derived from economic theory. In the nursing home industry, as in other industries, the dictates of profit maximization foster an emphasis on cost minimization. Although the possibility

of raising prices to maximize profits is always an option, a primary source of revenue for nursing homes, the government, does not pay market price but rather reimburses on a cost-oriented basis. Although many partially regulated industries often make up revenue shortfalls by raising rates on private-pay patients (e.g., hospitals), there is evidence that private-pay nursing home patients or their agents are responsive to price and quality (Nyman, 1989). Thus, nursing home cost shifting may not be as large as in other industries, especially given the large number of Medicaid-eligibles. Finally, some private-pay patients will only have sufficient resources to meet the price of care for a short period before becoming Medicaid residents, further limiting long-term cost shifting.

Ordinarily, the presence of competition will prevent firms from reducing costs to a point that significantly curtails quality, because customers who insist on better quality can presumably purchase the services from existing competitors. In this regard, nursing homes should be no different from other firms. However, with excess demand, the competition required by markets to offset cost-minimization incentives is diminished because a surplus of potential residents in search of beds is readily available. Consequently, according to the excess demand argument, facilities can reduce costs and quality with impunity because there is little danger of losing prospective residents. If the excess demand argument is valid, one would anticipate that facilities located in markets with limited bed supplies will spend less on patient care than facilities located in markets with relatively more abundant bed supplies.

Approximately one-half of the financial burden of nursing home care is shared by Medicaid with reimbursement on a prospective cost basis. One implication of

Nyman's argument is that excess demand has a greater impact on Medicaid patients than on private patients. Because private patients provide a more lucrative source of revenue, they are almost always preferred over Medicaid patients. Higher quality and more efficient nursing homes can act on this preference by admitting private-pay patients first. Then, given a shortage of beds, only the few remaining or residual beds are filled by Medicaid residents. In turn, other Medicaid-eligibles gravitate to poorer quality homes in search of a bed. In short, nursing homes in underbedded markets have no incentive to compete for Medicaid patients. Furthermore, with tight bed supplies, facilities are in a position to choose patients who require less costly care. If this is the case, one would expect lower expenditures per patient day among Medicaid-dominated facilities located in underbedded markets, while an equivalent pattern need not necessarily occur in surplus-bed markets.

In sum, the excess demand argument focuses on cost reduction efforts as the method by which nursing home operators maximize profits, unconstrained by the need to attract patients. This argument holds that the requisite competition needed by free markets to offset cost-minimization incentives that detract from quality of care is lacking. Nyman's (1988a) study of 269 Wisconsin nursing homes was an initial attempt to operationalize excess demand and explicitly test its impact on nursing home expenditures. In this instance, the average number of empty beds in the county in which the facility was located functioned as a proxy for market demand. Ostensibly, homes located in counties with few or no empty beds would have little incentive to compete for residents, relative to those homes located in counties with numerous beds to fill.

Although it is hard to generalize beyond the Wisconsin sample, several of Nyman's findings are noteworthy. For instance, he found that an increase of one additional bed in all homes located in underbedded markets could be expected to increase total expenditures by \$.62 per patient day in those facilities. Similarly, the average nursing home located in underbedded markets could be expected to spend approximately \$240,000 more (1983 dollars) if located in more competitive markets; that is, markets with surplus beds. Finally, the negative association between percentage of Medicaid residents and expenditures, which occurs frequently in nursing home cost studies, was significant in underbedded markets, but not in markets with surplus bed supplies. Nyman's conclusions and their implications for policy are somewhat controversial. Payments to nursing homes accounted for more than 43 percent of State Medicaid budgets in 1985 (Pierce, 1987). Thus, cost-containment efforts are generally aimed at nursing homes. Eliminating excess demand by relaxing certificate-of-need regulations conflicts with these efforts and could conceivably contribute to the problem of budgetary overruns. In effect, the additional budgetary pressure of increased bed supplies could force policymakers to depress reimbursement rates even further or to limit the number of bed days for which Medicaid will reimburse nursing homes.

Be that as it may, the authors believe that the excess demand argument could be a starting point for determining more rational nursing home regulations and pricing procedures. Yet, before considering the policy implications, it is first necessary to determine whether Nyman's findings are of general applicability. In this article, we investigate the impact of excess demand on nursing home expenditures in Kentucky.

Based on previous research, we hypothesized that facilities located in underbedded regions (tight markets) would have appreciably lower costs than facilities found in overbedded regions (surplus markets). Moreover, we anticipated the Medicaid-cost relationship would vary as a function of demand. Specifically, we hypothesized a negative association between percentage of Medicaid residents and nursing home costs in tight markets and no relationship in surplus markets. Finally, these hypotheses were tested using total and operating costs per patient day (all cost data are computed on a per patient-day basis), because the latter was expected to be more sensitive to cost minimization efforts by administrators.

SAMPLE AND EMPIRICAL MODEL

Data from 1989 Medicaid certification inspection surveys and Medicaid cost reports of 209 facilities in Kentucky were provided by the State's Cabinet of Human Resources. The facilities in the initial sample consisted of personal-, intermediate-, and skilled-care nursing homes. For this study, only data from skilled- and/or intermediate-care facilities were analyzed. After excluding personal-care facilities and facilities with missing data, the final sample totalled 179 observations. The homes with missing data consisted of 11 facilities in their first year of operation for which no cost data were available. In addition, informal and formal audits of Medicaid cost reports ensure an acceptable degree of reliability. For example, 35 percent of all facilities are audited annually, and 5 percent of these are selected randomly. On the average, facilities are audited once every 3 years.

The empirical model tested is similar, though not identical, to previous models employed by Nyman (1985, 1988a,b). Cost of care per patient day was the dependent

variable. While Nyman employed total cost per patient day, this analysis was conducted with both total costs and operating costs per patient day. The model's 11 independent variables included the following items.

The average number of empty beds in the county in which each home was located was the first independent variable. This measure has been employed extensively by Nyman as a proxy for excess demand. Hence, it was intended to reflect the relative pressure to compete for patients based on market conditions. The excess capacity of each facility, the second independent variable, was included as a control for each home's attractiveness. This variable was included to isolate the marketwide effects of excess capacity on expenditures from firm-specific effects. Another way of capturing attractiveness would be to employ occupancy rates; however, to maintain consistency with Nyman's model, the average number of empty beds in each home served as the proxy.

The third independent variable was the percentage of Medicaid residents in the home. By and large, homes with a higher percentage of Medicaid residents will have lower costs, because reimbursement rates are appreciably less than corresponding private-pay rates. However, according to the excess demand argument, this relationship should dissipate under more competitive conditions (i.e., surplus bed supplies).

The fourth independent variable, Medicaid reimbursement rate, was included to assess the proportion of Medicaid dollars spent on patient care. Medicaid reimbursement rate covers routine facility costs offset by any miscellaneous revenue (e.g., the sale of supplies) and certain non-allowable costs (e.g., bad debt expense). Because Kentucky operates under a prospective payment system, the 1989 reimbursement rates were based on 1988 cost data, with adjustments for inflation.

A quality-of-care variable and case-mix indicators were included to control for input differences. Previous research has provided no generally accepted measure of quality. However, Nyman (1988b) employed code violations weighted by severity as a dependent measure in his investigation of excess demand and nursing home quality. Consistent with Nyman's work and the research of others (Christianson, 1979; Riportella-Muller and Slesinger, 1982), the total number of Medicaid certification code deficiencies for each home in 1989 served as the measure of quality. Although analyses using weighted code violations based on patient-care deficiencies were conducted, the pattern of results was similar to those using total deficiencies; hence, they are not reported here.

The case-mix measure was generated from 1989 resident classification data submitted by each facility in the State as part of the requirements for Kentucky's new Case Mix Assessment Reimbursement (CMAR) System. Generally, case-mix measures used for establishing reimbursement rates are suspect, given the economic incentive to inflate. In addition, these data were provisional and subject to change, because implementation of the CMAR system was not scheduled until 1990. The CMAR measure is based on eight activities of daily living, special nursing needs (e.g., intravenous medications), the presence of behavioral problems requiring staff intervention, and clinical monitoring. From these criteria, 11 resident classifications with weights ranging from 1.0 (low resource use) to 4.0 (high resource use) are possible. In effect, higher weights reflect greater resident dependence. Accordingly, each facility's average classification weight served as its CMAR score. The second case-mix indicator, annual patient discharges, may be regarded as a

patient characteristic indicator because the extent of patient turnover distinguishes facilities with more short-stay patients from those with residents in need of long-term chronic care (Bishop, 1980). The last case-mix variable, percentage of skilled nursing facility (SNF) residents, was also included to reflect differences in product type. In general, more complex levels of care are associated with greater costs. Three other variables were included in the equation because of frequent use in previous nursing home cost studies. For example, the number of beds in each home was used as a control because costs are assumed to vary with scale of production. In addition, a squared term was employed to evaluate any curvilinear relations between costs and output. Finally, given previous research on the cost differences associated with ownership mode, a dummy variable was employed to assess for-profit status effects.

RESULTS

Combined Markets

Total Costs Per Patient Day

Means, standard deviations, and intercorrelations for the variables are listed in Table 1. The regression results for the combined markets are presented in Table 2. The R^2 indicates that the variables in the equation explained almost 70 percent of the variation in costs. As anticipated, nursing home costs were higher in counties where the average number of empty beds was greater. These market-demand effects emerged while controlling for the excess capacity of individual facilities. The coefficient for excess capacity indicates that each home experiences a \$.58 increase in resident cost per day with every additional empty bed.

Table 1
Means, Standard Deviations, and Intercorrelations¹ for Empirical Model's Variables

Variable	Mean	Standard Deviation	Intercorrelations											
			2	3	4	5	6	7	8	9	10	11	12	13
Total Cost	46.24	9.23	.94	.50	.34	-.64	.64	-.21	.22	.25	.42	.13	.13	-.24
Operating Cost	39.42	8.17		.47	.28	-.62	.58	-.20	.22	.24	.44	.10	.12	-.28
Empty Beds (County)	3.41	3.62			.46	-.37	.29	-.03	-.07	.30	.16	.27	.21	-.09
Empty Beds (Home)	4.14	4.23				-.28	.17	-.04	.01	.35	.09	.44	.38	.00
Medicaid Percent	0.73	0.21					-.48	.20	-.20	-.18	-.37	-.02	-.02	.04
Reimbursement Rate	44.28	4.80						-.13	.39	.36	.73	.24	.24	-.05
Deficiencies	3.59	6.55							-.08	-.03	-.12	.10	.11	-.03
Patient Mix	2.77	0.36									.25	.41	.15	.14
Discharges	30.75	33.64										.50	.68	.68
SNF Percent	0.12	0.21											.33	.29
Beds	96.83	42.73												.94
Beds Squared	11,192.11	111,477.28												
For-Profit (=1)	0.75	0.44												

¹Correlations greater than .12 are significant ($p < .05$).

NOTE: SNF is skilled nursing facility.

SOURCE: 1989 Medicaid certification inspection surveys and Medicaid cost reports.

Table 2
Regression Results for Total Sample (n = 179)

Variable	Total Costs	Operating Costs
Intercept	19.380 (.011)	34.796 (.001)
Excess Capacity (County)	0.580 (.001)	0.570 (.001)
Excess Capacity (Home)	0.250 (.047)	0.146 (.214)
Percent Medicaid Residents	-13.516 (.001)	-12.552 (.001)
Reimbursement Rate	0.802 (.001)	0.368 (.007)
Code Deficiencies	-0.112 (.090)	-0.098 (.117)
Case Mix	1.044 (.435)	1.166 (.356)
Discharges	-0.000171 (.993)	-0.00131 (.941)
Percent SNF Residents	-1.773 (.595)	5.231 (.097)
Number of Beds	-0.043 (.174)	-0.079 (.009)
Number of Beds Squared	0.000106 (.351)	0.000230 (.033)
For-Profit Status (= 1)	-4.131 (.001)	-4.732 (.001)
Regression	$R^2 = .66$ $F = 29.67$	$R^2 = .62$ $F = 24.35$

NOTES: SNF is skilled nursing facility. Numbers in parentheses are significance levels.

SOURCE: 1989 Medicaid certification inspection surveys and Medicaid cost reports.

The percentage of Medicaid patients was negatively related to costs. The coefficient signifies a decline of about \$13 in costs per patient day as the percentage of Medicaid patients increased from 0 to 100 percent. Consistent with previous research, for-profit facilities had significantly lower costs (approximately \$3.61 less) than non-profit facilities.

The Medicaid reimbursement rate was one of the most significant predictors of total costs. The coefficient indicates that every additional reimbursement dollar resulted in \$.80 spent per patient. Although

none of the case-mix indicators were significant predictors of costs, all three were highly intercorrelated with reimbursement rate. Hence, problems of multicollinearity may have suppressed any unique contributions to cost variability. Furthermore, the preliminary nature of the data from Kentucky's new CMAR system or the non-operating cost portions of total costs may have obscured these relationships.

Of the remaining variables, deficiencies were marginally related to cost, which could be interpreted as a positive relation between quality and expenditures. However, size and

its squared term proved to be unrelated to expenditures in the combined samples.

Operating Costs Per Patient Day

The R^2 for operating costs was .62, only slightly below that of total costs. Excess demand, ownership status, percentage of Medicaid residents, and Medicaid reimbursement rate were all significant operating cost predictors, consistent with the total cost regression results. Interestingly, the regression coefficient for reimbursement rate implies that every dollar increase in reimbursement rate effected a \$.36 increase in operating costs, roughly one-half the \$.80 for total costs. In addition, average operating costs were sensitive to facility size as well as its squared term, indicating some slight diseconomies of scale in capacity as facilities become increasingly large. Finally, operating costs were also responsive to one of the case-mix indicators, the percentage of SNF residents. In effect, an increase in the percentage of SNF residents resulted in higher costs, as might be expected.

Tight Markets and Surplus Markets

Using the average number of empty beds as a criterion, separate regressions were performed on observations under tight bed supplies (fewer than 3.4 beds) and surplus beds (at least 3.4 beds). In addition, a Chow test (Chow, 1960) revealed significant differences between the two total cost regressions as well as the two operating cost regressions. This indicates that differences in the coefficients for tight markets and surplus markets are meaningful. Also, following procedures employed by Nyman (1988a), regression equations were computed at two additional cutoff points (2.4 and 4.4). With minor exceptions, these

supplemental regressions yielded similar results. Using 4.4 beds as a criterion, size predicted total costs in surplus markets. With 2.4 as the criterion, average excess capacity was positively related to both total and operating costs in surplus markets.

Total Costs Per Patient Day

Table 3 presents results for regressions computed on counties with facilities averaging fewer than 3.4 empty beds (tight beds), while Table 4 depicts results from counties averaging at least 3.4 empty beds (surplus beds) per facility. The regression was significant in each instance (.69 and .58 for tight and surplus markets, respectively). Contrary to previous research, the percentage of Medicaid residents was a significant predictor of total costs in both tight markets and surplus markets. The coefficients indicate a decline of about \$6 and \$20 (for tight and surplus markets, respectively) in costs per patient day as the percentage of Medicaid patients increased from 0 to 100 percent.

Total costs were also sensitive to ownership status in both markets, with for-profit facilities having significantly lower costs than not-for-profits. However, the reimbursement rate coefficient changed across the two regressions. While the rate was a significant cost factor in the tight bed markets, it proved to be unrelated to costs in the surplus bed markets. Thus, with tight bed supplies, an additional dollar of reimbursement resulted in an extra \$1.14 spent per patient. By comparison, when beds were generally available, reimbursement rates had no real impact on patient-care dollars spent. Lastly, patient-mix indicators and facility-size variables failed to account for any unique variability in costs in either market.

Table 3
Regression Results for Tight Bed Market (n = 121)

Variable	Total Costs	Operating Costs
Intercept	3.420 (.604)	24.295 (.001)
Excess Capacity (County)	0.095 (.829)	0.111 (.808)
Excess Capacity (Home)	0.060 (.731)	-0.065 (.718)
Percent Medicaid Residents	-5.925 (.013)	-8.301 (.001)
Reimbursement Rate	1.146 (.001)	0.698 (.001)
Code Deficiencies	-0.087 (.111)	-0.022 (.698)
Case Mix	-0.804 (.465)	-1.265 (.268)
Discharges	0.015 (.504)	0.014 (.536)
Percent SNF Residents	-3.946 (.200)	3.181 (.317)
Number of Beds	-0.040 (.111)	-0.074 (.005)
Number of Beds Squared	0.000095 (.289)	0.000190 (.041)
For-Profit Status (= 1)	-2.957 (.001)	-4.205 (.001)
Regression	$R^2 = .69$ $F = 22.80$	$R^2 = .62$ $F = 16.30$

NOTES: SNF is skilled nursing facility. Numbers in parentheses are significance levels.

SOURCE: 1989 Medicaid certification inspection surveys and Medicaid cost reports.

Operating Costs Per Patient Day

The R^2 for operating costs were .62 and .57 (for tight markets and surplus markets, respectively). Consistent with the results reported earlier, ownership status and the percentage of Medicaid residents were significant cost predictors. Once again, reimbursement rate was significantly related to operating costs in tight bed markets, but not in surplus bed markets. However, in contrast to total costs, operating costs were responsive to facility size and its squared term in tight bed markets, though not in surplus bed

markets. In turn, the facility CMAR score, while related to operating costs in the surplus bed markets, was not a significant cost factor in the tight bed markets.

Facility Characteristics

To assess any differences in facility characteristics across the two markets, *t*-tests were calculated to compare the facility mean values from tight and surplus markets. The results are summarized in Table 5. These comparisons indicate that nursing homes located in tight markets tended to have significantly lower costs and

Table 4
Regression Results for Surplus Bed Market (n = 58)

Variable	Total Costs	Operating Costs
Intercept	42.889 (.035)	48.222 (.010)
Excess Capacity (County)	0.714 (.221)	0.941 (.078)
Excess Capacity (Home)	0.297 (.209)	0.213 (.319)
Percent Medicaid Residents	-19.762 (.001)	-15.086 (.004)
Reimbursement Rate	0.179 (.644)	-0.210 (.552)
Code Deficiencies	-0.076 (.712)	-0.155 (.410)
Case Mix	5.238 (.174)	6.467 (.067)
Discharges	0.007 (.861)	0.003 (.930)
Percent SNF Residents	3.744 (.632)	10.141 (.157)
Number of Beds	-0.075 (.497)	-0.121 (.228)
Number of Beds Squared	0.000116 (.772)	0.000351 (.336)
For-Profit Status (= 1)	-6.478 (.012)	-6.174 (.008)
Regression	$R^2 = .58$ $F = 5.87$	$R^2 = .57$ $F = 5.56$

NOTES: SNF is skilled nursing facility. Numbers in parentheses are significance levels.

SOURCE: 1989 Medicaid certification inspection surveys and Medicaid cost reports.

reimbursement rates, smaller facilities, and a higher percentage of Medicaid residents. Interestingly, Table 5 also reveals that average costs were lower than reimbursement rates among tight market nursing homes, while costs exceeded reimbursement rates in surplus market facilities.

DISCUSSION

Problems for Excess Demand

A comparison of nursing home costs in underbedded and overbedded markets is one means of estimating the impact of

excess demand. In this study, the average costs of facilities located in overbedded markets were significantly higher than that of facilities in underbedded markets (a differential of \$9.03 and \$7.21 for total and operating costs, respectively). However, as Nyman (1988a) has noted, this comparison does not control for any differences in nursing home characteristics across the two samples. To control for these differences, the characteristics of the average home in the underbedded market (i.e., the mean levels of the regression variables for these facilities) were multiplied by the

Table 5
Mean Comparisons of Facility Characteristics from Tight and Surplus Markets

Variable	Means		t-Value	p ¹
	Tight Market	Surplus Market		
Total Cost	41.31	50.34	-5.72	.001
Operating Cost	37.08	44.29	-5.08	.001
Medicaid Percent	0.77	0.64	3.75	.001
Reimbursement Rate	43.43	46.06	-3.28	.001
Patient Mix	2.77	2.75	0.49	.624
Discharges	25.88	45.35	-3.57	.001
SNF Percent	0.10	0.16	-1.74	.086
Beds	90.75	109.52	-2.79	.006
For-Profit Status (=1)	0.78	0.69	1.21	.229

¹Two-tailed.

NOTE: SNF is skilled nursing facility.

SOURCE: 1989 Medicaid certification inspection surveys and Medicaid cost reports.

regression coefficients of homes from the surplus bed market. The sum of these products was \$41.02 for total costs and \$35.21 for operating costs. Original cost estimates for the underbedded market were \$41.31 and \$37.08 (total costs and operating costs, respectively). Hence, total costs per patient day for an average nursing home located in an underbedded market would be virtually the same, and operating costs slightly higher (\$1.87), if the home were located in a surplus bed market. Using the same operations, the estimated cost per day of homes relocated from overbedded markets to markets characterized by excess demand would decrease about \$4.00 per patient day for total and operating costs. Effectively, this comparison suggests that in Kentucky, reducing excess demand, as operationalized by Nyman, may not always lead to increases in patient-care expenditures.

The Medicaid-cost relationships that emerged in this study differ from previous research and conflict with excess demand predictions. While the percentage of

Medicaid residents had a marked influence on costs across all regression equations, the negative Medicaid-cost relation was appreciably stronger in overbedded markets compared with underbedded markets. According to the excess demand argument, the negative Medicaid-cost relation occurs in underbedded markets because the higher quality facilities are able to fill most of their beds with private-pay residents, while Medicaid clientele occupy the few remaining beds or gravitate to lower quality facilities. Lower costs need not be associated with Medicaid-dominated facilities in overbedded markets, because facilities must compete for both patient types. However, the pattern of results reported here does not support excess demand arguments, inasmuch as the negative Medicaid-cost relation was stronger in the surplus bed markets.

Comparing "operating cost" regressions with "total cost" ones yields some interesting insights with possible implications for the excess demand argument. Nyman's research on excess demand effects implies

that increasing competition by increasing the number of beds in nursing home markets results in substantially increased spending per patient. Absent a determination that increased spending leads to improved quality or efficiency, it is unclear that increased spending per patient day is a necessary or even desirable goal for nursing home policymakers to pursue. Furthermore, the Kentucky evidence suggests that if underbedded nursing homes were moved to overbedded areas (or vice versa), their cost structures would closely approximate existing nursing homes in those markets. This finding seems to imply that excess demand really doesn't increase per patient expenditures except to the extent that empty beds cause increased costs per patient day (i.e., a large proportion of nursing home costs are fixed and must simply be spread over a smaller number of patients, thus driving up the costs per patient).

While the Kentucky data do not yield increased expenditures in overbedded markets, but rather a strong relationship suggesting decreased expenditures in underbedded ones, using operating cost regressions also casts some doubt on the excess demand hypothesis. For the total sample, increasing the reimbursement rate \$1.00 increases patient expenditures by \$.80, but more than one-half (\$.43) goes to non-operating expenses (greater interest, depreciation, etc.). Although the argument can be made that improved or modernized buildings and equipment benefit the residents, the relatively small increases in monies spent directly on the residents suggest that increasing bed supplies to spur competitive pressures may not bring about increased expenditures in patient care to the extent necessary to justify a policy of increasing system costs by reducing excess demand.

Methodological and Theoretical Issues

Although these data lend partial support to the excess demand argument, the impact was less pronounced than expected. Several factors may account for this. First, it is conceivable that the model employed in this study lacks one or more key variables. As such, the analysis is a correspondingly weak test of excess demand effects. Second, in comparison with previous investigations, the variability and intensity of excess demand in Kentucky may differ from other markets. Finally, the excess demand argument typically invokes "pressure to compete" as an important mechanism in the effects observed. However, even though bed utilization (i.e., the average number of empty beds per county) may reflect consumer demand, it may not be an adequate indication of market competition. Each of these considerations is analyzed below.

Location and chain ownership are two variables excluded from our initial analyses. To begin, higher input prices are likely to vary with location. Accordingly, location should have an effect on costs. Also, research by McKay (1991) on the cost effect of chain ownership revealed that chain homes had lower average costs than independent homes at intermediate and high levels of output. It stands to reason that nursing home chains are likely to prefer and establish facilities in underbedded markets where relatively higher output is assured. If these same chain-owned facilities were relocated to overbedded markets, the excess demand argument would predict increased expenditures. Yet, given the cost advantages associated with centralized purchasing and administration of chain-owned facilities, any pressure to increase costs could be mitigated. Alternatively, if the advantages of more efficient purchasing

and administration remain intact, it is equally likely that these more efficient homes would compete in overbedded markets by using lower costs to offer equal quality of service at a lower price than their competitors. Under this scenario, these homes would use their greater efficiency and lower price to more successfully attract patients than their competitors. Effectively, not only would the pressure to increase costs (per excess demand argument) be mitigated, it would be eliminated. While the logic for each variable is compelling and previous research supportive, supplemental analyses using these variables did not deviate appreciably from the original regression results. Facilities from Louisville and Lexington areas proved to be located in tight bed markets only. Hence, the impact of this location variable could not be isolated from those of the market. A dummy variable indicating chain ownership failed to account for any meaningful variability in expenditures across all regressions.

Failure to replicate the pattern of Medicaid-cost relations reported by Nyman (1988a) may signify differences across States and nursing home markets. For example, in 1985, Wisconsin ranked second among all States in the number of certified beds per 1,000 elderly persons; Kentucky ranked 36th (Kenney and Holahan, 1991). Indeed, the ratio in Wisconsin (85.26) was more than twice that of Kentucky (41.62). Moreover, the average number of empty beds in the Kentucky sample was 3.4, while the average in Nyman's Wisconsin sample was 7.5. Hence, it is possible that the Kentucky market as a whole can be characterized as underbedded relative to the Wisconsin market. A lack of surplus bed markets in this sample could have prevented an adequate test of excess demand hypotheses, although the same problem may have occurred in Nyman's Wisconsin sample,

where empty beds averaged less than 6 percent. Even so, the Medicaid-cost relation was negative in both markets within Kentucky, but appreciably stronger in the overbedded or surplus market. The excess demand argument would predict a pattern precisely opposite from the one reported here.

By and large, demand for health care beds and bed use are the same. Within nursing home markets, however, a distinction can be made because there is generally a shortage of beds at the prevailing Medicaid price (Feldstein, 1988). Moreover, utilization may significantly underestimate demand because Medicaid does not subsidize the price of other long-term care services and the chances of institutionalization are inversely related to income levels. Accordingly, any variability in these proxy measures of demand (e.g., number of empty beds) may overestimate the differences in "competitive pressure" simply because demand for nursing home beds is excessive in most markets. Nevertheless, market competition can be captured in other ways. For instance, competition in the hospital industry has been based on the number of hospitals within a market or measures of concentration, including the Herfindahl index (Feldstein, 1988). With respect to nursing home markets, Tuckman and Chang (1988) reported cost convergence between for-profit and non-profit facilities within competitive markets, using concentration ratio as a proxy for competition. More research focusing on the competitive features of nursing home markets is clearly warranted, inasmuch as failure to provide adequate nursing home care is often regarded as a market failure. At the same time, regulation is a hallmark of this industry. To the extent that existing firms extract benefits from those regulations, it will be particularly difficult to demonstrate the

value of "market-oriented" strategies that emphasize the central role of competition.

Nyman has introduced the concept of competitive pressure into the nursing home policy debate. The question is whether he has measured it properly or accounted for its role. For example, even if there are no empty nursing home beds in a particular market, it is not certain whether this reflects a severe supply shortage or a market-clearing supply of beds at equilibrium. Another shortcoming, discussed earlier, is that the chronic excess demand for nursing home beds could inhibit competition even in markets identified as overbedded. It is possible that, due to differing marketing strategies, some nursing homes tend to have more empty beds, but do not feel competitive pressures to fill them. For instance, in Kentucky, the average number of discharges in tight markets was 26 per year, while for surplus (overbedded) markets, it was 45. Thus, what we (and Nyman) are identifying as surplus beds may simply be beds empty because of the inherent friction that results when a bed empties through discharge, an event more likely to occur in a facility that focuses on relatively short-term care.

The question of how to measure competition, or the lack thereof, is still an open one. Resolving the measurement issue should make the assessment of excess demand hypotheses more manageable. A more effective proxy, perhaps, could be constructed using population data (e.g., beds per thousand population in the nursing home catchment area). However, one may need to control for differences in cultural context (e.g., family caregiving) as well as the availability of home and community care because these may serve as substitutes for institutional care and effectively reduce the real demand for beds. Another caveat relates to private

pay/Medicaid mix and longitudinal shifts in mix. Nursing homes employing explicit quality-enhancement strategies designed to attract private-pay residents may admit a disproportionate number of private-pay patients who convert to Medicaid status after a short period. Economic conditions that give rise to this are likely to vary across States and geographic subareas of States. As a result, one may observe some counterintuitive relationships among the percentage of Medicaid residents, patient-care expenditures, and quality of care. In sum, further study clearly needs to be done into what factors, in addition to the level of empty beds, actually put pressure on owners to take steps to increase occupancy, and what those steps are likely to be.¹

Excess Demand and Public Policy

Another problem for the excess demand argument is the issue of whether excess demand actually yields improved quality of nursing home care to the residents, and whether that improved quality is worth the additional costs imposed on government and private-pay residents. Clearly, current measurements of nursing home quality are inadequate for the purpose of answering these questions. The primary difficulty stems from the diversity of views underlying perceptions of what constitutes nursing home quality. No single criterion is meaningful, because one cannot easily dismiss the preferences of any constituency—policymakers, health care professionals, administrators, owners, investors, third-party insurers, or consumers.

Although cognizant of the value-laden nature of nursing home quality, we propose

¹Ideally, non-economic forms of research could contribute to our understanding of this issue. For example, using interview and survey techniques with nursing home operators and administrators could give some insight into their perceptions of and responses to competitive pressure in the marketplace.

that one pragmatic way to measure quality and efficiency involves adding another variable into the debate—the private-pay rate.² We want, as does Nyman, to use competition to bring some rationality into the nursing home market. If a nursing home can attract paying customers at a given rate (above the government payment rate), that private-pay rate could serve as a proxy for quality of nursing home care. Very simply, if markets work, paying patients don't care about costs; they care about results. Their willingness to pay a given rate, therefore, establishes that nursing home as offering quality comparable to other nursing homes able to attract patients at equivalent private-pay rates. Furthermore, efficiency can be measured or evaluated by the difference between the private-pay rate and the cost of providing service. From a government perspective, a payment system that rewards homes that are able to attract private-pay patients at a rate above their costs and penalizes homes that can't, would introduce a measure of efficiency, as well as quality, into the regulatory picture. Moreover, it would assure that the government was getting the maximum value for its nursing home expenditures. At times, data limitations may preclude this suggested line of research. We hope, however, that private rates can be brought into the debate involving future nursing home policy.

Under the present state of research, one cannot be sure whether competition is actually being measured, whether increased nursing home costs actually improve care quality at all, or whether increased costs improve quality enough to justify the increased expenditures. Until these

²Nyman (1988b) has used private per diem price as a predictor of certification code violations (quality) in a previous study. Interestingly, the private per diem price was negatively related to violations in markets where excess demand was likely. That is, in markets where facilities ostensibly compete for private-pay residents, consumers apparently respond to quality differences.

questions can be answered, the policy implications of this line of research remain murky, at best.

ACKNOWLEDGMENTS

The authors wish thank Dan Black and three anonymous reviewers for their constructive comments on an earlier version of this article. Also, we gratefully acknowledge the assistance of Woody Dunn, Floyd Parrish, and Robert Kester from the Kentucky Cabinet of Human Resources.

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