Hospital Selective Contracting without Consumer Choice: What Can We Learn from Medi-Cal?

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Abstract

In the selective contracting era, consumer choice has generally been absent in most state Medicaid programs, including California's (called Medi-Cal). In a setting where beneficiary exit is not a threat, a large payer may have both the incentives and the ability to exercise undue market power, potentially exposing an already vulnerable population to further harm. The analyses presented here of Medi-Cal contracting data, however, do not yield compelling evidence in favor of the undue market power hypothesis. Instead, hospital competition appears to explain with greater consistency why certain hospitals choose to contract with Medi-Cal while others do not, the trends in inpatient prices paid by Medi-Cal over time, and the effect of price competition on service cutbacks, such as emergency room closures.

INTRODUCTION

Selective contracting has its origins in the national recession of the early 1980s, which caused tax revenues to fall, precipitating a severe budgetary crisis in several states. Given the prevailing pro-market temper of the times, California's policymakers chose to meet this fiscal challenge by allowing the state Medicaid program (Medi-Cal) and private insurers to contract selectively with hospitals on the basis of price and a few other factors mandated by the legislature (Johns, Derzon, and Anderson, 1983). Selective contracting allows health insurers (plans) to channel their members to hospitals offering favorable terms, thereby forcing hospitals to compete on the basis of price in addition to quality, service breadth, and amenities. Heretofore, the legal climate had disfavored selective contracting, viewing it as a form of collusion. But several economists had challenged this notion arguing just the opposite, that selective contracting was crucial for fostering price competition in the health industry (Enthoven, 1978; Feldstein, 1971; McClure, 1978; Newhouse and Taylor, 1971). California's landmark legislation was widely emulated throughout the United States. Since California undertook its landmark pro-market health reform in 1982, public- and private-sector plans nationally have used selective contracting to foster provider price competition. And as several later studies attest, selective contracting in California and elsewhere has been effective in constraining health care cost inflation (Bamezai, Zwanziger, Melnick, and Mann, 1999; Dranove, Satterthwaite, and Sindelar, 1986; Melnick and Zwanziger,

Manuscript received April 2001; review completed August 2001; revision completed October 2001; revision review completed June 2002; accepted July 2002.

Journal of Policy Analysis and Management, Vol. 22, No. 1, 65–84 (2003)

Published by Wiley Periodicals, Inc. Published online in Wiley InterScience (www.interscience.wiley.com)
DOI: 10.1002/pam.10096

1988, 1995; Robinson, 1996; Robinson and Phibbs, 1989; Zwanziger and Melnick, 1988; Zwanziger, Melnick, and Bamezai, 1993).

SELECTIVE CONTRACTING—THE THEORY

The purchase of health care involves a complex set of transactions among many parties. For example, the market for hospital services involves at least four players (patient, physician, hospital, and insurance plan), and often employers, as well. In the traditional fee-for-service era, competition among hospitals was based predominantly on non-price factors. Physicians were reimbursed on a fee-for-service basis, a regime that did not foster cost-effective utilization of healthcare resources. Hospitals competed by duplicating costly amenities and services (non-price competition, also called the "medical arms race") to attract physicians and patients (Dranove et al., 1986). With such incentives in place, it was no surprise to find healthcare costs to be positively correlated to the level of non-price competition prevailing in a market (Robinson and Luft, 1985).

Selective contracting reverses many of the cost-increasing incentives inherent in the traditional fee-for-service model (Miller and Luft, 1994). Providers now have to compete for a plan's subscribers by offering price and other concessions. Depending upon the level of competition in insurance markets, these price concessions are passed on to consumers as plans jockey for market share. Employers that join a purchasing coalition, or improve price sensitivity among their employees, can leverage inter-plan competition more effectively to obtain lower premiums. Employers can foster price sensitivity by providing employees with clear information about price, benefits, and quality on each plan, and by limiting the employer's premium contribution to the cost of covering essential benefits. Finally, the nature of the reimbursement scheme is an important driver. Preferred provider organizations (PPOs) primarily rely upon selective contracting (and to some extent upon utilization review) to control hospital costs. Health maintenance organizations (HMOs), on the other hand, usually go a step further by relying on capitated reimbursements, sometimes even distributing a share of the inpatient care savings back to the physicians.

It is easy to intuit that few plans (that is, a concentrated insurance market structure) operating in highly competitive provider markets will generate the most intense price competition among providers, which is why popular policy discourse has favored few but large "health insurance purchasing cooperatives." But for the benefits of this provider competition to flow to the consumer, and for consumer preferences to be taken into account by the market, a "reasonable" amount of competition among health plans is also required. If plans assemble a network only on the basis of price, they ought to run the risk of losing subscribers because of either unacceptable quality or access. Striking a balance between provider and plan competition remains a difficult policy problem since oligopoly theory offers few clear-cut predictions. Policy debate therefore ebbs and flows, sometimes favoring antitrust action against provider consolidation, and at other times favoring provider consolidation because plans are perceived as having become too strong. An example of the latter is legalization of physician collective bargaining vis-à-vis managed care plans—Texas being the first state to undertake such an action in the year 2000 (Texas, 2000). Similar initiatives are being considered elsewhere.

STUDY SIGNIFICANCE AND PRIOR LITERATURE

What effect is a dominant insurance plan likely to have on providers and consumers under selective contracting? This question is addressed by examining the experience

of California's Medicaid program (Medi-Cal) after the advent of selective contracting. Prior to selective contracting, Medi-Cal accounted for approximately 15 percent of total days in the average hospital, with this proportion hitting 30 percent or more in roughly one out of ten cases. Consumer choice in private insurance markets is both a strong determinant of plan behavior and a check on plan market power. If a large market share plan drives prices so low that the quality of its network is adversely affected, consumers can switch to a plan that pays higher prices to providers offering better quality. This inherent check did not apply to Medi-Cal during the early years of selective contracting, however. Many state Medicaid programs, at least historically, have offered only a single plan. Because single-payer Medicaid plans do not compete for enrollees, they can afford to make significant year-over-year changes in their network without fear of losing members to another plan. Absence of an exit threat arguably endows Medi-Cal with greater incentives, as well as the ability, to extract large price concessions from traditional Medi-Cal providers, possibly up to a point where service and quality are adversely affected.

It is worth pointing out that the California legislature asked state negotiators to consider several other factors, such as beneficiary access, demonstrated ability to provide or arrange for special services, and so on, while creating a network of select Medi-Cal providers (Johns et al., 1983). State negotiators were also cautious about accepting bids that aimed to carve out either a certain number of beds or specific services for Medi-Cal patients. Carve-outs were discouraged both to deflect criticism that Medi-Cal was creating a two-tier system of medicine, and also to facilitate easy bid comparison across hospitals. All these political factors arguably prevented Medi-Cal from becoming too aggressive.

Although early studies show that most traditional Medi-Cal providers were able to obtain contracts causing minor disruptions in patient access (Brown, Cousineau, and Price, 1985; Johns et al., 1985), and that the legislature-mandated criteria were substantially fulfilled during the contracting process (Brown, Price, and Cousineau, 1985), it is worthwhile re-visiting these and related questions because far more data are now available. Not only do these data include information about hospital contracts over time but also information about hospital negotiated prices. The latter data were closely guarded during the early years of the program and were not analyzed by the aforementioned studies.

This paper presents empirical analyses of Medi-Cal contracting and price data between 1981 and 1991. Selecting 1991 as the terminal year avoids the confounding effects of the Medicaid Disproportionate Share Program, which since 1992 has infused hospitals servicing large numbers of Medi-Cal beneficiaries with significant amounts of new monies.

Previous studies that have examined the relationship between plan market share and plan market power have produced equivocal results. All are based upon data from commercial insurers, however. The level of bargaining power that plans enjoy vis-à-vis hospitals depends upon several factors. These include: the number of competing hospitals and plans; the elasticity of health care demand with respect to price, quality, and distance; and patient loyalty to a particular hospital or to a particular plan. Adamache and Sloan (1983) and Feldman and Greenberg (1981) evaluate the effect of Blue Cross market share on provider discounts, the former concluding that higher market shares are associated with greater discounts; the latter, critiqued by Headen (1982) on conceptual and methodological grounds, finding no such relationship. Both these studies predate selective contracting, which diminishes the relevance of their empirical results. Foreman, Wilson, and Scheffler (1996) evaluate these same issues using more recent data, finding that high market-share

plans indeed succeed at negotiating lower provider payments. But because their study fails to account for hospital competition, it is difficult to assess whether lower payments are a reflection of plan monopsony power, or a reflection of diminished provider market power on account of selective contracting.

Examples of studies that control for hospital competition while exploring the relationship between plan market share and provider reimbursements include two by Staten, Dunkelberg, and Umbeck (1987) and Staten, Umbeck, and Dunkelberg (1988), discussed and reviewed by Pauly (1987, 1988), one by Melnick et al. (1992), and one by Brooks, Dor, and Wong (1997). Staten et al. (1988) are unable to detect a significant relationship between plan market share and transaction prices by Blue Cross of Indiana. Melnick et al. (1992) analyze Blue Cross of California data and also find no relationship between a hospital's dependence upon Blue Cross and the negotiated per diem, but then Blue Cross is not as dominant a plan in California as it is elsewhere. Only Brooks, et al. (1997) detect a significant negative relationship between plan market share and transaction prices. Significantly, however, all four studies show that negotiated per diems are inversely related to the level of hospital competition.

METHODS AND DATA

The following study uses Medi-Cal contracting and price data to address three interrelated questions. Did Medi-Cal modify its network often to shift business toward the lowest cost providers? What factors drove hospitals to contract with Medi-Cal? What were the key determinants of changes in Medi-Cal reimbursements over time?

Background on the Medi-Cal Contracting Program

Prior to selective contracting, the California Department of Health Services controlled both hospital capacity and capital investment through licensing and certificate-of-need regulations. California was divided into 138 Health Facility Planning Areas (HFPA) for the purpose of enforcing these regulations, and this planning structure was carried over into the selective contracting era. In (mostly urban) HFPAs with several hospitals, contracts were negotiated with hospitals until adequate bed capacity was acquired for the expected Medi-Cal patient load. Once this happened, the HFPA was deemed closed. In "closed" HFPAs, Medi-Cal beneficiaries can obtain non-urgent inpatient care only at contracting hospitals (emergency care can be sought at any hospital). In several rural HFPAs, however, selective contracts could not be negotiated because of inadequate capacity. In these "open" HFPAs, Medi-Cal beneficiaries can obtain care at any hospital, which continue to be reimbursed on the basis of cost.

The first round of contracts was completed during the 1983–1984 period beginning with the large urban areas. Between 1983–1984 and 1991, the period of this study, the number (and identity) of closed HFPAs has remained remarkably stable. Among 138 HFPAs, 66 remained closed in 1991 of which 65 had closed during the first round of negotiations. These 66 closed HFPAs accounted for approximately 90 percent of both Medi-Cal inpatient expenditures and patient days in 1982, one year prior to selective contracting.

The majority of the hospitals that chose to contract with Medi-Cal did so early (by 1984), and then remained in the network. All contracting hospitals are located in closed HFPAs because a hospital can expect greater patient volume in return for price discounts only in the closed HFPAs. Although rare in practice, an HFPA can

be deemed closed even without a single contracting hospital located within its boundaries provided sufficient capacity, within easy reach, is under contract to Medi-Cal in a neighboring closed HFPA. In other words, it is the underlying hospital market structure that drives both a hospital's contracting as well as an HFPA's open/closed status. So, while HFPAs serve a useful administrative purpose, they should not be confused with hospital market boundaries.

Table 1 displays the number of hospitals enrolled in Medi-Cal's network by the year a hospital first entered the network. Among the 332 acute-care hospitals in open and closed HFPAs, with complete data, that treated Medi-Cal beneficiaries and remained operational during 1981–1991, 211 hospitals enrolled in the Medi-Cal network at one point or another. Of these 211 hospitals, the majority (187 hospitals) enrolled in the network at the inception of the selective contracting program. Although the data suggest some subsequent provider disenrollment, there is little evidence of frequent provider switching in and out of the network. For example, among the initial 187 hospital enrollees, 161 remained continuously in the network through 1991. A total of 121 hospitals in our sample never contracted with Medi-Cal.

Statistical Analyses

Two sets of analyses were performed with these data. First, a panel-probit model of hospitals' contracting status was estimated to identify its determinants using data on the entire sample of 332 hospitals during the 1984–1991 period. Second, how Medi-Cal reimbursements have changed between 1981 and 1991 was examined for the 161 hospitals continuously enrolled in the Medi-Cal network relative to the 121 hospitals that never joined the network (control group). Control group hospitals can belong to either open or closed HFPAs.

The above analyses were supplemented by evaluating whether Medi-Cal selective contracting led to service cutbacks. During the late 1980s many California hospitals terminated their emergency rooms, and one point of analysis was whether these closures were related to a hospital's dependence upon Medi-Cal, or other market factors.

Panel Probit Model of Contracting Status. Table 1 suggests that relatively stable hospital- and market-level structural factors drive a hospital's contracting status because the composition of Medi-Cal network providers has changed little over time. Longitudinal contracting data are especially useful in such situations because they can be modeled within a panel-probit framework to account for unobserved

Table 1. Hospital contracting pattern.

Contract Cohort	Number of Contracting Hospitals by Year								Continuously in Network
	1984	1985	1986	1987	1988	1989	1990	1991	
First contract 1983–84	187	185	185	184	181	173	165	165	161
First contract 1985		3	3	3	3	3	3	3	3
First contract 1986			10	8	8	6	6	4	4
First contract 1987				6	6	6	6	5	5
First contract 1988					0	0	0	0	0
First contract 1989						1	1	1	1
First contract 1990							1	1	1
First contract 1991								3	3
Never contracted	121	121	121	121	121	121	121	121	

hospital heterogeneity. A random-effects probit estimator is preferable for two reasons. First, when only a few observations are available over time, a random-effects probit estimator is consistent while the fixed-effects probit estimator is not (Maddala, 1987). And, second, probit estimators require less restrictive assumptions than the alternative logit estimator.

$$\Pr(C_{it}) = \Phi(X_{it}) + \mu_i + \varepsilon_{it} \quad (1)$$

C_{it} contracting status for hospital i in year t (C=1 if contracting, zero otherwise)
X_{it} hospital competition (Hirschman–Herfindahl index)
market position (Medi-Cal share of hospital days, hospital's share of total Medi-Cal days in its market, hospital occupancy rate, market occupancy rate, average cost per day)
hospital characteristics (bed size, ownership)
Medi-Cal demand (Medi-Cal eligibles as a percentage of county population)
μ_i hospital random effect
ε_{it} random error ~ $N(0, \sigma^2)$

The probit model (Equation 1) includes several explanatory variables to capture the relative bargaining position of hospitals with respect to Medi-Cal. In general, the level of competition among hospitals is one of the most important determinants of hospital bargaining power vis-à-vis plans. Hospital competition is captured through a patient-origin Hirschman–Herfindahl index (HHI), which varies between 0 and 1, lower levels indicating higher levels of competition. Rural hospital markets are by and large concentrated, and therefore a rural dummy is not included to prevent confounding with the HHI effect. The HHI is supplemented by four additional market position variables. A hospital's dependence upon Medi-Cal is captured by the share of a hospital's total inpatient days accounted for by Medi-Cal. Conversely, Medi-Cal's dependence on a specific hospital is captured by the hospital's share of total Medi-Cal days in its market. In other words, the latter measure captures the countervailing bargaining power a hospital may enjoy in spite of being highly dependent upon Medi-Cal for its survival. Hospital and market occupancy rates also aim to capture the relative strength of a hospital's negotiating position. Medi-Cal's bargaining power should be less in high-occupancy markets since it cannot threaten to take its business elsewhere with a high level of credibility. The model also controls for hospital characteristics such as bed size, ownership, and average cost per day. Including the latter permits assessing whether Medi-Cal exhibited a propensity to contract with cheaper, possibly lower quality, hospitals. Finally, the Medi-Cal eligible proportion of county population is used as a control for Medi-Cal demand. Expected Medi-Cal caseloads are an important driver of the number of beds Medi-Cal must have under contract before it can close an HFPA, which in turn influences contracting probabilities at the hospital level. To the extent the demand measure is imperfect, the hospital specific random effects offer some protection by implicitly accounting for unobserved or imperfectly measured factors that influence contracting probabilities.

The probit model is estimated using contracting data between 1984 and 1991. Average costs per day and the market position variables are potentially endogenous. To be on the safe side, all the market position variables were instrumented, as well as the HHI by their pre-selective contracting levels. The panel-probit model was subjected to several sensitivity analyses. For example, cross-sectional probit models of contracting status were estimated, which produced qualitatively similar conclusions as the pooled random-effects probit model.

Medi-Cal Reimbursement Trends. The focus is on both Medi-Cal reimbursement trends per day as well as per case-mix-adjusted discharge for the following reasons. The former can be estimated accurately but fails to account for changes in patient severity across hospitals, especially in the closed HFPAs. Non-contracting hospitals in closed HFPAs receive mostly emergency room cases that in all likelihood cost more on a per day basis than contracting hospitals in closed HFPAs, or for that matter hospitals in open HFPAs (which are all non-contracting). Evaluating trends in reimbursement per case-mix-adjusted discharge removes these biases in principle, except construction of a reliable Medi-Cal case mix index is difficult in practice. Medicare DRG weights are of limited value because of vast differences in the two patient populations. Estimation of Medi-Cal specific DRG weights was beyond the scope of this study. A compromise was struck by estimating a hospital-specific Medi-Cal case mix index for every alternate year by combining Medi-Cal diagnoses codes (from the California discharge abstracts) with all-payer DRG weights available from New York state. By analyzing reimbursements on a per-day and per-case-mix-adjusted-discharge basis, we aim to assess the impact of measurement error present in our case mix index.

The effect of selective contracting on Medi-Cal reimbursements is captured through a difference model that relates the rate of change in the dependent variable to the HHI and the market position descriptors. These analyses are restricted to hospitals that do not repeatedly bounce in and out of the network. Focusing on rates of change eliminates unexplained preexisting differences in reimbursement levels, and also selection bias since in a setting with stable contracting patterns the latter is likely to be relatively time invariant. Therefore, rates of change offer a sounder basis for drawing statistical inferences. The difference model is derived from a fixed-effects model (Equation 2) that allows coefficients to vary over time (structural adjustment).

$$Ln(R_{it}) = \alpha_t + \beta_t X_{it} + \mu_t + \varepsilon_{it} \tag{2}$$

where

R_{it} Medi-Cal reimbursement per day or per case-mix-adjusted discharge

X_{it} hospital competition (Hirschman–Herfindahl index)
market position (Medi-Cal share of hospital days, hospital's share of total Medi-Cal days in its market, hospital occupancy rate, market occupancy rate, average cost per day)
hospital characteristics (bed size, ownership)

μ_i hospital fixed effect

ε_{it} random error ~ $N(0, \sigma^2)$

Taking differences between any two points in time leads to Equation 3.

$$\Delta(Ln(R_{it})) = \Delta\alpha_t + \beta_t(\Delta X_{it}) + \Delta\beta(X_{it}) + \Delta\varepsilon_{it} \tag{3}$$

Changes in the independent variables are omitted from the difference model because they are potentially endogenous and in any case very small. Once again, all the base-year market position variables and the HHI were instrumented by their pre-selective contracting levels.

Two models are estimated. The first assesses the short-run effect of selective contracting by analyzing the rate of change in Medi-Cal reimbursements between 1982 and 1985. The second assesses the long-run effect by analyzing trends over the subsequent 1985–1991 period. For two reasons, 1985 serves as a good breakpoint. It is

the first full year that all 161 contracting hospitals spent within the network. But more importantly, it is roughly the time when contracting and non-contracting hospitals arrived at a level playing field because of convergence in their overall average cost per day as well as Medi-Cal reimbursement per day. The models are estimated using weighted least squares to rectify nonconstant error variance. The weights are derived through a model that relates error variance to hospital bed-size and Medi-Cal days (Carroll and Ruppert, 1988). Ramsey's (1969) RESET test cannot reject the null hypothesis of no omitted variable bias.

Data and Variable Construction

Studies of hospital market competition and managed care have been severely limited by the lack of available data on negotiated transaction prices. Core data for these analyses come from the California Medical Assistance Commission (CMAC), which administers the Medi-Cal contracting program. These include information about hospital contracting status, Medi-Cal days, discharges, and (inpatient) reimbursements between 1981 and 1991. Outpatient reimbursements are not subject to bargaining, hence excluded. Medi-Cal program data are supplemented with information about hospital characteristics, overall revenues and expenses, and discharge abstracts from the Office of Statewide Health Planning and Development (OSHPD). Annual estimates of the Medi-Cal eligible population and total population by county are obtained from the California Department of Health Services and from the Area Resource File, respectively. The HHI is derived from the annual discharge abstracts available from OSHPD. The Medi-Cal case mix index is constructed by combining Medi-Cal diagnoses codes (from California discharge abstracts) with the all-payer DRG weights available from New York. Construction of the key variables is described next, while Table 2 presents their summary statistics.

Medi-Cal Reimbursements. Reimbursement per day is calculated as the ratio of total Medi-Cal inpatient payments divided by total Medi-Cal days. Although this

Table 2. Descriptive statistics of model variables.

Variable	Mean	Std. Dev.
Proportional change in Medi-Cal reimbursement per day (1982–85)	0.301	0.510
Proportional change in Medi-Cal reimbursement per case-mix-adjusted discharge (1982–85)	0.126	0.592
Proportional change in Medi-Cal reimbursement per day (1985–91)	0.547	0.644
Proportional change in Medi-Cal reimbursement per case-mix-adjusted discharge (1985–91)	0.599	0.974
Overall average cost per day	525.700	93.624
Hirschman–Herfindahl index	0.306	0.168
Medi-Cal's share of total hospital days	0.147	0.104
Hospital's share of total Medi-Cal days in its market	0.190	0.212
Available beds	190.500	141.700
Medi-Cal eligible proportion of county population	0.124	0.044
Hospital occupancy >60 percent (indicator variable)	0.581	0.494
Market occupancy >60 percent (indicator variable)	0.620	0.486
Hospital and market occupancy >60 percent (indicator variable)	0.434	0.496
Not-for-profit hospital (indicator variable)	0.667	0.471
For-profit hospital (indicator variable)	0.275	0.447

may not be identical to the negotiated per diem rate, it accounts for reimbursements made by Medi-Cal for any carve-out services. Reimbursements per case-mix-adjusted discharges are calculated as the ratio of total inpatient payments divided by the product of total Medi-Cal discharges and the Medi-Cal case mix index. These dependent variables are logarithmically transformed, then differenced, prior to model estimation.

Hirschman–Herfindahl Index. A hospital-level HHI was constructed using actual zip code-level patient flow data to define hospital markets, using a methodology described by Melnick and Zwanziger (1988). The HHI varies between 0 and 1, with lower levels indicating greater competition. Five steps are required to calculate each hospital's HHI. First, all DRGs (diagnostic related groups) are categorized into 48 separate service categories based on the type of physician that typically treats a patient in a given DRG. Next, a hospital's market area (by service) is identified using patient origin data—zip code areas (ZCAs) are included in the market if they contribute to the hospital's discharges for that service. Third, for each ZCA included in the marker hospital's market for a given service, the market share of each competing hospital is calculated. Fourth, for each ZCA-service combination an HHI is calculated by summing the squares of each competing hospital's market share (estimated in step 3). Finally, the level of competition each hospital faces is obtained by taking a weighted average of all the ZCA-service HHIs in its market, with the proportion of patients it draws from each ZCA-service combination serving as the weight.

Market Position Variables. The proportion of total hospital days accounted for by Medi-Cal and the hospital occupancy rate is easy to compute. Construction of the corresponding market-level measures, however, is somewhat more complicated. As discussed above, we first identify each hospital's competitors while constructing the HHI. A marker hospital and its competitors comprise one hospital market. For each hospital in a market, we estimate the share of total discharges accounted for by the marker hospital as well as its competitors (market share). Within each market, each hospital's annual Medi-Cal days is weighted by its overall market share to derive the marker hospital's proportion of these weighted days—this proportion serves as a measure of the hospital's importance to Medi-Cal. Market occupancy rates are calculated similarly: hospital occupancy rates of the marker hospital and its competitors are averaged, with the overall market share serving as the weight.

MODEL RESULTS

The estimated probit model (Table 3) demonstrates that hospitals reacted to Medi-Cal selective contracting in predictable ways. The highly significant HHI coefficient suggests that hospitals with fewer competitors appeared to have greater bargaining power vis-à-vis Medi-Cal and were less likely to negotiate a contract. It appears that Medi-Cal selective contracting caused little disruption of care since hospitals dependent upon Medi-Cal for a large share of their business were more likely to have a contract throughout the period. The proportion of hospital days accounted for by Medi-Cal has the largest and most significant coefficient (0.785) indicating that a hospital's dependence upon Medi-Cal is the single most important predictor of a hospital's contracting status. The model also indicates that hospitals providing a large share of Medi-Cal care in their market enjoy some amount of countervailing bargaining power, but the small coefficient on this second share variable is of little practical importance. The majority of the hospitals that provide most of the Medi-Cal care in their market are also contracting hospitals because Medi-Cal in turn

Table 3. Panel probit model of contracting status (1984–1991).

Variable	Coefficient (Std. Error)	Coefficient (Std. Error)
Ln(Average cost per day)	—	–0.681
		(0.447)
Ln(HHI)	–0.631**	–0.723**
	(0.174)	(0.185)
Ln(Medi-Cal share of hospital days)	0.785**	0.782**
	(0.120)	(0.120)
Ln(hospital's share of Medi-Cal days in its market)	–0.192**	–0.191**
	(0.070)	(0.070)
High hospital occupancy rate indicator (>60 percent)	0.216	0.189
	(0.250)	(0.251)
High market occupancy rate indicator (>60 percent)	–0.525*	–0.530*
	(0.221)	(0.222)
High hospital occupancy rate x high market occupancy rate	0.411	0.440
	(0.309)	(0.310)
Ln(county Medi-Cal eligibles/county population)	–0.175	–0.186
	(0.152)	(0.153)
Ln(available beds)	0.273**	0.285**
	(0.084)	(0.085)
Not for profit indicator	–0.019	–0.019
	(0.194)	(0.195)
For profit indicator	–0.187	–0.184
	(0.217)	(0.219)
1985 indicator	0.009	0.009
	(0.045)	(0.045)
1986 indicator	0.107*	0.108*
	(0.045)	(0.046)
1987 indicator	0.132**	0.133**
	(0.045)	(0.046)
1988 indicator	0.099*	0.100*
	(0.045)	(0.045)
1989 indicator	0.015	0.016
	(0.045)	(0.046)
1990 indicator	–0.037	–0.035
	(0.049)	(0.050)
1991 indicator	–0.009	–0.005
	(0.060)	(0.061)
Intercept	–1.078	2.967
	(0.522)	(2.723)
χ^2	112.460	113.870

Note: Market and hospital characteristics are based upon 1982 estimates; 332 hospitals from open and closed HFPAs.
**Significant at 1 percent level.
*Significant at 5 percent level.

accounts for a large share of their business (that is, the first share-variable coefficient dominates the second). Overall, Medi-Cal seems to have shown a preference for enrolling larger hospitals, probably to ensure the availability of a wide variety of services. Including average costs per day in the model alters none of the above conclusions, and the coefficient on this variable itself being insignificant suggests no great propensity on Medi-Cal's part to contract with cheaper hospitals.

Figure 1 displays Medi-Cal reimbursement per day for the 161 hospitals that remained continuously enrolled in the network from inception compared with the 121 non-contracting hospitals; the figure also displays the overall average cost per day trend for these two hospital groups. Contracting hospitals, disproportionately located in competitive markets, had higher average costs per day prior to selective contracting due to nonprice competition, a finding consistent with Robinson and Luft's (1985) earlier study. Correspondingly, per-day Medi-Cal reimbursements made to contracting hospitals were also relatively higher prior to 1983, although growth rates between 1981 and 1983 across the two groups are not significantly different. Over time, however, average cost per day has grown faster among hospitals not affected by Medi-Cal selective contracting and perhaps less affected by price competition in general. Unlike the overall average cost per day, Medi-Cal reimbursements per day show a marked downward adjustment for the contracting hospitals during the early years of the program and a somewhat slower rate of growth thereafter.

Table 4 presents fully interacted models of reimbursement growth over time on a per-day and per-case-mix-adjusted-discharge basis. These models show that contracting hospitals in highly competitive markets experienced lower reimbursement growth between 1982 and 1985. Parsimonious models include on the right-hand

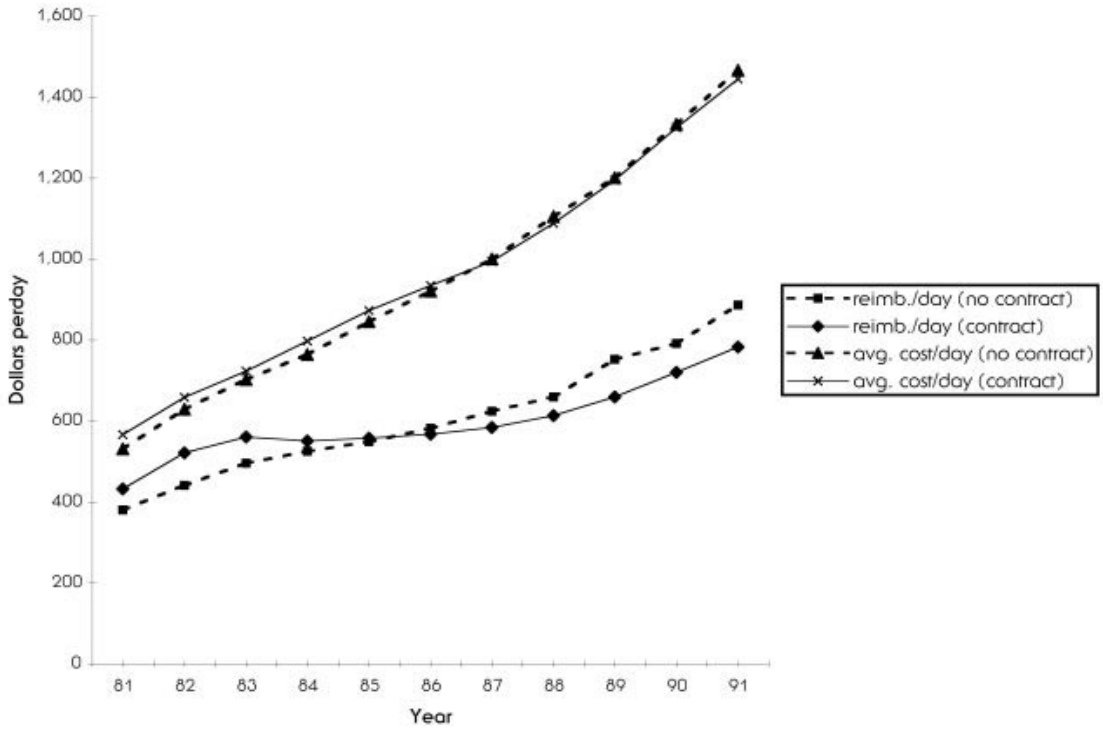

Figure 1. Medi-Cal reimbursements per day and overall average costs per day.

Table 4. Models of Medi-Cal reimbursement growth over time.

Variable	1982–1985 difference model (short run)				1985–1991 difference model (long run)			
	Per day		Per case-mix-adjusted discharge		Per day		Per case-mix-adjusted discharge	
Ln(Average cost per day) †	—	−0.005 (0.021)	—	−0.014 (0.034)	—	0.013 (0.042)	—	0.031 (0.053)
Ln(Average cost per day) x contracting dummy	—	−0.059* (0.025)	—	−0.028 (0.040)	—	−0.030 (0.044)	—	−0.061 (0.059)
Ln(HHI)†	−0.128** (0.031)	−0.066 (0.039)	−0.008 (0.042)	0.052 (0.060)	0.076 (0.054)	0.080 (0.077)	−0.004 (0.068)	0.021 (0.098)
Ln(HHI) x contracting dummy	0.214** (0.036)	0.087 (0.045)	0.084‡ (0.049)	−0.022 (0.070)	−0.110‡ (0.057)	−0.106 (0.081)	−0.059 (0.077)	−0.089 (0.108)
Ln(Medi-Cal share of hospital days) †	0.012 (0.031)	0.047 (0.032)	0.018 (.043)	0.054 (0.046)	−0.090‡ (0.048)	−0.097‡ (0.054)	−0.094 (0.059)	−0.072 (0.068)
Ln(Medi-Cal share of hospital days) x contracting dummy	−0.006 (0.035)	−0.044 (0.037)	−0.004 (0.049)	−0.061 (0.054)	0.105* (0.050)	0.106‡ (0.057)	0.138* (0.065)	0.101 (0.076)
Ln(hospital's share of Medi-Cal days in its market) †	0.082* (0.019)	0.008 (0.045)	0.122* (0.055)	0.039 (0.069)	0.041 (0.061)	0.071 (0.080)	0.020 (0.082)	0.019 (0.106)
Ln(hospital's share of Medi-Cal days in its market) x contracting dummy	−0.038 (0.041)	0.078 (0.051)	−0.099 (0.061)	−0.017 (0.077)	0.008 (0.064)	−0.040 (0.083)	0.060 (0.090)	0.069 (0.116)
High hospital occupancy rate indicator (>60 percent)	0.136 (0.086)	−0.141 (0.083)	−0.083 (0.128)	−0.094 (0.128)	0.195 (0.163)	0.194 (0.165)	0.201 (0.206)	0.211 (0.209)
High hospital occupancy rate indicator (>60 percent) x contracting dummy	−0.138 (0.096)	−0.155 (0.092)	0.071 (0.141)	0.058 (0.141)	−0.208 (0.168)	−0.210 (0.170)	−0.264 (0.220)	−0.265 (0.224)
High market occupancy rate indicator (>60 percent)	−0.081 (0.064)	−0.075 (0.065)	−0.094 (0.104)	−0.096 (0.109)	−0.058 (0.127)	−0.096 (0.132)	−0.029 (0.169)	−0.050 (0.176)
High market occupancy rate indicator (>60 percent) x contracting dummy	0.112 (0.079)	0.116 (0.079)	−0.081 (0.121)	−0.070 (0.126)	0.161 (0.134)	0.209 (0.140)	0.078 (0.189)	0.131 (0.198)
High hospital occupancy rate x high market occupancy rate	−0.113 (0.098)	−0.126 (0.094)	0.055 (0.151)	0.059 (0.151)	−0.284 (0.193)	−0.242 (0.197)	−0.118 (0.245)	−0.088 (0.251)

(*continued on next page*)

Table 4. (*Continued.*)

Variable	1982–1985 difference model (short run)				1985–1991 difference model (long run)			
	Per day		Per case-mix-adjusted discharge		Per day		Per case-mix-adjusted discharge	
High hospital occupancy rate x high market occupancy rate x contracting dummy	0.047 (0.113)	0.101 (0.108)	0.150 (0.170)	0.150 (0.171)	0.207 (0.200)	0.156 (0.204)	0.180 (0.142)	0.143 (0.273)
Ln(Available beds) †	—	0.095** (0.036)	—	0.098 (0.055)	—	−0.028 (0.070)	—	0.010 (0.088)
Ln(Available beds) x contracting dummy	—	−0.130** (0.042)	—	−0.096 (0.064)	—	0.064 (0.074)	—	0.011 (0.098)
Not-for-profit	—	0.061 (0.080)	—	0.019 (0.148)	—	0.205 (0.173)	—	0.348 (0.217)
Not-for-profit x contracting dummy	—	−0.101 (0.091)	—	−0.144 (0.161)	—	−0.277 (0.179)	—	−0.454‡ (0.233)
For-profit	—	−0.009 (0.086)	—	−0.080 (0.156)	—	0.362‡ (0.200)	—	0.419 (0.250)
For-profit x contracting dummy	—	−0.042 (0.102)	—	−0.141 (0.176)	—	−0.417* (0.208)	—	−0.430 (0.271)
Contracting dummy	−0.340** (0.062)	−0.311** (0.112)	−0.222** (0.091)	−0.118 (0.188)	−0.138 (0.103)	0.159 (0.201)	−0.187 (0.142)	0.219 (0.265)
Intercept	0.448** (0.054)	0.438** (0.101)	0.249** (0.085)	0.285 (0.173)	0.389** (0.099)	0.151 (0.195)	0.388** (0.131)	0.036 (0.247)
Adj. R^2	0.455	0.524	0.222	0.246	0.076	0.082	0.058	0.056

Note: 161 contracting; 121 noncontracting hospitals. Market and hospital characteristics are based upon 1982 estimates.
†Continuous variables standardized to mean zero and variance one.
**Significant at 1 percent level.
*Significant at 5 percent level.
‡Significant at 10 percent level.

side only market position variables; other models include additional hospital descriptors such as average cost per day, bed size, and ownership. In the parsimonious model, the contracting-dummy coefficient offers a direct estimate of the difference in reimbursement growth over time between contracting and non-contracting hospitals at the sample mean because the included continuous variables are standardized to a mean of 0 and a variance of 1. In any event, the explanatory power of bed size and ownership is weak, hence their exclusion of little consequence. Excluding average costs per day from the parsimonious models is also justified because, as noted earlier, hospitals in competitive markets had higher costs prior to selective contracting. In other words, it amounts to essentially the same story whether one concludes from Table 4 that contracting hospitals in highly competitive markets, or contracting hospitals with higher costs, experienced lower reimbursement growth between 1982 and 1985.

For contracting hospitals, the parsimonious short-run (1982–1985) models show that competition influenced Medi-Cal reimbursement growth in expected ways. Among contracting hospitals greater levels of hospital competition are associated with lower reimbursement growth rates because their environment became highly price competitive. And since these hospitals had higher costs to begin with, perhaps they also were subject to more intense bargaining. Both the per-day and per-case-mix-adjusted-discharge models support this observation, although in the latter case competition's effect is somewhat muted perhaps due to measurement error in the case mix index. For non-contracting hospitals, however, price competition was not a factor during this early period. Therefore, reimbursement growth shows no relationship with the HHI after accounting for case mix differences.

The short-run models also suggest that contracting as well as non-contracting hospitals of greater importance to Medi-Cal experienced somewhat greater reimbursement growth between 1982 and 1985. It is unclear why being a large provider of Medi-Cal services helps non-contracting hospitals since their reimbursements were not subject to bargaining. Perhaps, this market position variable is picking up the effects of unmeasured patient severity to some degree. Overall, Medi-Cal was successful in using selective contracting to control reimbursement growth. Between 1982 and 1985, a contracting hospital with average sample characteristics obtained approximately a 19.9 percent ($e^{-0.222} - 1$) lower increase in reimbursements per case-mix-adjusted-discharge relative to a comparable non-contracting hospital.

A good starting point to examine the long-term effect of selective contracting on Medi-Cal reimbursements is 1985 (Table 4) because it is the first full year that all 161 contracting hospitals spent within the network. But more importantly, it is roughly the time when contracting and non-contracting hospitals arrived at a level playing field because of convergence in their overall average cost per day as well as Medi-Cal reimbursement per day (Figure 1). Because of this convergence, the insignificant relationship between hospital competition and Medi-Cal reimbursement growth between 1985 and 1991 perhaps comes as no surprise. During this period, however, hospitals highly dependent upon Medi-Cal seem to have obtained marginally higher increments, contrary to expectation. But, overall, the long-run models exhibit very low explanatory power, and it is fair to conclude that reimbursement growth between 1985 and 1991 has essentially followed a random walk, with both contracting and non-contracting hospitals receiving roughly equal increments over time (the contracting-dummy coefficient is negative, albeit insignificant).

DID MEDI-CAL CAUSE EMERGENCY ROOM CLOSURES?

Table 5 shows hospital operating margins over time that indicate a relative decline in the financial health of contracting hospitals. Did declining financial health lead to noticeable service cutbacks, which may have in turn adversely affected access? Examining a frequency count of hospital service offerings over time reveals no systematic evidence of cutbacks among contracting hospitals relative to the non-contracting ones, except in the case of emergency rooms (ERs). In the sample of 282 hospitals, the proportion without trauma emergency rooms rose from 14.2 percent in 1982 to 30.5 percent in 1991, with contracting hospitals exhibiting a somewhat higher closure rate relative to non-contracting hospitals. Service offerings may differ from service usage, however. Only one study (Dranove and White, 1998) examines the change in service usage per admission and per day among Medi-Cal dependent hospitals, concluding that service levels fell faster among Medi-Cal dependent hospitals. Replication of their complex methodology falls beyond the scope of this paper.

Table 6 displays the presence or absence of emergency rooms between 1982 and 1991. Of the 242 hospitals with emergency rooms in 1982, 55 had terminated these services by 1991. Conversely, 9 of the 40 hospitals without these services in 1982 had added them by 1991. Two probit models were estimated to assess the market factors that drove these emergency room closures and openings. Table 7's first column presents the emergency room closure model estimated from the 242 hospitals that offered these services in 1982. The binary dependent variable is zero for hospitals that offered emergency room services in both years, or one if the service was terminated by 1991. The second column presents a model of emergency room openings estimated from the 40 hospitals that did not offer these services in 1982 (ownership is excluded because it predicts openings perfectly; all occurred in the not-for-profit sector). The binary dependent variable is 1 for hospitals that added these services by 1991, 0 otherwise. The estimated parameters are only weakly significant, but they again point to hospital competition as the most important explanatory factor. Most emergency room closures occurred in the more competitive markets with the opposite being true for openings, even after accounting for population growth. Furthermore, the majority of emergency room closures occurred in the not-for-profit sector, an indication that selective contracting forced hospitals to rationalize their

Table 5. Hospital operating margins.

	Net Patient Revenues ÷ Total Expenses	
Year	Noncontracting	Contracting
1981	1.030	1.009
1982	1.030	1.005
1983	1.035	1.010
1984	1.078	1.016
1985	1.079	1.018
1986	1.063	0.993
1987	1.028	0.969
1988	1.022	0.966
1989	1.029	0.971
1990	1.030	0.967
1991	1.019	0.967

Table 6. Emergency room availability among hospitals (1982 versus 1991).

		Emergency Room Status in 1991		
		Available	Not available	Total
Emergency room status in 1982	Available	187	55	242
	Not available	9	31	40
TOTAL		196	86	282

services in general, only more so among hospitals that until then had perhaps given greater importance to non-price competition. A contracting hospital dummy was deliberately not included in these models to force its entire effect on the exogenous Medi-Cal market share variables. In spite of this, these Medi-Cal market share variables are insignificant, once again not allowing us to make a linkage between the Medi-Cal program and ER closures. None of these conclusions are affected if average cost per day is excluded from the models.

Table 7. Probit model of emergency room closures and openings.

Variable	Closures	Openings
	Coefficient (Std. Error)	Coefficient (Std. Error)
Ln(Average cost per day)	–0.771 (0.613)	4.287 (2.718)
Ln(HHI)	–0.536* (0.312)	3.645* (1.939)
Ln(Medi-Cal share of hospital days)	0.059 (0.155)	–0.002 (0.588)
Ln(hospital's share of Medi-Cal days in its market)	–0.076 (0.111)	–0.200 (0.381)
High hospital occupancy rate indicator (>60 percent)	–0.008 (0.330)	1.825 (1.447)
High market occupancy rate indicator (>60 percent)	–0.086 (0.345)	–0.989 (0.748)
High hospital occupancy rate x high market occupancy rate	0.116 (0.438)	–2.659 (2.187)
Ln(1991 county pop./1982 county pop.)	–0.429 (0.930)	–4.311 (4.006)
Ln(available beds)	–0.216 (0.199)	0.843 (1.011)
Not for profit indicator	0.681** (0.303)	—
For profit indicator	–0.050 (0.379)	—
Intercept	4.070 (3.799)	–25.908 (15.276)
χ^2	19.400	20.100
N	242	40

Note: Market and hospital characteristics are based upon 1982 estimates.
**Significant at 5 percent level
*Significant at 10 percent level

DISCUSSION AND CONCLUSIONS

As long as the health care system is operated according to market principles, balancing bargaining power between plans and providers will remain an ongoing issue. After the advent of selective contracting in the early 1980s, antitrust review and action was mainly directed against hospital consolidation to prevent providers from accumulating unhealthy levels of market power. Recent developments in the legal and policy climate, however, seem to be on the opposite tack. Some amount of provider consolidation is being increasingly viewed as necessary for countering what is perceived to be excess (managed care) plan market power. An early indication of this impending change is legalization of physician collective bargaining (under certain conditions) in Texas.

The case of Medi-Cal was used to shed light on what may happen when the insurance market gets excessively concentrated. The hypothesis was that lack of consumer choice may have provided Medi-Cal with both the incentives and the means to bargain aggressively with hospitals beyond what hospital competition alone would permit, and that any negative impact of highly concentrated insurance markets would therefore be most clearly discernible here. But our evidence presents a mixed bag.

As far as the effect on beneficiaries is concerned, we are unable to detect frequent adjustments in Medi-Cal's network and the inevitable disruptions in patient care that such adjustments would have entailed had Medi-Cal exploited lack of plan choice in that manner. Neither is it possible to detect large shifts of Medi-Cal beneficiaries from high- to low-cost hospitals. Perhaps these findings are not too surprising given that the California legislature had specified several criteria, including access, that the state had to fulfill while undertaking selective contracts, and given that watchdog groups could easily monitor which hospital did or did not receive a Medi-Cal contract.

To what extent did Medi-Cal leverage competitive market conditions in the hospital sector to set up its network and generate price discounts? HHI was found to be a significant predictor of hospitals' likelihood of contracting with Medi-Cal, with those located in more competitive markets being more likely to contract. HHI was also found to be a significant predictor of Medi-Cal per diem growth but not throughout the period. Hospitals located in more competitive markets tended to receive smaller year-over-year increases, but these more competitive hospitals also had higher costs prior to selective contracting. After the initial period of adjustment to selective contracting, HHI's effect is no longer significant, however. Whether Medi-Cal used its market share to extract further price concessions was also tested, but supporting evidence could not be found.

Compelling evidence that would support the hypothesized lack of consumer choice is not forthcoming. Evidence in favor includes the finding that Medi-Cal dependent hospitals were more likely to enroll in Medi-Cal's network, and that these network hospitals experienced lower reimbursement growth, especially until 1985. But the latter should be interpreted cautiously since contracting hospitals were also more expensive until 1985. Beyond this date, when overall average costs per day converged between contracting and non-contracting hospitals, one can detect only a small negative, statistically insignificant, difference in reimbursement growth over time. Evidence against is far stronger though. The data support neither a significant negative relationship between a hospital's dependence upon Medi-Cal and reimbursement growth over time, nor a significant positive relationship between the former and the likelihood of subsequent emergency

room closures. In contrast, hospital competition tells a more consistent story, namely, that market power of competitively located hospitals has eroded over time which has forced these traditionally high-cost hospitals to cut costs, rationalize their services, and compete on the basis of price more than ever before.

Findings from this study may be of interest to policymakers concerned with current trends in health plan mergers and provider consolidation. Perhaps one of the reasons stronger negative effects of Medi-Cal selective contracting could not be detected is that the political system and public watchdog groups are intimately involved in the functioning of the Medi-Cal program, which is a roundabout way of empowering consumers who have few or no market choices. Had analyses been extended further, negative effects may still not have been discernible because of the Medicaid Disproportionate Share (DSH) Program, which started to infuse significant new monies into the Medi-Cal program since about 1992–1993, and was widely viewed as a political ameliorative for Medi-Cal–dependent hospitals in fiscal distress. Perhaps in the absence of these significant supplemental monies, operating margins may have continued to drop among contracting hospitals, and the effects of Medi-Cal market power might have become readily apparent by now. Perhaps politics and public opinion to some extent perform a similar role for large, visible public health insurers as consumer choice does for private. Either way, it is difficult to see how promoting provider consolidation is a sensible way of dealing with perceptions about health insurance plans having become too strong. A better alternative might be to sensitize the consumer to the true cost of health purchasing decisions through innovative benefit package design, and to empower the consumer through development and dissemination of reliable information about the quality of hospitals, surgeons, and specialists that practice in a given area. Many such initiatives are already underway.

Financial support provided by the Agency for Health Care Policy and Research and the Office of the Assistant Secretary for Planning and Evaluation made this research effort possible. We thank them, and also Holland Golec (California Medical Assistance Commission) and Jim Klein (California Department of Health Services) for providing us with key data about the Medi-Cal program.

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