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ABSTRACT

The research presented here focuses on the impact of competitive forces on the provision of social or merit goods by non-profit hospitals. We specifically examine the behavior of altruistic non-profit hospitals in the supply of charity care. The effects of competitive pressures and past charity care provision on the supply of philanthropic donations to non-profit hospitals are also examined. Empirical models of the supply of donations and charity care are specified and estimated using data on non-profit hospitals in Florida for the years 1980-1984. The coefficient estimates imply strong income effects in the charity care supply equations. This raises the possibility that competitive pressures and limits on hospital payments, under public insurance programs, may reduce the supply of indigent care. The results from the supply of donations models suggest that philanthropic donations will alleviate the competitive pressures to a small degree.

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I. Introduction

The research presented here focuses on the impact of competitive forces on the provision of social or merit goods by non-profit hospitals. Specifically, we are interested in the supply of hospital care to the medically indigent within the context of various market situations. There is on-going interest, from both the research and policy communities, in "competitive" approaches to improving efficiency in the health care sector (Davis et al., 1985; Goldsmith, 1988; and Pauly, 1988). A variety of strategies are subsumed under the heading of competition. They include improving market information about provider quality and prices (Pauly, 1988), creating incentives for consumers to become more prudent buyers of health care, and use of market power by institutions to obtain more favorable combinations of quality and price for health care services (Johns, 1985; Rosko, 1989; Fuchs, 1988).

Accompanying the expansion of the competitive forces in the health care market place has been two sorts of concerns. First, there is the view that increased competition for patients among providers may take the form of cost increasing non-price competition (Robinson and Luft, 1987; Robinson, 1988). Second, competitive pressures may diminish the ability of hospitals to cross-subsidize charity care (Lewin and Lewin, 1987).

The non-profit hospital continues to be the dominant provider in the market. In 1987 roughly 59% of nonfederal general hospitals were not for profit institutions. Moreover, 71% of all general hospital beds were in non-profit hospitals (American Hospital Association, 1987). Therefore developing an understanding of factors that influence the supply of charity care for this sector is of considerable importance for formulating policy towards financing of hospital care for the indigent. A central question for this analysis is how do non-profit hospitals respond to competitive pressures with respect to their provision of charity care. A related question concerns the extent to which competition from one type of provider (say for-profit hospitals) leads to a qualitatively different sort of response than does competition from other non-profits.

It is also important to consider how the role of donations to the hospital may influence responses to competitive pressures. Sloan et al. (1988) and Morrisey and Sloan (1986) have recently examined the factors which influence charitable donations to the hospitals. Approximately 0.6 per cent of hospital revenues originate from charitable contributions. There is some variation in this rate. We are interested in whether such revenues are used to compensate for reductions in opportunities for cost shifting and whether provision of charity care attracts contributions to hospitals. It is our intention examine both these issues in our analysis of the supply of charity care.

The paper is organized into six sections. The second section of the paper presents a theoretical discussion of the impacts of competition on provision of charity care. We draw on existing research literature to characterize several formulations of hospital competition and the impact it may have on provision of charity care. The third section of the paper reviews previous empirical studies related to the various propositions developed in the theoretical section. The next two sections present ojr own empirical analyses bearing on hypotheses about the supply of donations (Section IV) and the hospital's supply of charity care (Section V). Section VI summarizes our findings and their implications for future research.

II. Models of Competition, Charity Care and the Nonprofit Hospital

A. Theoretical Point of Departure

We will investigate the behavior of the non-profit hospital under a number of differing circumstances that each represent some form of "competition" as the term has been used in the literature. We begin with the simplest model and offer increasingly complex characterizations of the market situation faced by the hospital. We begin by examining a firm facing a regulated price and exogenous demand. This might be the type of competitive situation that is associated with Medicare's prospective payment system, selective contracting under Medicaid (Johns, 1985) or state rate setting programs. Each of these programs tends to reduce the supply price to hospitals for a large segment of the patient population. The impact of these programs is similar to what one might expect in a world of price competition. That is pressure is put on hospital price markups and discretionary funds, given evidence on the limited ability of hospitals to shift costs (Hadley and Feder, 1985). The exogenous demand assumption receives some support given current excess capacity in the hospital sector (although we relax both the price and demand assumptions below).

The hospital is assumed to maximize an objective function

(1) $U = U(R, N)$

whose two arguments are net revenue (R) and the amount of need of the medically indigent that is unmet (N), where $U_R>0$ and $U_N<0$. The disutility associated with N indicates that non-profit hospitals are concerned with a "public bad", unmet need for hospital care. We refer to this formulation of the objective function as purely altruistic in N because the hospital cares only about the amount of unmet need in the community regardless of which hospital gets "credit" for serving the indigents and thereby reducing unmet need.

Hospital net revenue is defined as the sum of endowment income (E) and revenues from providing services, PQ + rD where P is the fixed price, Q is the number of paying patients, D is the number of indigent patients, and r is the subsidy per indigent patient (where $0<r<P$).[1] The hospital's cost function is C = C(Q+D). Thus net revenue is defined as:

$$(2)\ R = PQ + rD + E - C(Q+D).$$

There has been considerable controversy over the extent to which non-profit and for-profit hospitals actually pursue different objectives (Pauly 1987, Sloan 1988, Steinberg 1987 and Manning 1973). The specification of the objective function allows for either identical or differing objectives to be accommodated. In addition, a number of recent studies point out that "profits" earned in one activity can be spent by non-profit firms to pursue other objectives of management or trustees (Hansmann 1980, James 1983, Danzon 1982, Clark 1980, Pauly 1987). These other objectives may take the form of "perks" for managers, creating a reserve fund, or doing "good works" in the community. Thus R may be viewed broadly as a composite commodity representing "profits" spent on all "goods".

The level of unmet need (N) is equal to the total need in the community (T) minus the amount of charity care delivered by various other types of hospitals. We therefore write an expression for N as:

$$(3)\ N = T - D - H - G$$

where H is the level of charity care delivered by other private hospitals,[2] G is the level of charity care delivered by publicly owned hospitals and D is the charity care provided by the hospital of interest. We adopt the Nash-

Cournot assumption that each hospital chooses the optimal amount of charity it provides conditional on the observed charity care supplied by other hospitals. Substitution of (3) and (2) into (1) allows us to rewrite the objective function as:

(1′) $U = U [(PQ + rD + E - C(Q+D)), (T-H-D-G)]$.

B. Comparative Statics Results for Exogenous P and Q

Since P and Q are both exogenous in this initial formulation there is only a single first order condition for maximization of (1′):

(4) $U_D = U_R [r - C_D] - U_N = 0$

Equation (4) indicates that at its optimum the hospital will admit indigent patients up to the point where the financial loss is just balanced, in utility terms, by the marginal reduction of unmet need in the community. The key comparative statics results for the policy variables of interest to this paper (P, r and E) are reported on Table 1 (see Frank and Salkever 1988 for a more complete and general discussion of this class of models).

Equation (6) represents the pure income effect while equation (7) is analogous to a Slutsky consumer demand equation. The first term on the right hand side is an income effect, while the second is a substitution effect. The latter is positive in equation (7), assuming an upward sloping marginal cost curve ($C_{DD}<0$) and concavity of the locus of points where R is maximized for values of N.[3] The implication of the concavity assumption is that $J > 0$. This means that an increase in subsidies for charity care (r) will result in an increased supply of charity care (provided that the income effect is non-negative). Note that the expression for dD/dP reduces to a pure income effect, since when Q is assumed to be exogenous no substitution is possible.

Many of the characterizations of the problem of access to care for the poor and uninsured in the policy literature appear to be based on a characterization of hospital behavior similar to that described above. That is, reductions in hospital prices (at the margin) are viewed as an important factor leading to reluctance to provide charity care (Lewin and Lewin, 1987; Wilensky, 1987). This pressure on prices has been associated with increased "competition". Competition in this context means that large payors (such as Medicare) are using regulatory powers to reduce prices in order to limit budgetary obligations. The effect is a reduction in hospital income and a drop in the supply of charity care.

Recent policy actions on the part of several states implicitly suggest a belief that income effects are likely to be small and substitution effects relatively large. The states of Florida and South Carolina have implemented funding "pools" for subsidizing charity hospital care. These pools are being financed, at least in part, by a tax on hospital revenues. If dD/dP were comprised solely of an income effect and it was large, one might expect states to view a tax on hospitals as a relatively inefficient manner by which to expand the level of hospital charity care.

C. Competition on the Basis of Nonprice Factors

Nonprice competition has long been recognized in the health care sector; recent studies focusing on this issue are Luft et al. (1986), Robinson and Luft (1987) and Allen and Gertler (1987). In order to accommodate such concerns we modify the framework proposed above by 1) allowing Q to be a choice variable, and 2) specifying a variable (q) which is an index of "quality" and a determinant of Q. Thus $Q = Q(q)$ and the cost function can be rewritten as $C = C(Q+D,q)$.[4] The hospital can then be characterized as maximizing U = U(R, N) by choosing optimal values of q and D. The new first order conditions can be characterized by equation (4) above and:

$$(8)\ U_q = U_R\ (PQ_q - C_Q Q_q - C_q) = 0.$$

The comparative static result for dD/dr is the same as in (7) above. The result for dD/dP is given in equation (9) of Table 1. Equation (9) is also analogous to a Slutsky demand equation. It is also important to note that the substitution effect (the second term on the right hand side of (9)) has the opposite sign as that in equation (6) (negative). In addition, the substitution effects in (7) and (9) are of different magnitudes. If the income effect is positive and the substitution effect of modest size then dD/dP is likely to be positive. In contrast if the income effect is small and the substitution effect strong dD/dP will be negative. Once again there are opinions (and actions) in the policy arena that are consistent with either formulation.

D. Competition as Improved Shopping Behavior

There are a variety of efforts aimed at improving shopping, either, on the part of or, on behalf of consumers of health services. These include development of information on provider outcomes and costliness. Moreover, organizations have arisen that assist consumers in processing available information for the purpose of making economic choices. These include PPOs, employee assistance plans and case management programs. A more aggressive consumer role is being proposed for "sponsors" of health insurance as a means of intensifying competition (Enthoven, 1988). These developments all lead to a more traditional characterization of competitive forces (Pauly, 1988). We treat improved shopping behavior in terms of shifts of a provider's downward sloping demand curve. We therefore specify the demand constraint on the firm as $P = P(Q, X)$, where X represents the degree of shopping activity and $P_X < 0$. This formulation leads us to rewrite equation (1′) as:

(1′′) $U = U[(P(Q, X)Q + rD + E - C(Q+D)), (T-D-H-G)]$

Maximization of (1′′) with respect to Q and D results in two first order conditions. The first is identical to equation (4) above, while the second takes the form:

(10) $U_Q = U_R [P_Q(Q, X)Q + P(Q, X) - C_Q] = 0$

This, of course is the familiar equilibrium condition of marginal revenue being equal to marginal cost. The comparative static result of primary interest to this research relates to the impact of expanded shopping on the supply of charity care or dD/dX (Equation (11) in Table 1). Assuming that $U_{RR}<0$, the key factors affecting the sign of dD/dX are the shape of the demand curve and the manner in which a change in X shifts the demand function. Specifically, if $P_{QQ}<0$, $P_{QX}>0$ and $P_{QX}> P_X/Q$, then $dD/dX < 0$. Figure 1 illustrates the implications of the first two of these conditions 1) that the demand curve is concave to the origin and 2) that it becomes flatter with an increase in X. Concavity of the demand curve is plausible, at least for low money prices, since the time price becomes a relatively larger share of the total cost to the consumer as the money price falls so the elasticity of demand with respect to the money price approaches zero. The flattening of the demand curve is consistent with the presumption that greater competition increases the price elasticity of demand faced by the individual firm.

The implication of this result is that markets where there is more intensive "shopping" on the part of consumers and their agents, there is likely to be a smaller supply of charity care provided by hospitals, ceteris paribus. Hospitals operating in markets with organizations that enhance "consumerism" will supply less charity care than otherwise similar hospitals in different markets. These organizations might include: PPOs, HMOs and other managed care arrangements.

E. Endogenous Donations and the Supply of Charity Care

We now extend the model to allow philanthropic donations to the hospital to be endogenous. This is accomplished by specification of a donations or endowment function E. Most research on donations to the hospital sector has been concerned with financing of capital projects for hospitals (see, for example, MacLeod and Perlman, 1978). We are interested in donations used to fund charity care services which are part of the operating budgets of hospitals. Recent work by Morrisey and Sloan (1986) and Sloan et al. (1989) has taken up the issue of hospital philanthropy in a more general manner than has previously been the case. In particular Sloan et al. (1989) propose an explicit model of hospital philanthropy in which the philanthropist's utility is a function of total hospital output and other goods. Maximization of this objective function subject to a budget constraint yields the optimal supply of donations to hospitals.

Our approach differs from Sloan et al. (1989) in two respects. First, rather than assume that all hospital output is valued by donors, we only view care to the poor and uninsured as generating benefits to donors. Second, our approach assumes that a hospital's level of need is considered by potential donors. This suggests that, all things equal, philanthropists prefer to donate to hospitals whose financial position is relatively weak.

These considerations are taken into account by specifying a donation function of the form:

(12) $\bar{E} = E(D, \Pi)$; $E_D>0$ and $E_\Pi<0$

where Π is defined as the profits made by the hospital on paying customers. Thus $\Pi = P(Q,X)Q - C(Q)$. Derivation of the comparative statics for the impact of competition on the supply of charity care (dD/dX) in the context of this model yields similar results to those found in equation (11) above. For dD/dX to be negative the demand function must behave in the same fashion as is illustrated in Figure 1. In addition two other conditions must be met: $-1<E_\Pi<0$ and $E_{D\Pi}<0$. The first condition indicates that there must be less than dollar for dollar crowding-out of profits for donations to guarantee a negative dD/dX. An inward shift of the demand curve, due to a change in X, reduces profits generated from paying customers which results in reduction in discretionary dollars but the simultaneous increase in donations does not fully compensate for the loss of these profits. Empirical suport for this assumption is provided below.

III. Review of Empirical Evidence

The vast majority of the support for notions about the impact of competition on the supply of hospital charity care comes from casual observation and speculation. The empirical evidence on the effect of various characterizations of competition on charity care has been slow to surface. We have found two studies which explicitly make efforts to estimate hospital supply of charity care responses to competition, and one study that offers some evidence as a by-product.

Thorpe and Phelps (1988) use data from private non-profit hospitals in the State of New York to estimate a model of the supply of charity care.

Using data from audited financial statements of hospitals for the years 1981 to 1984 they estimated the impact of market structure on the provision of charity care holding constant the effects of a) the state subsidy scheme for uncompensated care, and b) population characteristics of the county in which the hospital operates. The results reported were for the impact of a county Herfindahl Index on the level of uncompensated care provided by a hospital. They found a significant relationship that indicates that hospitals operating in relatively more competitive markets provide less uncompensated care. This result corresponds most directly to our hypothesis regarding dD/dX in either the endogenous or exogenous donations cases. (This result may also be due to crowding out by private hospitals as implied by the pure altruism model outlined above.)

Hadley and Feder (1985) report on results from a survey done jointly by the American Hospital Association and the Urban Institute. They report strong responses to "revenue pressures" among both financially healthy and distressed hospitals. They found large increases in the number of hospitals that "adopted explicit limits on charity care" during a period of constrained revenues. While this is not direct evidence of decreased supply, it certainly offers support for the notion of intent to reduce such care. At first glance the results reported by Hadley and Feder suggest that $dD/dP>0$. This would imply a very strong income effect and a relatively weak substitution effect. Yet it is never made quite explicit what is meant by revenue pressures. Thus their finding may also support the hypotheses that $dD/dP<0$ and $dD/dX<0$. This would occur if revenue constraints involve shifting and flattening of the individual hospital's demand curve.

Finally, Sloan, Morrisey and Valvona (1988) offer some evidence for the dD/dX hypothesis. They analyzed the percentage of hospital discharges that were "self pay" patients. These are thought to be largely uninsured indigent patients. They examined data from the Commission on Professional and Hospital Activities. Regression models were estimated which included variables describing characteristics of county population, hospital structure (size, ownership and teaching status) and the percent of the local population that enrolled in HMOs. Again a larger HMO presence in a market may indicate enhanced consumerism and therefore possibly a test of $dD/dX<0$. The estimates reported by Sloan and his colleagues were very unstable for different time periods analyzed and all had standard errors that were very large relative to the estimated coefficient. We view these findings as offering little support to an "improved shopping" competitive effect.

IV. An Empirical Model of the Supply of Donations

In the preceding discussion, we argued that the flow of donations received by the hospital may be influenced by (1) the amount of charity care it supplies and (2) its financial situation. This argument opens up the possibility that the supply of charity care may not be drastically eroded by increased competitive pressures that lead to shrinking hospital profit margins. We will now examine the empirical basis for this argument by analyzing data from 61 private non-profit acute care hospitals in Florida over the period 1982-1984.

The dependent variable in our analysis is annual unrestricted contributions reported as non-operating income in the hospital financial reports filed with the Florida Hospital Cost Containment Board (HCCB). For the 158 data points in our study, these contributions represented on average 0.54 per cent of each hospital's annual total revenue.[5] Explanatory variables (see Table 2) relate to hypothesized determinants of the supply of donations. These include the following characteristics of the population of the county where the hospital is located: the logarithm of the size of the population (LTOTPOP), the logarithm of real per capita income (LRPCINC), and the logarithm of the per cent of the population age 65 and over (LPPOP65P).[6] As a proxy for the number of high income individuals in the county population, we also included the logarithm of the ratio of dividends, rents, and interest income to total personal income in the county (LDIVRAT). Donations can also come from corporate sources. We hypothesized that corporate donations would be larger when employment was concentrated among a small number of larger employers. Relatively large employers may have greater community visibility; moreover, if they see the benefits of their donations accruing in large part to themselves and their employees, they will be less concerned about free-riding of non-contributing employers (Navarro, 1988). To test this hypothesis, we estimated the number of private sector employees in large establishments (500+ employees) as a fraction of total county private sector employment (BIGBEMPR).[7]

The supply of donations to the hospital is also hypothesized to depend upon characteristics of the hospital itself. In particular, the supply is expected to depend positively on the amount of charity care supplied by the hospital. This is measured by the logarithm of "equivalent admissions" financed by charity and bad debt lagged one year (LCHARAD1).[8] Our behavioral hypothesis is that donors supply funds to the hospital specifically to provide "public goods" such as charity care; thus the provision of charity care by the hospital in the prior year signals to donors that their donations will indeed be used for this purpose and thereby encourages them to donate more funds in the current year.

The net-revenue performance of the hospital is also assumed to influence the supply of donations. Hospitals that earn larger operating profits are expected to be seen as less "needy" by donors and less likely to translate a marginal dollar of donations into a marginal dollar of charity care. Information about financial performance is assumed to become available well after the close of the previous fiscal year. Thus, our regression model includes the hospital's operating margin rate lagged two years (OPMGN2) as an explanatory variable. (Analyses with a one-year lag were also performed.)

Dummy variables for hospitals that are members of the Council of Teaching Hospitals (DUMTEACH), church-affiliated hospitals (CHURCH), and hospitals affiliated with Catholic organizations (DUMCATH) are also included in selected regressions. As providers of public goods in the form of educational and research services, teaching hospitals should be able to attract additional donations. Religious affiliation might have a positive effect on donations for several reasons. Donors might feel more assurance that their contributions would indeed go to support "good works" rather than emoluments. A greater expectation of private benefits in the "hereafter" may also encourage donations to religiously-affiliated hospitals. (The analysis by Dixit and Grossman (1984) suggests that donations to these hospitals could be viewed as a means of acquiring other-worldly rents.)

Competition for donations to support charity care will presumably reduce the flow of donations to the hospital. Two explanatory variables are used to account for this competition, the ratio of non-federal government beds to all hospital beds in the county (RNFGBED) and the logarithm of the ratio of beds in the hospital to all beds in private nonprofit hospitals in the county (LRBEDSNP). As major suppliers of charity care and other public goods financed by taxes, public hospitals are expected to crowd out private donations resulting in a negative coefficient for RNFGBED; private crowding out by other nonprofits implies a positive coefficient for LRBEDSNP.

The logarithm of the average payroll per employee in the health services sector in the county (LRWAGEHS) is included as a price variable from the donor's perspective; if the donor's utility depends upon the quantity of charity services provided by the hospital rather than the dollar volume of his own donations, and if these charity services are a normal good to the donor, a higher cost per unit of service should reduce the quantity of charity services the donor is willing to finance. The effect of this price change on the dollar volume of donations depends on the donor's price elasticity of demand for charity services. Finally, a dummy variable is included to account for hospital efforts to increase community support by establishing an organized hospital auxiliary or volunteer program (AUXORVOL).[9] (The hypothesis that community support is indeed higher for hospitals which offer such programs was suggested to the authors by Ross Mullner.)

Coefficients from estimated donation supply functions are reported in Table 3. Equations 1-4 were estimated by the Fuller-Battese (1974) variance-components technique while equation 5 included hospital-specific dummies.[10] The signs of the estimated coefficients for the population variables are generally consistent with the expectation that larger, wealthier populations donate more to local hospitals.[11] A number of these coefficients are not significant at conventional levels however, particularly the LTOTPOP and LRPCINC coefficients. The low significance levels of the coefficients in equation 5 illustrate the problem of estimating a fixed-effects model with only three cross-sections of data.

The regression results also provide some support for both of the hypotheses concerning donation supply discussed in our theoretical analysis. The estimated elasticity of donation supply with respect to lagged charity admissions is approximately +0.3 in all five regressions. The fraction of the cost of a charity admission recovered through the donations it generates is small however. At the sample mean values for deflated unrestricted contributions (7.568), lagged charity admissions (768.8), and deflated gross revenue per adjusted admission (0.1441), this +0.3 elasticity implies that approximately 2 per cent of the price of a charity admission will be paid for by donations in the following year.[12] The strongly negative coefficients for OPMGN2 imply that shrinking operating margins elicit an increased supply of donations. In particular, our coefficient estimates imply that a one per cent decline in operating margin increases the supply of donations by approximately 5 to 10 per cent.[13] Evaluated at the mean donation level ($181,429) and a total revenue level of $33 million (based on the mean donation level and the mean ratio of donations to total revenue of 0.0054), the OPMGN2 coefficients imply an increase of $9,000 to $18,000 for a decrease of $330,000 in net revenues. (Note that the denominator of OPMGN2 is revenues.) This is consistent with our assumption (in our theoretical discussion) that $-1<E_{\Pi}<0$.

Coefficients for almost all of the remaining variables were clearly and consistently insignificant. The only exception is the 1984 dummy whose coefficient implies a very substantial decline in donations during that year. While this decline coincided with the implementation of the Medicare Prospective Payment System (PPS), it is not clear why the advent of PPS would affect the flow of donations per se.[14]

V. Charity Care Supply Regressions

Our empirical analysis of charity care supply is based on data for 69 private nonprofit general hospitals in Florida for the years 1980-1984. Dependent variables are the logarithm of equivalent admissions accounted for by bad debt and charity care and the corresponding figure for equivalent inpatient days. Definitions for the independent variables used in the analysis are shown in Table 2. Only hospitals that (1) had HCCB financial report data available for each of the five study years and (2) maintained private nonprofit ownership status in each of the five years were included in the analysis.[15]

Our explanatory variables include a number of different measures of socio-economic and demographic characteristics of the county population. These variables include measures of insurance coverage (LPHSPANY, LRMCARE, LPWELFARE) that should be negatively related to the level of community need (T in our theoretical model).[16] Since population size, birth rate (particularly among low-income women) and the rate of accidents and injuries are presumed to be positively related to T, variables relating to these demographic characteristics (LTOTPOP, LRTRBRTH, LRRBTHB, and LREXDEAD) are also included. Other explanatory factors include exogenous variables expected to influence the supply of donations (LRPCINC, LDIVRAT, BIGBEMPR) and variables measuring nonoperating income flows and Medicare profit opportunities (NNNOPCBD and BITE1RMC).[17] The market structure and competitive environment in which each hospital functions are described by measures of the distribution of hospital beds by ownership type (RNFGBED, RFORPBED), HMO enrollment (RHMOSANS), the county Herfindahl index ($\overline{\text{LHERFSYS}}$), an only-hospital dummy (DUMONLYH), and the hospital's share of non-profit beds in the county (LRBEDSNP). Wage (LRWAGEHS) and fixed capital input (LBEDS) measures are included as arguments in the hospital's cost function.[18] Additional dummy variables are included for other hospital characteristics (CHURCH, DUMTEACH, DUMCATH, DUMNTOLS, DUMNATCM) and individual years, and we also include a measure of the hospital's Hill-Burton free care obligation (ADJHBADM). Finally, regression models were also run with the supply of charity care by other hospitals (TCHADMP, TCHADMF, OTHCHADM) replacing the market structure variables. This was done to replicate the direct tests of the altruism versus rivalry hypotheses explored in our previous study of Maryland hospitals (Frank and Salkever, 1988). All variables except those which took on zero values were entered in logarithmic form in the regressions; remaining variables were entered in linear form. All monetary variables were deflated by an estimated cost-of-living index value for each year and county. Regressions were estimated by the Fuller-Battese (1974) variance components method or with hospital-specific fixed effects. (Year effects are treated as fixed in all regressions.)

Regression results for charity plus bad debt equivalent admissions are reported in Table 4. Regression 1 presents the complete model results for the variance components method while regression 5 presents the analogous results for the fixed-effects method. Regressions 2 and 3 exclude a number of insignificant variables from Regression 1 while regression 6 reestimates regression 3 with fixed effects. Regression 4 replaces the market structure variables of regression 1-3 with measures of the charity care supplied by other hospitals. Results for regressions 1-3 show highly significant positive coefficients for LBEDS, BITE1RMC, NNNOPCBD, and DUMTEACH. The LBEDS coefficient indicates that increases in bed complement result in proportionate increases in the supply of charity care. The magnitude of the BITE1RMC coefficients implies that at the fiscal 1984 mean value for this variable (0.135), implementation of the PPS system in 1984 increased the supply of charity care by about 13 per cent. The NNNOPCBD coefficients imply an elasticity of charity care supply, evaluated at the mean value for NNNOPCBD (0.00028), of approximately +0.3. Thus, the results for NNNOPCBD and BITE1RMC are indicative of large positive income effects on the hospital's supply of charity care. The moderately strong negative coefficients of the wage variable (LRWAGEHS) are also consistent with positive income effects.[19]

Results in regressions 1-3 for the variables relating to community need for charity care are mixed. Coefficients for the insurance variables (LPHSPANY, LRMCARE, LPWELFAR) are uniformly negative, as expected, but rarely significant; coefficients for the birth and external death rate variables are clearly insignificant and fluctuate in sign. Results for the market structure variables are generally consistent with the hypotheses that competition and public supply of charity care both reduce the supply of this care by the nonprofit private hospital, but these results are also not highly significant. The elasticity of supply with respect to the public hospital share of beds (evaluated at the mean for RNFGBED of 0.16) is roughly -0.08. The positive coefficients of LRBEDSNP, DUMONLYH and LHERFSYS are consistent with private crowding out (as well as public crowding out) but their coefficients are not highly significant.[20] The more strongly negative coefficients for RFORPBED are presumably due more to competitive pressures exerted by investor-owned hospitals than to crowding out since the volume of charity care supplied by the investor-owned hospitals is rather small. On the other hand, the weak results for the RHMOSANS variable do not support the competitive pressure hypothesis.

Coefficients for the Hill-Burton obligation variable, the hospital characteristics dummies (other than DUMTEACH), and the year dummies are generally weak. Comparisons of results across regressions 1-3 indicates that inclusion or exclusion of these variables has little effect on the findings for the other explanatory variables. Similar comments apply to the donation supply variables LRPCINC, LDIVRAT and BIGBEMPR. The weak results here may be due, at least in part, to the relatively small share of unrestricted contributions in net nonoperating income.[21]

Regression 4 replicates the direct tests of crowding out we previously carried out with data from Maryland. Evidence of crowding out in this regression is weaker than in regressions 1-3. The coefficient of charity care supply from other voluntary hospitals (OTHCHADM) gives the strongest evidence of crowding out but its t-statistic barely exceeds 1.0 and the implied elasticity at the mean is only -0.1.

Several of the fixed effects results in regressions 5 and 6 differ sharply from the corresponding results in regressions 1 and 3. Coefficients for LTOTPOP are very large and significant while those for LBEDS are much weaker. Since the fixed effects results are based on variations over time, this suggests that growth of the population may increase the community need for charity care; the weak result for LBEDS probably reflects the fact that bed complement does not change rapidly over time so there is little information with which to estimate the fixed-effects coefficient for this variable. Other fixed-effects results are generally consistent with the results for regressions 1-3 discussed above.

Regression results with the logarithm of equivalent inpatient days of charity plus bad debt care as the dependent variable are presented in Table 5. Comparison of regressions 1-3 with regressions 1, 3, and 4 of Table 4, and of regressions 4 and 5 in Table 5 with regressions 5 and 6 in Table 4 reveals no important changes in the results with the dependent variable based on equivalent days.[22]

VI.Concluding Remarks

In the theoretical section of this paper, we have incorporated a representation of increasing competition into a model of charity care supply by the nonprofit private hospital. Our theoretical results identify conditions under which increased competition will affect the supply of charity care. Our results also highlight the critical role of income effects in deciding between various policy proposals that have been advanced for stimulating the supply of charity care. We have also extended our previous research by incorporating the supply of donations into the model. Relationships between competitive pressures, suply of charity care, and donations were derived.

Several results from our empirical analyses are of particular interest for understanding the impacts of future policy directions and industry trends. The strong evidence of income effects in our charity-care supply regressions raises the possibility that competitive pressures and limits on hospital payment under public insurance programs may indeed reduce the supply of indigent care by squeezing hospital profit margins. The difference between this result and the absence of evidence of strong income effects in our earlier study of Maryland hospitals is also striking. It is reasonable to speculate that this difference in results relates to the difference in regulatory environments between the two states. In a stringent rate regulation program, hospitals with large amounts of nonoperating income may be under greater pressure to hold down rate increases; thus, at the margin additional income is distributed back to the general public in the form of lower rates rather than being available to finance increases in the supply of indigent care.

Our results also suggest that the trend toward greater market concentration and a reduced public-sector market share will have positive but rather modest impacts on the supply of charity care by private nonprofit hospitals. On the other hand, continued growth of the market share of investor-owned facilities, according to our results, implies a decline in this supply.

Finally, while our results are generally consistent with the expectation that increased competition, tight public-sector budgets, and increased competitive pressures from investor-owned facilities will tend to squeeze the supply of indigent care, findings from our study of donation supply suggest that philanthropic donations will alleviate this squeeze to at least a small degree. Further research with larger and more recent bodies of data is clearly needed to determine whether private philanthropy can be expected to play a more significant role in funding the care of the indigent.

APPENDIX

DESCRIPTION OF DATA SOURCES

The annual reports filed by each hospital with the Florida Hospital Cost Containment Board (HCCB) are the source of our data on uncompensated care (charity plus bad debt), donations, net nonoperating income, gross revenue per adjusted admission and patient day, and acute care bed days available (used for LBEDS). More than half of the reports in our data base were for fiscal years beginning on October 1 and ending on September 30. More than 90 per cent of these reports were for fiscal years ending on or after June 30 and on or before December 31. Thus, differences in fiscal year reporting periods should not be an important source of bias in our analyses. Data on staffed beds available at the end of each year for every nonfederal acute care hospital in Florida were obtained from the American Hospital Association (AHA) annual survey tapes and annual issues of the AHA Guide to the Health Care Field; in several instances these data were supplemented with year-end beds available figures from the HCCB reports. These data were used for constructing the variables RNFGBED, RFORPBED, LRBEDSNP, and LHERFSYS.[23] The same hospitals used for calculating these variables were also used for computing the county-wide charity care plus bad debt figures from the HCCB reports. Data on membership in multi-hospital systems and (for the 69 study hospitals) on contract-management were obtained from these same sources and from annual issues of the AHA Directory of Multihospital Systems. (We defined national systems to mean systems in which more than half of the owned, leased or sponsored beds were in states outside of Florida.) Data on other characteristics of the 69 study hospitals were obtained from the AHA sources cited above. Population and income data, as well as data on birth and death rates were obtained from the Area Resources File compiled and distributed by the U.S. Department of Health and Human Services. Data on the age and race distribution of population for each county were obtained from estimates supplied to us by the National Cancer Institute. Private hospital insurance coverage percentages for each county were generated as synthetic estimates from insurance coverage regressions estimated with data from the National Health Interview Survey conducted by the U.S. National Center for Health Statistics. Average county health sector wages were computed from data on employment and payrolls supplied by the State of Florida. Data on HMO enrollments were obtained from the Interstudy HMO Census for each year for each HMO in operation in Florida. Since (1) a single enrollment figure is given for each HMO, (2) all Florida HMOs during the study period were located in Metropolitan Statistical Areas (MSAs), and (3) enrollees in an HMO could come from counties outside the one in which the HMO is located, we used the MSA population in computing RHMOSANS and assigned the same value for this variable to every county in the MSA. Counties outside of MSAs were assigned a value of zero for RHMOSANS. County-level data on Medicare enrollments were obtained from HCFA. Data on AFDC and general assistance recipients by county were obtained from the State of Florida while data on SSI recipients were obtained from the U.S. Department of Health and Human Services, as were data on Hill-Burton free-care obligations of hospitals. The PPS ratio of payments to 1981 costs projected forward were obtained from the U.S. Congressional Budget Office. Variables expressed in monetary units were all deflated by a county-specific estimated cost of living index.[24]

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NOTES

1. Initially we treat E as an exogenous source of revenues made up of untied donations. Below we relax this assumption.

2. For ease in notation we treat all private hospitals under the term H. It is possible to disaggregate H into non-profit and for profit hospitals. This will be done in the empirical work below.

3. This concavity condition is analogous to the concavity of the multiproduct profit function (in the two output case) when one output is fixed. This point is discussed in Chambers (1988).

4. We continue to assume an exogenous price for hospital services. This may be viewed as maintaining the notion of a regulated price.

5. In 24 of 183 cases, data on contributions were not reported while in another case a negative value was reported. These 25 cases were excluded from our regressions. The 0.54 per cent of revenue in our study cases is quite close to the national figure for 1981 of 0.6 per cent reported by Morrisey and Sloan (1986).

6. Nominal per capita income and other variables expressed in monetary units in the study were deflated by an estimated county cost of living figure.

7. Our estimate of the number of employees in large establishments was computed as 750 times the number of establishments with 500-999 employees plus 2000 times the number of establishments with 1000+ employees. Data for these estimates were obtained from <u>County Business Patterns</u>.

8. Equivalent admissions are calculated by dividing charity and bad debt deductions from revenue by gross patient revenue per equivalent admission. As noted below, regression models with a

two-year lag were also tested.

9.Further information on data sources and construction of variables is provided in the appendix.

10.Equations 2-4 allowed for both cross-sectional and time-series error components. Equation 1 included fixed effects for each year and hence did not allow for a cross-sectional error component.

11.The negative coefficient for LPPOP65P is consistent with this expectation if the wealth of the elderly, holding constant the fraction of their incomes from dividends, interest and rent, tends to be lower than that of younger persons.

12.Note that the mean value for our cost-of-living deflator is $23,973.20. If this were normalized to 1.0, the mean values foe unrestricted contributions and gross revenue per adjusted admission would be $181,429 and $3,454.54 respectively.

13.To test the sensitivity of these results to alternative lag structures, equation 2 was rerun first with a two-year lag on charity admissions and then with a one-year lag on operating margin. In the first instance, the coefficient and the t-statistic on charity admissions fell by nearly one half; in the second instance the coefficient and t-statistic on operating margin fell by nearly one-half. In view of these changes in the strength (though not the direction) of our findings, further testing with empirically-determined lag structures and a larger data base should be pursued.

14.A further comparison of our model and results to the recent work by Sloan et al. (1989) may also be of interest. They estimate a "reduced-form" donation supply function where the equilibrium values of the endogenous determinants of donations (the level of hospital output and the hospital's level of solicitation effort) have been replaced by the exogenous variables which determine these equilibrium values. The per cent of gross revenue accounted for by bad debt plus charity care is viewed as an exogenous indicator of the level of insurance coverage in the hospital's product market. Other exogenous variables include hospital bed size, teaching status, and church affiliation, county per capita income and per cent of persons over age 65, average nurse payroll in the hospital, per cent of hospital revenues from cost-based insurers, per cent of revenue covered by rate-setting programs, hospital location in an SMSA, and the average personal income tax rate in the state. Positive and significant coefficients are reported for the bad debt and charity revenue per cent, nurse payroll, per cent over 65 in the population, and per capita income. Bed size did not have a significant effect on donations except for very large hospitals (400+ beds) and church affiliation had a significantly negative effect. While the bad debt plus charity care revenue percentage is viewed as endogenous in our own model (since the hospital chooses how much free care to provide) and hence one might raise concerns about simultaneity bias in its coefficient, the result for this variable in the Sloan et al. study could be viewed as corroborating our own result for lagged charity care.

15.The 69 study hospitals include all Florida acute-care general hospitals that were under private nonprofit ownership over the entire 1980-84 period and that filed HCCB annual financial reports over this period. Hospitals that were listed in the American Hospital Association (AHA) Guide to the Healthcare Field as long-stay were excluded as were those classified as specialty hospitals. The 69 study hospitals includes the 61 hospitals in the donation-supply analysis.

16.LPWELFARE is viewed as a proxy for Medicaid coverage since AFDC and SSI recipients are covered by Medicaid.

17.The PPS "bite" variable could be viewed as an exogenous price variable (holding costs constant); thus its impact on charity care supplied would include both substitution and income effects.

18.Bed size might also influence hospital preferences. For example, the marginal utility of quantity at any given volume of service provided may vary with the occupancy rate of the hospital. A specific (though perhaps extreme) example of this is Feldstein's (1971) assumption that hospitals seek to attain an exogenously-determined target occupancy level.

19.Since net nonoperating income includes unrestricted donations which, according to our donation-supply results, depend upon lagged charity care supply, positive correlation between current and lagged charity care supply due to omitted hospital-specific effects could provide a purely statistical explanation for a positive NNNOPCBD coefficient. To examine this possibility, regression 1 was first reestimated with the same 158 data points used in our donation-supply regressions and then reestimated with these same data points and with unrestricted donations subtracted out in calculating NNNOPCBD. Both regressions yielded smaller and insignificant coefficients for NNNOPCBD presumably because the substantial intertemporal changes in NNNOPCBD over the 1980-82 period were not included in the reduced sample of 158 data points. Moreover, the reestimated NNNOPCBD coefficient was larger (34.9051 versus 10.4097) when donations were excluded. While this test is not very strong, it suggests that the significant NNNOPCBD coefficients for the full sample do indeed reflect a positive income effect on charity care supply.

To test the sensitivity of our other results to possible omitted variables bias in the NNNOPCBD coefficient, we also estimated several regressions with NNNOPCBD deleted. No substantive change in our finding was noted.

20.This is due in part to the correlations among these variables. When LRBEDSNP is excluded from the model, the coefficient and t-statistic for LHERFSYS increase by about one-third. When LHERFSYS is excluded, the coefficient and t-statistic for LRBEDSNP increase by about two-fifths. It should also be noted that regressions with an alternative Herfindahl index that did not treat hospitals in the same system as one firm yielded essentially identical results to those obtained with LHERFSYS.

21.For the 158 data points in our donation-supply regressions, the ratio of the mean undeflated value for unrestricted contributions to the corresponding figure for net nonoperating income is 0.2435.

22.Regressions were also run with grants and donations restricted to the support of indigent care subtracted from charity plus bad debt before computing the values of our dependent variables. Results were essentially identical to those reported here; this is not surprising in that only about 10 per cent of the study hospitals reported receiving grants and donations restricted to indigent care in any year and the annual amount of these grants and donations was small relative to total uncompensated care. Thus, the mean and variance of our dependent variables changed by less than one-half of one per cent when these restricted grants and donations were netted out.

23.Hospitals whose beds were included in the computation of these variables were all short-term non-federal hospitals that were not units of institutions or hospitals specializing in psychiatric care, tuberculosis and other respiratory diseases, chronic diseases, mental retardation, or treatment for alcoholism and other chemical dependencies.

24.The regressions used to generate these cost-of-living estimates, as well as the regressions used to generate synthetic estimates of insurance coverage, are available from the authors.

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Table 1

Comparative Statics Results

P and Q Exogenous

(6) $$\frac{dD}{dE} = \frac{U_R\ C_{DD}\ [U_{RR}\ (r-C_D)\ -\ U_{NR}]}{|J|}$$

(7) $$\frac{dD}{dr} = D\ \frac{dD}{dE} + \frac{U_R^2\ C_{DD}}{|J|}$$

Nonprice Competition

(9) $$\frac{dD}{dP} = Q\ \frac{dD}{dE} - U_R\ [C_{QQ}\ \frac{\partial Q}{\partial q} + C_{Qq}]\ U_R\ \frac{\partial Q}{\partial q}$$

Exogenous E: Shopping Behavior

(11) $$\frac{dD}{dX} = (U_{RR}(P_XQ)\ (r-C_D))(-U_R(P_{QQ}Q + 2\ P_Q-C_{QQ})-U_R^2C_{DD}(P_{QX}Q + Px)/|J|$$

Table 2: Explanatory Variables in Donation Supply and Charity Care Supply Regressions

LTOTPOP	Logarithm of total population in the county
LRMCARE	Logarithm of the per cent of county population enrolled in Medicare
LRPCINC	Logarithm of real per capita income in the county
LRTRBRTH	Logarithm of births per capita in the county
LRRBTHB	Logarithm of the ratio of nonwhite to total births in the county
LREXDEAD	Logarithm of the county death rate from external causes
LPHSPANY	Logarithm of estimated per cent of persons in the county under 65 with any private insurance
LPWELFAR	Logarithm of the per cent of county population receiving AFDC, General Assistance or SSI payments (excluding SSI old-age assistance)
LDIVRAT	Logarithm of ratio of dividends, rent and interest to personal income in the county
BIGBEMPR	Fraction of county private-sector employees in establishments of 500+ workers
NNNOPCBD	Real net nonoperating income per bed
ADJHBADM	Annual Hill-Burton free care obligation level divided by gross inpatient revenue per admission
BITE1RMC	Ratio of Year 1 PPS payment level to projected costs (based on 1981 level) multiplied by per cent of county population enrolled in Medicare multiplied by fraction of the hospital's 1984 fiscal year under PPS
LBEDS	Logarithm of acute care bed-days available in the hospital
LRWAGEHS	Logarithm of real health services payroll per employee in the county
RHMOSANS	Estimated per cent of area population enrolled in HMOs (excluding Medicare enrollees)
RNFGBED	Ratio of nonfederal public hospital beds to total acute care beds in the county
RFORPBED	Ratio of for-profit to total nonfederal acute care hospital beds in the county
LRBEDSNP	Logarithm of ratio of beds in the hospital to nonprofit private acute care hospital beds in the county
DUMONLYH	Dummy for only hospital in the county
LHERFSYS	Herfindahl index for hospitals in the county (based on nonfederal acute care beds and counting hospitals within the same system as a single hospital
DUMxx	Dummy for the year 19xx (defined for 1981-1984)
CHURCH	Dummy for church-affiliated hospitals
DUMCATH	Dummy for hospitals affiliated with Catholic organizations
DUMTEACH	Dummy for COTH member hospitals
DUMNTLOS	Dummy for hospitals owned, leased or sponsored by national systems
DUMNATCM	Dummy for hospitals contract-managed by national systems
TCHADMP	Bad debt plus charity equivalent admissions at nonfederal acute care public hospitals in the county

Table 2: Explanatory Variables (Cont'd.)

TCHADMF	Bad debt plus charity equivalent admissions at for-profit acute care hospitals in the county
OTHCHADM	Bad debt plus charity equivalent admissions at other nonprofit acute care hospitals in the county
TCHDAYP	Bad debt plus charity equivalent days at nonfederal acute care public hospitals in the county
TCHDAYF	Bad debt plus charity equivalent days at for-profit acute care hospitals in the county
OTHCHDAY	Bad debt plus charity equivalent days at other nonprofit acute care hospitals in the county
LPPOP65P	Logarithm of the per cent of county population age 65 and over
LCHARAD1	Logarithm of charity and bad debt equivalent admissions lagged one year
OPMGN2	Ratio of operating revenues minus operating expenses to operating revenues lagged two years
CHURCH	Dummy for hospitals affiliated with religious organizations
AUXORVOL	Dummy for hospitals with organized auxiliaries and/or volunteer departments

Table 3: Donation Supply Regressions

	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5
LCHARAD1	0.348922 *	0.348404 *	0.343177 *	0.347473 *	0.29637683
	1.4589	1.4623	1.6032	1.3983	0.711
OPMGN2	-9.7813 ***	-9.74907 ***	-9.93403 ***	-9.78257 ***	-4.7597613
	-2.5385	-2.5516	-2.574	-2.4986	-1.028
LRPCPINC	2.62631	2.59083	2.66708	2.4974	6.64567715
	0.91387	0.91459	1.1533	0.86387	1.01
LDIVRAT	3.236 **	3.28062 ***	3.26917 ***	3.2369 **	1.1988602
	2.1669	2.3592	2.4657	2.2803	0.171
BIGBEMPR	-0.674215	-0.629423		-0.742055	-2.95534327
	-0.17878	-0.16918		-0.19561	-0.368
CHURCH	0.294339	0.296603		0.128981	
	0.59[illegible]	0.60043		0.12019	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	-0.569
[illegible]	[illegible]				
	[illegible]069749				
DUM84	-0.612419 **	-0.598917 **	-0.595068 **	-0.589792 **	-0.5171109
	-1.6947	-2.2473	-2.3203	-2.1554	-1.073
LTOTPOP	0.361912	0.367036	0.353047	0.342791	-0.16852031
	0.87945	0.905	1.0753	0.81356	-0.021
LPPOP65P	-1.88177 *	-1.91319 *	-1.88024 *	-1.85845 *	-3.02752644
	-1.3711	-1.454	-1.5299	-1.3619	-0.384
RNFGBED	-0.0278778	-0.0467178		-0.0145175	0.82257896
	-0.01895	-0.032244		-0.0098882	0.283
LRWAGEHS	0.480176	0.420566		0.513992	-1.11309384
	0.20072	0.18476		0.22107	-0.248
DUMTEACH			-0.0670364	-0.0759886	
			-0.062847	-0.070243	
DUMCATH			0.302983	0.185044	
			0.58132	0.17467	
AUXORVOL			0.211834	0.212322	
			0.36216	0.35637	

Note: Numbers reported below coefficients are t-statistics. Coefficients significant at the 0.1, 0.05 and 0.01 levels (one-tailed) are denoted by *, **, and *** respectively

Table 4: Uncompensated Equivalent Admissions Supply Regressions

	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5	Reg. 6
LBEDS	0.859131 ***	0.928017 ***	0.879522 ***	1.04215 ***	0.08531116	-0.05378445
	3.7898	4.2381	4.3745	11.344	0.27	-0.18
LDIVRAT	0.134877	0.0870538		0.0260953	0.401587765	
	0.37872	0.28266		0.071351	0.579	
LRPCPINC	-0.493773	-0.267526	-0.407409	-0.351344	-0.08056322	-0.18529934
	-0.98245	-0.66107	-0.86358	-0.70074	-0.139	-0.344
LTOTPOP	0.204052	0.162663	0.200569	-0.0649289	1.35403681 *	1.42236322 **
	0.81647	0.6729	0.90422	-0.50443	1.59	2.202
BIGBEMPR	0.55817	0.577635		0.642129	1.17648959 *	
	0.83134	0.87051		0.96915	1.624	
MNFGBED	-0.528656	-0.340099	-0.559095 *		-0.53296751	-0.43406913
	-1.1813	-0.79828	-1.3287		-0.246	-0.865
[illegible]	[illegible] *	[illegible]	[illegible] *		-1.56259684 **	-1.62735882 **
	[illegible]	[illegible]	-1.5363		-1.893	-2.075
TCHADMP				-0.000000917		
				-0.18		
TCHADMF				0.0000123685		
				0.19923		
LRWAGEHS	-0.359227	-0.287025	-0.305323	-0.390646 *	-0.43731564 *	-0.30844388
	-1.2033	-1.0147	-1.0639	-1.3163	-1.448	-1.063
LRBEDSNP	0.184063	0.121223	0.182644		0.05832583	0.1960693
	0.82667	0.5605	0.88998		0.195	0.692
LPHSPANY	-1.12635 *	-0.885792 **	-1.31293 **	-0.870492	-1.04496256	-1.22649365 **
	-1.3613	-1.9526	-1.7569	-1.0685	-1.268	-1.715
OTHCHADM				-0.000024118		
				-1.0229		
BITE1RMC	0.894783 ***	0.956811 ***	0.960994 ***	0.837938 ***	0.74726849 **	0.75938465 **
	2.5579	3.8132	2.8343	2.3676	2.241	2.304
LRMCARE	-0.420034	-0.237087	-0.218221	-0.443489	0.20586022	0.06979096
	-1.0704	-0.66637	-1.0852	-1.1447	0.32	0.127
RHMOSANS	-0.641898	0.182763		-1.29217	0.15803776	
	-0.3645	0.1081		-0.66896	0.077	
LPWELFAR	-0.0379351	-0.0465139		-0.0548111	-0.08761961	
	-0.51104	-0.63882		-0.73099	-1.177	
LREXDEAD	0.0276001	-0.014195		-0.0298731	0.07011519	
	0.14275	-0.080065		-0.14561	0.368	
[illegible]	-0.132596	0.223629		0.116771	0.25292439	
	[illegible]	0.51211		0.19517	0.342	

Table 5: Uncompensated Equivalent Days Supply Regressions

	Reg. 1	Reg. 2	Reg. 3	Reg. 4	Reg. 5
LBEDS	0.924218 ***	0.964905 ***	1.10318 ***	0.15537934	0.02991799
	4.2741	5.0913	13.076	0.483	0.098
LDIVRAT	0.181915		0.0576505	0.64726581	
	0.54043		0.1658	0.885	
LRPCPINC	-0.396268	-0.285733	-0.208856	0.06581521	-0.07035566
	-0.78848	-0.60794	-0.41849	0.111	-0.128
LTOTPOP	0.189552	0.153379	-0.0132648	1.2258643 *	0.22611028 **
	0.80135	0.76236	-0.10694	1.413	1.859
BIGBEMPR	0.715971		0.821254	1.37675527 **	
	1.0726		1.2509	1.865	
RNFGBED	-0.588125 *	-0.579147 *		-0.1902958	-0.47997239
	-1.3357	-1.4073		-0.35	-0.936
RFJEPBED	-0.580[illegible]71	-0.638329 *		-1.[illegible]502898 **	-1.69326187 **
	-1.2804	-1.3168		-1.991	-2.113
TCHDAYP			-0.000003068		
			-0.111		
TCHDAYF			0.0000007725		
			0.086334		
LRWAGEHS	-0.474656 *	-0.401566 *	-0.52476 **	-0.56229142 **	-0.41180876 *
	-1.5807	-1.3934	-1.7631	-1.826	-1.389
LRBEDSNP	0.185939	0.164081		0.05543139	0.17749915
	0.87255	0.8432		0.[illegible]85	0.613
LPHSPANY	-1.01803	-1.23676 *	-0.774718	-0.99564138	-1.39213669 **
	-1.2181	-1.6435	-0.94636	-1.186	-1.762
OTHCHDAY			-0.000003481		
			-0.99863		
BITE1RMC	0.739138 **	0.79861 **	0.672814 **	0.59332847 **	0.62639582 **
	2.0854	2.325	1.8825	1.746	1.861
LRMCARE	-0.441565	-0.176029	-0.438047	-0.000512871	-0.05559567
	-1.1937	-0.94873	-1.2029	-0.001	-0.099
RHMOSANS	-0.46007		-0.500541	0.23468636	
	-0.2669		-0.25309	0.112	
LPWELFAR	-0.0277474		-0.0432025	0.09568703	
	-0.36984		-0.57127	-1.261	
LREXDEAD	0.040953		0.0207823	0.09068552	
	0.21001		0.10103	-0.467	
LRTRBRTH	-0.228019		-0.0621051	0.13590445	
	-0.40341		-0.10107	0.18	

Table 5: Uncompensated Equivalent Days Supply Regressions
(Continued)

LRRBTHB	-0.0181955 -0.099373		0.000301212 0.0016885	-0.17213958 -0.597	
LHERFSYS	0.0978177 0.43229	0.127396 0.66272		0.29989569 0.733	0.2306405 0.635
NNNOPCBD	100.332 ** 2.2541	94.0855 ** 2.1544	100.248 ** 2.2304	117.87291 *** 2.639	112.27286 *** 2.608
ADJHBADM	-0.000230901 -0.39264		-0.00036974 -0.62317	-0.00032102 -0.556	
CHURCH	0.128994 0.35831		0.165251 0.4756		
DUMTEACH	0.412611 *** [illegible].5525	0.418751 *** 2.[illegible]635	0.422545 *** 2.5902		
[illegible]	[illegible] [illegible]		-0.251422 -0.69503		
DUMNTOL[illegible]	[illegible].0382625 0.2657		0.055971 0.3863		
DUMNATCM	0.10794 0.79882		0.110713 0.81874		
DUMONLYH	0.0957291 0.20312		0.410981 0.97277		
DUM81	0.056537 0.66716	0.0457473 0.68088	0.0637904 0.76525	-0.05204938 -0.428	-0.008557547 -0.123
DUM82	0.0212908 0.1632	0.000190688 0.0019509	0.0574554 0.45537	-0.11456307 -0.664	-0.08496986 -0.83
DUM83	0.100976 0.83957	0.0627784 0.75003	0.105871 0.91747	-0.03276872 -0.137	-0.003404589 -0.035
DUM84	0.0435999 0.32237	0.0133316 0.13653	0.053253 0.41404	-0.12417902 -0.537	-0.05014326 -0.383

Note: See note to Table 3.