The Competitive Effects of Not-for-Profit Hospital Mergers: A Case Study

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Applying conventional horizontal merger enforcement rules to mergers of nonprofit hospitals is controversial. Critics contend that the different objective function of not-for-profits entities should mitigate, and possibly eliminate, competitive concerns about mergers involving nonprofit hospitals. We provide evidence relevant to this debate by analyzing ex post a horizontal merger in a concentrated hospital market. Here, the transaction reduced the number of competitors (both nonprofit) in the alleged relevant market from three to two.

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I. Introduction

Although researchers have made innumerable attempts to analyze the relationship between competition (as proxied by concentration) and performance (e.g., price), empirical evidence on the actual competitive effects of horizontal mergers is scarce. Perhaps this is not surprising. When assessed by contemporary antitrust standards, most mergers (even most horizontal mergers) do not present a serious risk of competitive harm. The handful that do typically either will be blocked in their entirety, or approved conditional on the completion of some remedial action (e.g., the divestiture of a critical competitive asset to a third party) designed to ameliorate the risk of competitive harm. Hence, candidates for the study of (plausibly) anticompetitive mergers will arise only infrequently; when, for example, the enforcement agencies lose a merger challenge in court, obtaining no competitive relief, or when the enforcement agencies do not kgst agam8edial antuemer.0u-0ce

[1] See Complaint In the Matter of Santa Cruz Hospital, et al. 188 F.T.C. 382 (1994).

equilibrium prices. Consequently, this transaction would have been challenged by the FTC, had the Commission been able to intervene before the transaction was completed[2]. However, because the transaction was too small (in absolute size) to trigger the Hart-Scott-Rodino filing thresholds, the FTC did not receive prior notification of the transaction, and the parties were able to consummate the acquisition before the FTC could seek a preliminary injunction. Ultimately, the FTC entered into a consent order with Dominican Hospital, but the decree required only that Dominican notify the Commission prior to any further acquisitions in the relevant geographic market – it did not restore the premerger market structure. For this reason, this acquisition provides an excellent opportunity to assess, ex post, the actual, as opposed to the predicted, competitive consequences of a horizontal merger.

This study should be of interest for at least two reasons. First, as noted, empirical studies of the price effects of horizontal mergers are comparatively rare, notwithstanding their apparent importance to appraising the efficacy of federal merger enforcement policy. Studies such as this should help policymakers assess whether the enforcement decision rules embodied in the Merger Guidelines predict with an acceptable degree of accuracy the competitive consequences of actual horizontal mergers.

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[2] See Statement of Chairman Janet D. Steiger in Support of Final Issuance of Consent Order In the Matter of Dominican Santa Cruz Hospital, et al. 188 F.T.C. 382 (1994).

Second, and more specifically, the applicability to hospital markets of the antitrust agencies' approach to horizontal merger analysis (i.e., the Merger Guidelines) recently has been called into question. A substantial share of hospital output (approximately 90 percent) is produced by private and public nonprofit hospitals. Critics have contended that the antitrust agencies and courts have assumed that these not-for-profit providers seek maximum profits, notwithstanding the substantial body of theoretical and empirical analyses suggesting that nonprofit entities -- or more

[3] See Lynk (1994, 1995) for a more detailed review of the relevant theory and evidence.

arguments compelling. In at least one case[4], a U.S. Federal District Court found that the nonprofit, community-sponsored status of the merging parties was an important factor in rebutting an otherwise convincing prima facie case against the merger of two rival hospitals.

The transaction analyzed here provides an excellent opportunity to explore these possibilities. The acquiring entity (Dominican Santa Cruz Hospital) is part of a chain of Catholic hospitals operating in the western United States. Its sole remaining rival in Santa Cruz county, Watsonville Community, is a locally-sponsored community hospital. According to the arguments set forth above, Watsonville Community would appear to be the type of nonprofit hospital least prone to exercise market power; any such propensity to charge competitive prices would, moreover, place a powerful post-merger competitive constraint on Dominican's ability to raise prices. Consequently, an analysis of both entities' (but especially Watsonville's) post-merger pricing behavior should provide a valuable insight into the behavior of nonprofit producers.

The next section reviews briefly the empirical literature on hospital competition. We review first those studies that have explored the empirical relationship between concentration and hospital prices. These studies for the most part are cross-sectional in nature, and do not specifically investigate the equilibrium effects of actual horizontal

[4] See F.T.C. v. Butterworth Health Corporation and Blodgett Memorial Medical Center, (U.S. District Court, Western District of Michigan, Southern Division), September 26, 1996, slip. op. at 27.

mergers. The effects of mergers (including hospital mergers) are the focus of the second, much smaller (but much more recent) body of research that we review.

Section III describes briefly the details of the Dominican-Santa Cruz transaction. Section IV outlines the empirical strategy for studying the price effects of that merger. Section V presents the empirical results.

II. Studies of Hospital Competition

A. Cross Sectional Studies

Most early (i.e.,pre-1983[5]) studies of hospital competition were carried out using a variant of the well-known "Structure-Conduct-Performance" (S-C-P) paradigm. As noted by Bresnahan (1989, pp. 1012-13), the distinguishing features of this empirical paradigm are reflected in the following assumptions: first, that price-cost margins can be accurately measured with accounting data; and second, that cross-sectional variation in market structure can be measured with a small number of observable variables (including market concentration). Early studies of hospital competition varied the standard SCP approach slightly by assuming that hospitals engaged mainly in quality, rather than price, competition. Accordingly, the typical study from this period attempted to discern the relationship between some measure of hospital costs (e.g., cost

[5] The year 1983 is significant in most analyses of hospital markets because this is the year Medicare instituted the prospective payment system (PPS). It is also the year in which California enacted legislation permitting selective contracting between health plans and individual hospitals.

per admission) to some measure of competition.[6] Usually, a negative relationship between hospital concentration and costs was found (e.g., higher costs per admission were observed in the less concentrated markets).[7] Generally, this finding was interpreted as reflecting the consequences of insurance-induced moral hazard, and other principal-agent problems.

Studies using data from the mid-1980s and after, and which focus on the California experience, present a different picture. Typically, these studies addressed the relationship between market concentration and price, as opposed to market structure and cost, and generally, they obtained results consistent with the traditional S-C-P paradigm -- i.e., a positive relationship between concentration and price.[8]

While suggestive, these price-concentration studies do not provide direct evidence of the effects of hospital mergers. One problem with drawing inferences about the competitive effects of mergers from this literature is that the results are almost surely sensitive to the way the geographic markets are defined, since this definition will

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[6] A notable exception was Noether (1988), who found that increased competition reduced mark-ups over cost.

[7] For a comprehensive review of this literature see Pautler and Vita (1994). For seminal works see Joskow (1980) and Robinson and Luft (1985).

[8] For example, Dranove et al. (1993) found that an increase in the Herfindahl-Hirschman Index (HHI) from 2500 to 5000 results in a price increase of approximately 3 percent for a basket of hospital services. Melnick et al. (1992) found that where a merger reduces the number of competitors from three to two (assuming that the competitors had equal shares), the per diem price for medical/surgical services increases by 9 percent. Other examples are Keeler, Melnick, and Zwanziger (1999), and Simpson and Shin (1998).

determine the value of the concentration index. Most of these studies delineated

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[9] For example, see Kessler and McClellan (1999) and Werden (1989). Only the former have offered an alternative method for defining antitrust markets. Although there seldom may be good practical alternatives to patient flow data, it is nonetheless true that antitrust markets defined on this basis may lead to incorrect conclusions about the competitive constraints faced by a particular pair of merging hospitals.

B. Empirical Literature on Actual Mergers

[10] Another form of "event study" sometimes used by economists are stock market event studies, which examine the effect of an event (e.g., the announcement of a merger) on the stock market value of some set of affected firms (e.g., rivals of the merging entities). See MacKinlay (1997) for a general description of this approach. The stock market event study method on a number of occasions has been used to assess the consequences of horizontal mergers (see, e.g., Eckbo (1983)), and we are aware of at least one attempt to use this method to evaluate the competitive consequences of hospital mergers (Woolley (1989); see Vita and Schumann (1991) for a critique of this study). While the stock market event study method applied to horizontal merger analysis does not require the researcher to identify the precise boundaries of the antitrust market, it does require the researcher to identify at least some of the firms whose profits likely would be affected by the transaction.

[11] Of course, one can do more. In the empirical section below, we also estimate the effects of the merger on the price of (what appears to be) the merged entity's closest rival. Failure to find a positive price effect for this producer might mean either that this firm (1) did not produce a close substitute; or (2) the merger did not create market power. Finding a positive price effect would suggest (ceteris paribus) that the producer

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Among the first researchers to employ this strategy were Barton and Sherman (1984), who found that two mergers of microfilm producers increased both prices and profits. A very similar empirical strategy was used by Kim and Singal (1993) in their study of the price effects of airline mergers. Later, Schumann et al. (1992, 1997) examined the price effects of mergers that took place in three different industries: cement, corrugated paperboard, and titanium dioxide. [12]

Barton and Sherman, and Kim and Singal used a very simple -- and restrictive -- empirical strategy for measuring the competitive impact of a horizontal merger. Essentially, they analyzed movements in the price of the product affected by the merger, relative to the price of a substitute product hypothesized to face similar demand and cost conditions, but unaffected (or at least less affected) by the merger. The competitive effects of the transaction were assessed through a simple t-test of the

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[11] (...continued)
was in the relevant market, and that the merger was anticompetitive.

[12] Connor, Feldman, and Dowd (1998), and Wicks, Meyer, and Carlyn (1998) also attempted to assess the price effects of horizontal hospital mergers, but both studies exhibit considerable methodological problems. Connor et al. estimate an equation of the form: $\%?PRICE_{it} = f(\%?X_{it}, M_i)$, where the dependent variable is the percentage change price of the ith hospital from period t-1 to period t, X_{it} are exogenous variables, and M_i is a dummy variable set equal to 1 if hospital i merged during the sample period. It is difficult to reconcile this specification with economic theory, which predicts a relationship between the price level (not its rate-of-change) and market structure. Additionally, it appears that the merger dummy variable is either 0 or 1 for the entire sample period, instead of taking on different values for the pre- and post-merger periods.

Wicks et al. (1998) compare pre- and post-merger price levels, but do not include any control variables. Hence, it is difficult to know if any changes in prices reflect the exercise of market power, or are the result of changes in exogenous price determinants.

[13] Kim and Singal (1993, p. 554) rationalize this as follows: "Industry-wide changes, like fluctuations in fuel prices, changes in labor cost, and seasonal or cyclical variations in demand are likely to have an equivalent effect on routes of a similar

price determinants. As a consequence, one will incorrectly estimate the price effects of the transaction.

In the empirical section below, we propose an empirical framework that combines elements of the Barton and Sherman, and Schumann et al. approaches. We believe that this strategy will provide the best method for identifying accurately the competitive effects of the acquisition. Before setting forth this empirical strategy, we first describe in greater detail the events of the Dominican-Santa Cruz transaction.

III. History of the Transaction

On March 8, 1990, Dominican Santa Cruz Hospital ("Dominican"), a 259-bed, not-for-profit hospital, affiliated with the Catholic Healthcare West system, purchased the only other hospital in the city of Santa Cruz, AMI-Community Hospital ("Community"). Community, which was affiliated with American Medical International, was licensed for 180 beds and was a for-profit entity. Dominican and Community were located about two miles apart. The only other hospital in Santa Cruz county was Watsonville Community Hospital, located about 14 miles south of the city. The city of Santa Cruz is located about 40 miles south of San Jose, and 80 miles south of San Francisco. Santa Cruz county is bordered on the south and west by the Pacific ocean, and on the north and east by the Santa Cruz mountains.

The FTC's analysis of patient flows suggested that the overwhelming majority of the three Santa Cruz county hospitals' patients resided in Santa Cruz county, and that

most Santa Cruz residents receiving inpatient hospital care received it from hospitals in the county. Accordingly, the FTC's complaint alleged that the relevant geographic market was "Santa Cruz County and/or portions of Santa Cruz County." According to the Complaint, the merger increased the market share (of patient-days) of Dominican from 62 percent to approximately 73 percent, and increased the market share (measured by available beds) from 50 percent to 73 percent. The Herfindahl-Hirschman Index for the relevant antitrust market increased by over 1,700 points, from approximately 4,620 to approximately 6,350 (measured by patient-days); and by over 2,300 points (from approximately 3,770 to approximately 6,090) when measured by available beds. Under the Merger Guidelines enforcement criteria, a transaction generating concentration figures of this magnitude would be presumed anticompetitive. Absent compelling evidence that such a merger would create substantial efficiencies, or that the exercise of market power would be constrained by the threat of entry, normally the FTC would seek to preliminarily enjoin such a transaction.[15] Had the FTC had the opportunity to seek a preliminary injunction in this case, it would have done so.[16] However, as noted

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[15] According to the 1992 Merger Guidelines (§1.51(c)), "the [FTC] regards markets [with HHIs above 1800] to be highly concentrated . . . [when] the post-merger HHI exceeds 1800, it will be presumed that mergers producing an increase in the HHI of more than 100 points are likely to create or enhance market power or facilitate its exercise."

[16] As then-FTC Chairman Steiger observed at the time, "[t]he facts of this case provide sufficient reason to believe that this acquisition violates Section 7 of the Clayton Act. Ordinarily, such facts would lead the Commission to seek a preliminary injunction in federal district court." See Statement of Chairman Janet D. Steiger in Support of Final

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earlier, the small absolute size of the transaction failed to trigger the Hart-Scott-Rodino filing thresholds, and the FTC was not able to seek an enforcement action until after the transaction was completed.

In March, 1993, approximately three years after the merger was consummated, the FTC accepted a consent agreement with Dominican Santa Cruz Hospital and Catholic Healthcare West. The consent order did nothing to restore the pre-merger competitive environment; it required only that the respondents obtain the Commission's prior approval before acquiring any other hospitals in Santa Cruz County. Although all of the FTC Commissioners concluded that the merger probably had created significant market power, a majority of the FTC Commissioners concluded that the agency had few good remedies available to it.[17] The acquired hospital, Community, already had been converted to a skilled nursing/rehabilitative care facility. Thus, the effects of the merger could have been reversed only at considerable cost. Further, Sutter Health, a major Northern California hospital chain, had announced plans to construct an acute care hospital in Santa Cruz, and had already purchased a 3.8

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[16] (...continued)
Issuance of Consent OrderIn the Matter of Dominican Santa Cruz Hospital, et al. 188 F.T.C. 382 (1994).

[17] See Statements of Chairman Steiger, Commissioner Azcuenaga, and Commissioner Yao In the Matter of Dominican Santa Cruz Hospital, et al. 118 F.T.C. 382 (1994).

[18] Sacramento Business Journal, March 16, 1992.

[19] "Sutter Health, a major Northern California hospital chain, announced plans to construct an acute care hospital in Santa Cruz, which would restore a third hospital competitor in the market. The very real prospect that Sutter will enter this market, before a divestiture decree could be obtained through litigation and a willing buyer found, is an additional factor weighing against pursuit of a divestiture order." See Statement of Chairman Janet D. Steiger in Support of Final Issuance of Consent Order in the Matter of Santa Cruz Hospital, et al.

[1]

where P_{it} is the price of hospital i at time t; Z_{it} is a vector of demand shifters (e.g., income); W_{it} is a vector of input prices; and M_t is a dummy variable set equal to one for all time periods subsequent to the transaction. In section V, below, we estimate equation [1] separately for Dominican Hospital and its closest remaining rival, Watsonville Hospital.

Because we cannot observe all of the exogenous factors that might affect the equilibrium prices of the merged entity and its competitors, we incorporate elements of the approach used by Barton and Sherman (1984) and Kim and Singal (1993) in their merger studies. Essentially, these authors analyzed movements in the price of the product affected by the merger, conditional on the price of a substitute product that faces similar demand and cost conditions, but which is unaffected by the merger. In other words, this other product serves as a control group; it is assumed that the exogenous determinants of price (e.g., input prices) affect the "control group" and the "treatment group" equally. [20] If true, and if the merger had no impact on equilibrium price, then the relationship of the price of the merged entity to the price of the "control" would be unchanged post-merger. Post-merger changes in this ratio can then be imputed entirely to the transaction.

As noted earlier, the assumption that exogenous factors affect the merged entity and the control group equally is restrictive – it is unlikely that all of the determinants of

[20] See note 13, above.

price will be matched across the two groups. Accordingly, we include as regressors, in addition to the price of the control group, the observable determinants of that price (e.g., factor prices faced by the peer group hospitals). This specification avoids the unnecessarily restrictive assumption that all intertemporal differences in the covariance of the two prices is attributable to the change in market structure. Below, the criteria used to construct this control group (which we refer to as the "peer group") are discussed in greater detail.

Carrying out the analysis via the estimation of equation [1] eliminates the necessity of specifying a geographic market for the outputs produced by the merging hospitals. If the Dominican-Community merger was anticompetitive, then the coefficient on the merger dummy variable should be positive, [21] irrespective of the dimensions of the market in which Dominican and Community competed prior to merger.[22] Conversely, if the merger was not anticompetitive, for whatever reason (e.g., low concentration in the relevant market, subsequent entry, offsetting efficiencies, or not-for-profit status), then the coefficient on this variable should be zero (or negative, if

[21] As we discuss below, a positive coefficient potentially is also consistent with post-merger quality improvements.

[22] Knowing the dimensions of the market would be important if the merger was anticompetitive, and if we wished to estimate the welfare loss associated with the transaction. Then, we would also wish to know which other hospitals also raised their prices (and by how much). This paper attempts to address a much simpler question: did the merged entity (and its closest rival) raise price post-merger?

[23] In the OSHPD data, there are various categories for both gross and net patient revenue. Net revenue is equal to a hospital's gross revenue minus any discounts that it offers. In the data, the gross revenue figures distinguish between inpatient and outpatient revenue, however, the net revenue figures do not. As noted by Dranove et al. (1993), failure to account for discounts seriously understates the effect of competition on price. Thus, several adjustments must be done in order to obtain estimates of net inpatient revenue from the gross inpatient data. While OSHPD has been collecting quarterly data from hospitals since approximately 1980, data prior to 1986 did not in any way distinguish revenue by payer group. As a result, observations from prior to 1986 were eliminated. For data from 1986 to 1992, net inpatient price was calculated by multiplying total net revenues from non-Medicare, non-Medicaid patients by the ratio of gross inpatient revenue to gross total revenue at the hospital. While this net revenue

[23] (...continued)
Net price was then calculated using the same methodology as outlined for the 1986 to 1992 data.

[24]

of discharge and DRG for each patient. Using these data, we created a quarterly casemix indicator for each hospital used in the empirical analysis. This was done as follows. Each non-Medicare/non-Medicaid discharge at each hospital for each quarter was weighted using the HCFA caseweight index for the relevant DRG. The weighted discharges were then summed and divided by the total number of discharges for each quarter at each hospital to obtain the casemix index.

As a further control for discharge heterogeneity, we also include the average length-of-stay for privately insured patients. The rationale for including this measure is straightforward – each additional day of hospitalization requires the consumption of additional labor and material resources. One cannot compare the price of a discharge across different time periods, or across different hospitals, unless one controls for variations in length-of-stay.

[26] All hospitals in our "peer group" were located in an MSA for which HCFA creates a wage index. The exception is El Centro Regional Medical Center in Imperial County. For this hospital we used a composite HCFA wage index for non-metropolitan areas of California.

[27] Though Watsonville Hospital suffered damage from the earthquake, the

this event, we create a dummy variable (quake) equal to 1 for the 3rd quarter of 1989 and all subsequent periods, and 0 otherwise.

Last, similar to other empirical studies of hospital mergers (e.g., Lynk (1995), Simpson and Shin (1998)), we include a number of other variables to control for exogenous demand- and cost-side variation. These consist of per capita income, the county-level unemployment rate, county population density, share of admissions Medicare, and share of admissions MediCal.

Table 1 contains descriptive statistics for the variables used in empirical analysis.

C. Creation of the Peer Group

As noted above, an important element of our study is the creation of a group of hospitals comparable to Dominican Santa Cruz and other in-market hospitals, and the inclusion of their prices (and the exogenous determinants of their prices) as an explanatory variable in the price equation. By so doing, we hope to control for otherwise unobserved demand and cost factors, unrelated to the merger, that might influence intertemporal price behavior at the merging hospitals. The State of California has undertaken two studies to categorize hospitals into peer groups for purposes of setting Medi-Cal reimbursement levels, the most recent in 1991 (Department of Health Services, 1991).

Santa Clara. The competitive environment in such large urbanized areas likely is very different from that found in the less urbanized area of Santa Cruz.

Next, the peer group was restricted to those hospitals that were placed in any of the short term urban hospital peer groups in the 1991 California study, and were licensed with between 100 and 300 beds in that year. While somewhat arbitrary, these licensed bed cut-offs would appear to limit the sample to hospitals reasonably comparable to the hospitals in Santa Cruz. This left 41 potential peer group hospitals. We next eliminated those hospitals in this group that were not between 100 and 300 licensed beds, and/or did not fall under one of the urban hospital groupings in the 1982 California Peer Group survey. This left 33 potential peer group hospitals. We next eliminated any hospitals that did not report between 100 and 300 beds in the 1996 AHA Guide. This left 25 potential peer group hospitals. We then eliminated all hospitals that had themselves been involved in a horizontal acquisition as reported in the OSHPD Hospital History Listing database. This group of 17 remaining hospitals comprise our peer group (see Appendix A).

[28] We conducted a Chow test to determine if the Watsonville and Dominican data should be pooled. The Chow test rejected this restriction at the 5 percent significance level. Accordingly, we estimate the price equation separately for each hospital.

[29] See Newey and West (1987) and Greene (1997, p. 506). The Newey-West estimator is a refinement of the White (1980) heteroskedasticity-consistent estimator; it

The results in Table 2 present the strongest evidence of an anticompetitive post-merger price increase. In column (a), which presents the fully specified version of the equation, the coefficient on merge, the merger dummy variable, suggests a substantial post-merger price increase – over $1,000 per admission, which represents a price increase of approximately 30 percent (Dominican's pre-merger average real revenue per admission was approximately $3,700). Most of the other coefficients in this equation are statistically insignificant – the only exceptions are Dominican's average length-of-stay (length-of-stay_d), which has the expected positive coefficient, and the Producer Price Index for surgical and medical instruments (ppi_med), which also has the expected positive coefficient.[30]

The finding of a post-merger price increase at Dominican is weakened, though not eliminated, by imposing restrictions on the reduced form equation. In column (b) of Table 2, we drop the quake dummy variable from the equation. In column (c), we further restrict the peer group variables to have zero coefficients. As can be seen, these restrictions cause the magnitude of the coefficient on merge to fall. Even in the most restricted version of the equation (i.e., column (c)), however, the results indicate that the merger raised price per admission by about $700. In this specification, the hypothesis

[30] We also estimate this equation using the log of the ratio of the Dominican (Watsonville) price to the average peer group price. The basic results are unchanged.

[31] We test the null hypothesis that the parameters on the peer group variables jointly equal zero. For the Dominican equation, the test statistic (distributed F(10, 19)) equals 1.14, which means that the null hypothesis can be rejected only at p=.39. For the Watsonville equation, the corresponding test statistic and significance level are 1.23 (p=.33).

[32] We can reject the null hypothesis that the true parameter on merge equals zero at the 31 percent level in the unrestricted version of the equation (see Table 3, column

While the empirical results presented in Tables 2 and 3 are consistent with an anticompetitive post-merger price increase, our inability to observe and measure quality perfectly means that we cannot rule out the possibility that the price increases reflect improvements in quality, rather than increased price-cost markups with unchanged (or even diminished) quality levels. We are, however, skeptical about the validity of this interpretation. First and foremost, the parties to the acquisition made no such claims in defense of the transaction. Rather, the parties claimed that the efficiencies from the transaction would derive from the realization of scale-related production efficiencies.[34] To the extent that such scale economies were realized, we would expect prices to fall, other things held constant.

It is perhaps conceivable that consolidation of particular services at Dominican could lead to volume-related quality increases – for example, because clinical outcomes for some procedures improve as the procedure is performed with higher frequency at a particular location.[35] Then, Dominican might be able to capture some or all of the value of this quality increase in the form of higher prices.

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[34] See Statement of Commissioner Yao. Dominican claimed that Community Hospital was inefficiently small, and that efficiencies could therefore be realized by converting it to a skilled nursing/rehabilitation facility, and channeling its patients to Dominican.

[35] For a large number of clinical procedures there is empirical evidence that outcomes improve with patient volume. See, e.g., Begg et al. (1998) and Selby et al. (1996).

hypothesis, we regress the LIFO statistic against a constant and the merge dummy. If the efficiency hypothesis is correct, we would expect to obtain a positive coefficient on merge. As it turns out, however, the coefficient is negative and statistically insignificant. [38] Thus, this result also fails to support the efficiency hypothesis.

Two other aspects of these empirical findings merit comment. First, we observe that the coefficient on entry (the dummy variable set equal to one for those time periods after the entry of the Sutter mini-hospital) was not consistently negative across specifications (e.g., compare Table 2 to Table 3), as theory would predict, and was never different from zero at conventional significance levels. As noted earlier, the FTC's rationale for not pursuing a divestiture remedy in this matter was predicated in part on the decision of Sutter to enter this market.[39] It now appears that the FTC overestimated the competitive impact of this entry. This error probably was attributable to the limited scale and scope at which entry actually occurred. The new hospital was not a full-scale acute care institution, but rather a very small (21 staffed beds) maternity and surgery center. It is implausible that this institution would impose the same competitive constraints on incumbent producers as did Community hospital. [40]

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[38] The estimated regression is: LIFO =.6881 - .0097*merge + e.
(77.42) (-0.87)
T-statistics are in parentheses.

[39] See note 19, above.

[40] As noted earlier (see note 34, above), Dominican had argued that Community (180 beds) was inefficiently small. If true, then it surely follows that a 21 bed hospital is
(continued...)

Table 1

Descriptive Statistics

Variable Name	Description	Mean	Minimum	Maximum
rprice_d	real net revenue per admission, Dominican Hospital	4434.55	3212.89	5882
rprice_w	real net revenue per admission, Watsonville Hospital	3897.98	1794.32	6490.128
rprice_p	real net revenue per admission, peer group hospitals	4955.76	3454.33	6091.85
length-of-stay_d	average length-of-stay, Dominican Hospital	4.01	2.71	5.63
length-of-stay_w	average length-of-stay, Watsonville Hospital	3.99	2.71	6.79
length-of-stay_p	average length-of-stay, peer group hospitals	4.38	3.70	4.93
medi-Cal share_d	share of admissions MediCal, Dominican Hospital	0.14	0.051	0.17
medi-Cal share_w	share of admissions MediCal, Watsonville Hospital	0.29	0.10	0.48

Variable Name	Description	Mean	Minimum	Maximum
medi-Cal share_p	share of admissions MediCal, peer group hospitals	0.21	0.17	0.24
medicare share_d	share of admissions Medicare, Dominican Hospital	0.39	0.33	0.44
medicare share_w	share of admissions Medicare, Watsonville Hospital	0.31	0.22	0.40
medicare share_p	share of admissions Medicare, peer group hospitals	0.38	0.34	0.40
casemix_d	casemix index, Dominican	0.85	0.75	1.04
casemix_w	casemix index, Watsonville	0.76	0.67	0.87
casemix_p	casemix index, peer group hospitals	0.94	0.84	1.05
density_p	population density, peer group counties	101.43	89.97	110.07
density_s	population density, Santa Cruz County	516.96	486.10	539.57
hmo5.6 120 0.96 57.84 re f 165.6 176.88		93.6 0.96 re f 259.2	119.04 93. 93.6 0.96	re f 259.2 3ab4nta Cruz

Variable Name	Description	Mean	Minimum	Maximum
hmo_w	share of admissions HMO insured, Watsonville	0.06	0	0.25
hmo_p	share of admissions HMO insured, peer group	0.15	0.06	0.23
income_s	real per capita income, Santa Cruz County	16104.97	14464.69	17700.51
income_p	real per capita income, peer group counties	13253.29	12968.84	13703.24
ppi_med	producer price index, medical & surgical instruments	121.19	107.27	131.27
unemploy_p	unemployment rate, peer group counties	10.53	8.16	14.40
unemploy_s	unemployment rate, Santa Cruz County	8.35	5.37	13.83
merge	= 1 for quarters after merger occurred	0.6304348	0	1
entry	= 1 for quarters after entry occurred	0.1086957	0	1
run_qtr	time trend	23.54348	1	48

Variable Name	Description	Mean	Minimum	Maximum
run_qtr2				

Table 2

	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
wage_p	94.71 (0.01)	926.02 (0.15)	
wage_d	-756.33 (-0.61)	-713.21 (-0.58)	-82.71 (-0.13)
rprice_p	.14 (0.28)	.18 (0.36)	
medicare share_d	1909.25 (0.42)	2625.13 (0.55)	3464.04 (1.37)
medicare share_p	-9161.47 (-0.58)	-11677.03 (-0.76)	
medi-Cal share_d	2410.38 (0.45)	1956.57 (0.37)	1109.31 (0.39)
medi-Cal share_p	-4574.66 (-0.19)	-3710.94 (-0.15)	
ppi_med	253.50 (1.89)	294.69 (3.18)	108.49 (2.16)
run_qtr	-96.75 (-0.60)	-117.87 (-0.78)	26.40 (0.27)
run_qtr2	0.78 (0.40)	1.03 (0.56)	-0.74 (-0.89)
entry	280.62 (0.39)	257.16 (0.36)	670.12 (2.35)
quake	278.89 (0.63)		
intercept	4634.23 (0.18)	1066.04 (0.04)	-1408.28 (-0.09)
	(0.64(0.185-802	278.834))Tj6278.89	

Table 3

Watsonville Hospital Price Regression

Quarterly Data, 1986-96

Dependent Variable = real net revenue per private admission

	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
merge	428.42 (1.48)	497.47 (1.44)	524.30 (1.52)
income_p	-1.44 (-0.58)	-0.83 (-0.34)	
income_s	-0.59 (-1.57)	-0.55 (-1.44)	-.63 (-3.17)
density_p	1.64 (0.01)	91.82 (0.31)	
density_s	-65.57 (-0.62)	-77.70 (-0.77)	-96.15 (-3.35)
unemploy_p	-192.81 (-0.58)	89.83 (0.26)	
unemploy_s	75.96 (0.37)	-68.12 (-0.31)	3.82 (0.07)
length-of-stay_w	661.65 (3.13)	589.53 (2.81)	746.46 (4.24)
length-of-stay_p	1564.40 (1.27)	1082.68 (0.97)	
hmo_w	-3001.02 (-1.27)	-2034.23 (-0.87)	-2926.96 (-1.15)
hmo_p	-2909.30 (-0.19)	-5026.07 (-0.32)	
casemix_p	-1333.34 (-0.14)	1593.00 (0.19)	
casemix_w	6441.82 (1.66)	6738.19 (1.76)	7241.37 (3.38)

	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
wage_p	3268.53 (0.28)	-1031.73 (-0.10)	
wage_w	-245.38 (-0.11)	92.20 (0.04)	-676.05 (-0.50)
rprice_p	0.02 (0.03)	-0.09 (-0.11)	
medicare share_w	1547.97 (0.32)	3444.37 (-.70)	1220.01 (0.25)
medicare share_p	-22510.47 (-1.47)	-16165.86 (-0.99)	
medi-Cal share_w	-4439.67 (-1.84)	-3690.78 (-1.47)	-3817.34 (-1.91)
medi-Cal share_p	3832.57 (0.11)	-2018.22 (-0.06)	
ppi_med	472.47 (2.48)	279.54 (1.52)	228.73 (2.21)
run_qtr	-108.34 (-0.47)	-25.37 (-.11)	109.46 (0.94)
run_qtr2	0.89 (0.29)	-.22 (-0.07)	-2.03 (-1.43)
entry	-525.84 (-0.93)	-416.75 (-0.66)	25.75 (0.05)
quake	-1023.69 (-1.82)		
intercept	4964.34 (0.14)	16107.88 (0.48)	27732.12 (1.42)
	N = 44 R^2 = .88	N = 44 R^2 = .87	N = 44 R^2 = .84

Newey-West heteroskedasticity and autocorrelation consistent standard errors (lag length = 1)

Table 4

Dominican Hospital Expense Regression

Quarterly Data, 1986-96

Dependent Variable = real inpatient expenses per admission

	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
merge	143.94 (1.02)	110.41 (0.83)	84.87 (0.66)
income_p	.22 (0.21)	0.24 (0.21)	
income_s	-0.27 (-1.62)	-0.28 (-1.63)	-0.24 (-3.93)
density_p	-9.94 (-0.07)	-6.02 (-0.04)	
density_s	3.38 (0.09)	-0.54 (-0.01)	-14.30 (-1.84)
unemploy_p	19.05TT1 10.08 Tf -0.0118 T5118 T4 Td (density_s)Tj /TT0 130 Tc 158.76 -0.24 Td (unemploy_p	- TT1 10.08 Tf -0.0117.67521)d	

dnemploy_p21)

(-5i4-0.004 T

	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
wage_p	4986.65 (1.69)	5853.47 (1.84)	
wage_d	-491.62 (-1.30)	-466.61 (-1.23)	294.96 (1.17)
expense_p	0.27 (0.56)	0.29 (0.61)	
medicare share_d	735.17 (0.44)	1438.33 (0.82)	780.20 (0.47)
medicare share_p	1082.31 (0.18)	-1341.07 (-0.23)	
medi-Cal share_d	1609.24 (0.49)	1045.77 (0.33)	395.13 (0.26)
medi-Cal share_p	-6820.35 (-1.17)	-1341.07 (-0.23)	
ppi_med	-46.42 (-0.67)	-0.13 (-0.002)	22.78 (0.81)
run_qtr	138.48 (1.54)	120.37 (1.36)	80.30 (2.94)
run_qtr2	-1.15 (-1.04)	-0.93 (-0.82)	-0.78 (-2.34)
entry	341.79 (1.14)	323.94 (1.11)	419.14 (2.68)
quake	308.11 (1.70)	-0.93[illegible]4 (-1.17)	

run_

	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
wage_p	-1061.92 (-0.28)	-939.29 (-0.27)	
wage_w	1799.07 (1.76)	1787.93 (1.87)	-170.24 (-0.41)
expense_p	-0.42 (-0.42)	-0.42 (-0.42)	
medicare share_w	4648.03 (1.93)	4597.5 (1.99)	2809.34 (1.73)
medicare share_p	-1914.61 (-0.29)	-2077.00 (-0.32)	
medi-Cal share_w	-329.37 (-0.21)	-348.62 (-0.23)	-1349.59 (-1.38)
medi-Cal share_p	-48.87 (-0.01)	160.19 (0.01)	
ppi_med	-56.90 (-0.68)	-51.61 (-0.71)	-21.18 (-0.36)
run_qtr	83.57 (0.53)	81.47 (0.53)	100.09 (2.17)
run_qtr2	-0.84 (-0.42)	-0.80 (-0.43)	-0.35 -0.84

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