

Physician Market Concentration and Antitrust

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Abstract

Objectives. We empirically examine market concentration measures of medical groups in each of California's metropolitan areas. Market shares are based on enrollment rather than number of physicians, thereby minimizing double counting problems. We then estimate statistical models to determine the extent to which medical group market structure affect medical group prices.

Methodology. We calculate and compare concentration ratios for health plans and medical groups in all California counties and MSAs, based on enrollment data from Cattaneo and Stroud, Inc. To assess the role of market structure on physician prices we estimate a price function.

Findings. This study has three primary findings. First, more than 75 percent of the MSAs in California exhibit medical group HHI concentration ratios in excess of 1,800, and 40 percent of the MSAs have medical group HHI concentration ratios of 3,000 or more. Second, in terms of antitrust safety zones, taking the MSA to be the relevant geographic market, only 4 medical groups lie outside of the 20 percent exclusive network safety zone, and no medical groups lie outside of the 30 percent non-exclusive network safety zone; taking the county as the relevant geographic market, the number of medical groups operating outside of the safety zones increases markedly: 12.8 percent comprised at least 20 percent of their markets and 7.9 percent comprised at least 30 percent of their markets. Third, the relationship between concentration and price depends on the source of price data: there is a positive association between medical group concentration and Medicare price, but a negative association between medical group concentration and Medicaid price

Conclusions. Medical group consolidation has led to a number of highly concentrated physician markets in California, with several medical groups falling outside of antitrust safety zones. The results of the multivariate models should be interpreted with caution, but the results are interesting enough to suggest that additional analyses should be done using better measures of price.

1. Introduction

Health plans nationwide increasingly rely on relational contracts with medical groups to supply health care services (Casalino, Gillies et al. 2003; Gold, Hurley, and Lake 2001; Robinson and Casalino 1995, 2001). This trend is particularly pronounced in markets where managed care organizations have relatively high market shares and capitated payment mechanisms are common, such as California (Robinson and Casalino 1995, 2001; Rosenthal et al. 2002; Penner 1997). In recent years, medical groups and independent practice associations (IPAs),¹ particularly those in California, have argued that they are often at a bargaining disadvantage when they consider signing contracts with health plans; similarly, several health plans have argued that some medical groups dominate certain cities and counties, thereby creating monopolies in several geographic markets (Ceniceros 2000; Strunk, Devers, and Hurley 2001). There have been several studies of the economic effects of health plan consolidation, but relatively few studies have examined the economic effects of medical group consolidation.

In this paper we empirically examine market concentration measures of medical groups in each of California's metropolitan statistical areas (MSAs). The unique contribution of this paper is that we calculate concentration ratios based on medical group enrollees, rather than using the number of affiliated physicians, thereby minimizing the effects of double counting—a common problem in the analysis of medical group markets. We then estimate statistical models to determine the extent to which medical group market structure affects physician prices. The working hypotheses are that MSAs with relatively higher physician concentration are expected, *ceteris paribus*, to have higher average physician charges.

2. Background

Over the past decade there has been a trend toward medical group consolidation, reflected in the increase in the number of physicians practicing in groups of 10 or more and the relatively large number of medical groups accepting some degree of financial risk from health plans (Gold, Hurley, and Lake 2001; Hurley et al. 2002). Several interest groups—including employers, health plans, state and federal regulators, and consumer groups—have expressed concern about the degree of provider consolidation, and the extent to which the trend toward consolidation may affect prices and quality (FTC 2000; Strunk, Devers, and Hurley 2001).

Much of the health plan physician contracting in California is based on delegation, wherein health plans delegate financial responsibility to physicians for most primary care (and in some cases more than primary care), paying physicians a fixed, capitated amount per month to provide services (Robinson and Casalino 1995). By placing physicians at risk financially, the logic behind the delegated model has been that it leaves day-to-day

¹ Physician organizations come in many different forms. The data in this study pertains mainly to medical groups and IPAs; thus, hereafter, we use the term “medical group” to refer to medical groups, IPAs, physician networks, physician joint ventures, and related forms of physician organization.

resource allocation decisions in the hands of the immediate caregivers rather than distant health plan utilization reviewers. One of the consequences of the delegated model, however, has been the need for physician groups to grow larger in order to more effectively manage and spread financial risk (Gaynor and Gertler 1995). In addition, by increasing size, physicians are presumably better able to take advantage of economies of scale, invest in information systems to facilitate care management processes, and gain negotiating leverage with health plans (Casalino, Devers et al. 2003; Casalino, Gillies et al. 2003). Currently, medical group and IPAs in California typically contract with most large health plans, whereas health plans typically contract selectively with a limited number of medical groups in a community.

Interest in physician group market power was in recent years reinvigorated by requests from physician groups in several states to be granted exemptions from state and federal antitrust laws (Ameringer 2002; Hellinger and Young 2001; Mulvaney and Harvey 1999). In many of the requests, physicians have relied on the argument that they have difficulty achieving a level playing field with health plans due to bargaining asymmetry. The implicit argument has been that physician groups cannot even the playing field through integration and consolidation alone, and should therefore be afforded the same protections as labor unions and other groups exempt from federal antitrust laws. Not unexpectedly, in many instances the debate over physician antitrust exemption turned from one of deciding whether physician groups were disadvantaged to deciding whether some consolidated groups exercised market power. If it could be shown that medical groups were capable of achieving bargaining symmetry through integration and consolidation, critics of physician exemptions argued, then there would be no legal basis for granting an antitrust exemption.

2.1 Antitrust Issues

In this paper we explore the validity of these concerns in the context of an analysis of antitrust issues. The U.S. Department of Justice (DOJ) and the U.S. Federal Trade Commission (FTC) have acted on numerous cases involving health plans and provider groups and have recently devoted additional resources to examining physician group consolidation (FTC 2003, 1996). Federal antitrust guidelines outlined by the DOJ and FTC specify safety zones within which physician networks “are highly unlikely to raise substantial competitive concerns” (FTC 1996). Physician network safety zones include (1) *exclusive* networks “whose physician participants share substantial financial risk and constitute 20 percent² or less of the physicians in each physician specialty with active hospital staff privileges who practice in the relevant geographic market,” and (2) networks that “share substantial financial risk in providing all of the services that are jointly priced through the network.” The primary justification for including “substantial risk sharing” as criteria for safety zone inclusion is based on the assumption that networks that share risk are more likely to have achieved a level of integration sufficient to gain scale and scope efficiencies.

² The threshold is 30 percent for *non-exclusive* networks.

Aside from clear cases of price fixing, which are considered per se illegal in antitrust law, physician network cases falling outside of the safety zones are analyzed under the “rule of reason,” which focuses on the extent to which integration can be justified on efficiency grounds and the extent to which integration has an anticompetitive effect (FTC 1996). By increasing size, medical groups may gain production efficiencies such as risk spreading, economies of scale, information sharing, quality improvement, and access to capital (e.g., Gillis 1998; Gaynor and Gertler 1995; Casalino, Devers et al. 2003; Rotarius, Fottler, and Blair 2003). Some studies, however, suggest that efficiency grounds for medical group consolidation explain only a small fraction of observed consolidation. The remainder appears to be motivated by negotiating leverage with contractual partners. For example, Casalino and others (Casalino, Devers et al. 2003), interviewing health care leaders in 12 metropolitan areas nationwide, found that gaining leverage with health plans was the most frequently cited benefit of large medical group practice arrangements; economies of scale were reported as a distant second, and quality improvement a distant sixth.³

In addition to demonstrating efficiency gains from consolidation, rule-of-reason analysis also includes an examination of possible anticompetitive aspects of integration, mainly the ability to (1) “raise the prices for physician services charged to health plans above competitive levels,” or (2) “prevent or impede the formation or operation of other networks or plans.” Examples of the former include recent high-profile price fixing cases in Lake Tahoe, Denver, and Austin (Reuters 2002; FTC 1999, 2000), and a classic example of the latter is the Marshfield Clinic case, wherein Marshfield Clinic physicians (a large network) had acted to prevent non-network physicians from entering local markets (Greenberg 1998). Central to both forms of anticompetitive behavior is the presence of barriers to entry into the market (Haas-Wilson and Gaynor 1998, 1998; Gaynor and Haas-Wilson 1999). In the case of Marshfield, incumbent providers, by virtue of their size, were able to create substantial entry barriers. In many of the recent physician price fixing cases, relatively high levels of market consolidation facilitated price fixing (FTC 2003). In addition, high levels of managed care penetration may indirectly act as barriers to entry. To the extent that managed care organizations are economizing on the transaction costs associated with developing reliable provider networks by contracting with larger groups, solo physicians are clearly at a disadvantage when entering a market (Haas-Wilson and Gaynor 1998).

3. Methods

3.1 Approach

The methodological approach consists of three steps. First, we calculate and compare concentration ratios for health plans and medical groups in all California MSAs. Second, we employ a multivariable price function to examine the relationship between physician

³ The authors note that gaining negotiating leverage with health plans “was cited 8 times more often than improving quality” (58 percent versus 7 percent) as a benefit of large group practice. The study’s main efficiency measure, economies of scale, was cited as a benefit to large medical group practice by only 23 percent of respondents.

market concentration and physician charges, taking the MSA as the unit of analysis. Price functions identify the relationship between price, quantity, and other factors likely to influence prices.

3.2 Data

The analytic dataset was based on the Cattaneo and Stroud, Inc. (CSI) inventory of medical groups, which contains enrollment data (total and by county and MSA) in addition to basic contact information for all California medical groups and IPAs that (1) have at least 6 primary care physicians affiliated with the group, and (2) have at least one risk or non-risk contract with at least one health plan.⁴ The CSI dataset is unique in that medical group enrollment is reported by county. The chief limitation of the CSI medical group inventory is that it is not routinely closed at the end of a given time period (e.g., calendar year), which restricts investigation to cross-sectional analyses. Another limitation is that the data do not permit distinguishing between medical groups and IPAs. The final medical group dataset contained information on 482 medical groups as of December 31, 2001. As a final step data from the Area Resource File, the Center for Medicare and Medicaid Services, and the California state Medicaid program (“MediCal”) were merged to the health plan and medical group datasets. The resulting files support analyses at the health plan, medical group, county, and MSA level.

3.3 Variables

Market concentration indices are calculated for medical groups and health plans by MSA. Although not an ideal measure of market concentration, a standard method of measuring market concentration is the Herfindahl-Hirschman Index (HHI). The HHI is calculated by summing the squares of each firm’s market share in the MSA; that is, $HHI = \sum_i s_i^2$, where s denotes the market share of firm i . This method allows for firms with relatively large market share (e.g., 60 percent) to be more heavily weighted in the index. The HHI index equals 10,000 when an industry or market consists of a single seller. For the multivariate models of medical group prices, we assumed the MSA to be the relevant geographic market.⁵ The product market was defined as enrollees in managed care plans. Total health plan enrollment by MSA was roughly equal to the sum of medical group

⁴ For more information on the medical group inventory, including summary reports, refer to http://www.cattaneostroud.com/medgroup_reports.htm

⁵ According to the DOJ and FTC “relevant geographic markets for the delivery of physician services are local” (FTC 1996). However, given that some medical groups operate out of more than one office (and, in the case of some IPAs, out of many different offices), the scope of the market may extend beyond “local” boundaries, such as municipalities and counties. Hence, for this analysis we take the MSA as the relevant unit of analysis.

enrollment in the MSA, which was expected given that the vast majority of health plans in California require that enrollees align themselves with a medical group.⁶

Ideally, for the purposes of this study, models explaining variation in medical group price should be based on average commercial payer prices, such as capitation rates or discounted fee-for-service rates, charged by physicians to commercial health plans. However, we were unable to identify a source of such data for all California MSAs, as health plans tend to closely guard proprietary capitation rate data.⁷ Medical group price models are based on two different sources of price data: Medicare Part B (physician) “Adjusted Average Per Capita Cost” (AAPCC) by MSA, and the state Medicaid mean outpatient visit charge by MSA. It is likely that Medicare and Medicaid charges are at least somewhat correlated with commercial payer charges in cross-sectional analysis.

There are important limitations, however, to using Medicare and Medicaid charges as proxies for charges to commercial payers. Beginning in 1998, the Medicare program switched from a county-level calculation of AAPCC to a blended county-national method. By 2003, the AAPCC had evolved into a value that is 50 percent county and 50 percent national.⁸ Hence, for the purposes of our analysis, the critical MSA-level differences were significantly diluted by 2002 and, as a result, are less likely to capture MSA-level market structure influences. Medicaid charges have a different set of limitations. We use the Medicaid mean outpatient visit fee-for-service (FFS) charge by county, aggregated to the MSA level. It is likely that the FFS charge disproportionately reflects charges by physicians in solo-practice or in small groups, given that larger physician groups are more likely to treat Medicaid patients enrolled in Medicaid managed care plans. Thus, Medicaid charge data are likely to be less sensitive to the market structure of larger medical groups. Definitions and sources of all of the remaining variables serving as regressors are described in Table 1.

3.4 Economic Model

The physician charge model has the MSA as the unit of observation ($n = 24$) and the health plan model has the health plan as the unit of observation ($n = 34$). The price model that we estimate is expressed as Equation 1:

$$(1) \quad P_{it} = \beta_0 + \beta_1 Q_{it-1} + \beta_2 D_{it-1} + \beta_3 S_{it-1} + \beta_4 M_{it-1} + \varepsilon_i$$

⁶ Note that the CSI medical group inventory tracks only groups that participate in some version of the delegated model, surveying only those with six or more physicians and at least one risk-bearing or non-risk bearing contract with at least one plan.

⁷ Informal communication with health plan representatives suggested that capitation rate data is kept in strict confidence mainly because of its potential to undermine contract negotiations with provider groups. However, we are currently negotiating to obtain price data from a large California health plan, and plan to incorporate the new data into the next draft of this paper.

⁸ For more information, refer to <http://cms.hhs.gov/healthplans/rates>

This model describes MSA prices rather than prices of specific physician practices. Consequently, the 2002 MSA physician price level (P_i) can be expressed as a function of lagged (2001) MSA-level measures of the quantity of physician services (Q_i), the demand for those services (D_i), the supply of physician services (S_i), and the structure of the market in which the services are transacted (M_i). Quantity measures include the number of outpatient visits per 1,000 population. Demand measures include per capita income, mean age of the MSA population, and percent of the population living in urban areas. Physician supply measures include the number of MDs per 1,000 population and the ratio of specialists to total MDs. Market structure variables include measures of health plan and medical group concentration, as measured by the HHI. We estimate the model using a simple Cobb-Douglas functional form (i.e., log-log) in order to minimize the number of regressors.

4. Results

4.1 Market Structure

Concentration ratios (HHIs and four-firm ratios) for medical groups and health plans in all of California's 25 MSAs are shown in Table 2. In general, the U.S. Department of Justice (DOJ) and Federal Trade Commission (FTC) regard post-merger HHI levels of 1,800 as critical and warranting additional inquiry (FTC 1992). Among California MSAs in 2001, 19 out of 25 markets (76 percent) had medical group HHI levels in excess of 1,800, and 15 out of 25 markets (60 percent) had health plan HHIs in excess of 1,800. The mean HHI across all California MSAs is 3,166 for medical groups and 2,452 for health plans. Four-firm concentration ratios (CR4s) show similar patterns: 16 out of 25 markets (64 percent) had medical group CR4s above 80 percent, a value generally considered critical in antitrust analyses (Posner 1976). Health plan CR4s show 12 out of 25 markets (48 percent) above the 80 percent threshold. Whereas all California MSAs are served by at least 20 commercial health plans, 7 out of 25 markets (28 percent) have four or fewer medical groups. However, based on the statewide mean of CR4 among health plans, the four largest health plans tend to, on average, serve just over 80 percent of the MSA market.

The most concentrated medical group metropolitan areas are Shasta, Sutter/Yuba, Butte, Santa Cruz, and Monterey, each with HHIs in excess of 5,000. The least concentrated medical group markets are Orange, Los Angeles, Riverside/San Bernardino, Tulare, San Diego, and Ventura, each with medical group HHIs below the DOJ threshold of 1,800. Markets characterized by highly concentrated medical groups were also likely to have highly concentrated health plans; the Shasta MSA, for example, had the highest medical group and health plan concentration.

In terms of the 20 percent and 30 percent antitrust safety zones, there are significant differences depending on the definition of the relevant geographic market. Taking the MSA to be the relevant geographic market, only 4 medical groups lie outside of the 20 percent exclusive network safety zone, and no medical groups lie outside of the 30

percent non-exclusive network safety zone.⁹ Taking the county as the relevant geographic market, the number of medical groups operating outside of the safety zones increases substantially: 62 medical groups (12.8 percent) comprised at least 20 percent of the total number of physicians in their market and 38 medical groups (7.9 percent) comprised at least 30 percent of the total number of physicians in their market.

4.2 Physician Charges

An important question is whether markets characterized by high concentration also have higher prices (charges). The results of the price model are shown in Table 3. Using Part B AAPCC as the dependent variable, MSA medical group concentration has a significantly negative affect on physician charges. A 10 percent increase in medical group concentration is associated with a 6 percent decline in average per capita physician charges. Conversely, using Medicaid physician charges as the dependent variable, MSA medical group concentration has a significantly positive affect on physician charges. The concentration effect is larger in the Medicaid price model. A 10 percent increase in medical group concentration is associated with a 2.2 percent increase in physician charges. The effect of the other covariates also varies by price measure. Per capita income is positive and significant in the AAPCC model but not significant in the Medicaid charge model. Percent of MSA population over age 65 is significant and negative in the Medicaid charge model but not significant in the AAPCC model.

5. Discussion

The goal of this study is to quantify the extent of physician market concentration in California based on medical group enrollment rather than numbers of physicians. The descriptive findings of this study can be summarized as follows. First, more than 75 percent of the MSAs in California exhibit medical group HHI concentration ratios in excess of 1,800, and 40 percent of the MSAs have medical group HHI concentration ratios of 3,000 or more. Second, very few groups operate outside of the antitrust safety zones when the MSA is taken as geographic market. However, when a smaller, more local area (i.e., the county) is taken as the geographic market, 62 medical groups are large enough to comprise at least 20 percent of total county physicians, and 38 medical groups are large enough to comprise at least 30 percent of total county physicians; some of these groups may lie outside of the DOJ-FTC safety zones.

The multivariate models go a step further and examine the possible association between physician market concentration and physician price. The results are inconclusive. The relationship between physician concentration and price differs markedly depending on the source of price data. Models based on Medicare price data suggest that higher levels of physician concentration are associated with lower prices, whereas models based on Medicaid data suggest that higher levels of concentration are associated with higher

⁹ The CSI data does not support differentiation of groups according to the degree of network exclusivity.

prices, as would generally be predicted by economic theory. It is likely that neither the Medicare nor Medicaid price variable is sufficiently reflective of commercial prices, which would presumably be the most likely price affected by market concentration.

This study has four important limitations. First, as discussed, the price models do not directly reflect measures of prices charged by physicians to commercial payers. The extent to which Medicare or Medicaid physician charges reflect charges faced by commercial payers is not known. Second, in the absence of patient origin data we were not able to delineate market boundaries optimally. Geopolitical boundaries such as counties and MSAs may approximate actual market areas in some cases, but not in others. For example, it would be inaccurate to calculate two different HHIs for adjacent MSAs if residents routinely cross MSA lines to obtain services; one HHI for the two MSAs would be more appropriate. This is more likely to be a potential problem in adjacent MSAs, such as San Francisco and Oakland or Los Angeles and Riverside/San Bernardino. Even better, of course, would be to delineate market boundaries entirely based on patient origin data.¹⁰ Third, the multivariable statistical model makes use of a relatively small number of observations (24 MSAs), which (1) leaves the analysis very sensitive to outliers, (2) does not permit the estimation of flexible functional forms (e.g., the translog specification) due to the large number terms necessary for those model specifications (Keeler and Ying 1996; Breyer 1987), and (3) makes the models more sensitive to small changes in specification. Finally, we are looking at only one snapshot in time, ignoring the effects that changes in concentration may have on prices and profits. Panel data models would also serve the purpose of increasing the number of observations.

The implications for antitrust policy are somewhat narrowed by these limitations, but not entirely. There are two important implications. First, both medical groups and health plans exhibit high levels of concentration in several California MSAs. The market dynamics in these counties should be observed very closely, particularly in the case of a proposed merger of plans or medical groups. Second, the data that would be required for comprehensive antitrust analysis currently do not exist and would be relatively difficult to obtain. Health plans possess patient origin data and physician price data that can be mapped to medical groups, but such data are closely guarded and would have to be aggregated for all medical groups and all health plans statewide in order to construct meaningful market structure measures.

¹⁰ For example, Elzinga and Hogarty (1973) developed one of the most commonly used methods of delineating market areas based on consumer origin data (Elzinga and Hogarty 1973). In their model, “if only a small proportion of the product consumed in the hypothetical geographic area is ‘imported’ into the area from outside, this is an indicator of a unique geographic market area” (p.54). This is referred to as the “little in from outside” (LIFO) element. Using the LIFO criteria alone, the geographic market for medical group A, for example, would be defined as the cluster of zip codes or counties for which approximately 90 percent or more of the total market visits (or encounters) were attributable to medical group A. Similarly, if medical group A treats less than 10 percent of consumers from zip codes or counties beyond the hypothetical market area, then the hypothetical market area is a reasonable and relevant market area for medical group A (“little out from inside,” or LOFI).

These problems are not intractable and provide a framework for future research. Future studies of physician market structure dynamics should focus on obtaining accurate price information, either through a survey of providers or directly from the administrative data of larger plans. In addition, panel data models should be employed. Panel data models offer several advantages, including additional confidence in the direction of causation (e.g., concentration leading to higher prices) and the ability to simultaneously measure the effects of levels and changes (Baltagi 1995). Future research should also look for ways to make use of patient origin data as a means to delineate market areas, although that would be an exceedingly difficult task to implement beyond a small handful of market areas.

6. Concluding Remarks

Determining the extent of anticompetitive behavior in any industry is a highly complex, data-intensive endeavor. In this paper, we have only scratched the surface by conducting some relatively simple analyses based on HHI measures of concentration, antitrust safety zones, and price and profit models. The descriptive findings support the conjecture that medical group consolidation has led to a number of highly concentrated physician markets in California, with a small number medical groups falling outside of antitrust safety zones. The results of the price models should be interpreted with caution, but the results are interesting enough to suggest that additional analyses should be done using better measures of price.

Table 1
Means, Standard Deviations, and Sources of MSA-Level Variables

Variable	Mean¹	S.D.	Source
Medicare Part B per capita cost (AAPCC) (2002)	\$259.05	\$18.56	CMS ²
Medicaid outpatient visit charge (2002)	\$36.23	\$7.44	CDHS ³
Outpatient visits per 1000 population (2001)	1.55	0.70	ARF ⁴
Percent urban population (2001)	86.38%	10.33%	ARF ⁴
MDs per 1000 population (2001)	2.75	1.41	ARF ⁴
Ratio of specialists to total MDs (2001)	0.69	0.10	ARF ⁴
Per capita income (2000)	\$29,982.06	\$9,778.73	ARF ⁴
Percent over age 65 (2000)	11.1%	1.83%	ARF ⁴
Health plan HHI (2001)	2,451.84	1,016.47	CSI ⁵
Medical group HHI (2001)	3,217.36	1,947.04	CSI ⁵

Notes and Sources:

(1) Based on 25 MSAs (AAPCC and Medicaid charge by MSA are calculated using county level payment weighted by county population)

(2) Center for Medicare and Medicaid Statistics (CMS) (<http://cms.hhs.gov/healthplans/rates>)

(3) California Department of Health Services, Data Systems Branch *MediCal Services and Expenditures Month-of-Payment Report* (CY2002)

(4) Bureau of Health Professions Area Resource File (February 2003 Release)

(5) Cattaneo and Stroud, Inc.

Table 2
Medical Group and Health Plan Concentration Ratios by California MSA, 2001

MSA Name	Groups ¹	HHI _{MG} ²	CR4 _{MG} ³	Plans ⁴	HHI _{HP}	CR4 _{HP}
Shasta	2	7,978	100.0%	26	4,563	99.1%
Sutter; Yuba	3	7,795	100.0%	20	3,659	96.0%
Butte	3	6,513	100.0%	21	2,866	91.1%
Santa Cruz	2	5,074	100.0%	24	1,641	75.4%
Monterey	2	5,006	100.0%	24	5,378	96.6%
Alameda; Contra Costa	18	3,571	81.8%	33	3,038	78.4%
Napa; Solano	7	3,277	81.8%	27	3,636	88.7%
San Luis Obispo	4	3,104	100.0%	24	2,403	91.7%
San Joaquin	12	3,026	90.0%	26	1,781	75.7%
Santa Barbara	9	3,000	86.0%	24	1,995	87.6%
Yolo	4	2,990	100.0%	25	2,284	80.8%
El Dorado; Placer; Sacramento	16	2,936	79.1%	33	2,675	83.4%
Merced	8	2,853	88.7%	20	1,569	75.0%
Santa Clara	17	2,697	76.1%	30	2,394	72.3%
Marin; San Francisco; San Mateo	22	2,512	81.5%	32	2,309	74.7%
Fresno; Madera	9	2,505	92.1%	31	2,423	91.0%
Stanislaus	10	2,453	83.3%	26	1,659	76.5%
Kern	10	2,235	88.3%	26	1,863	79.5%
Sonoma	11	1,876	75.2%	27	2,580	83.7%
Ventura	16	1,648	73.1%	28	1,630	75.4%
San Diego	46	1,542	64.5%	33	1,676	70.2%
Tulare	11	1,424	64.9%	24	3,124	90.2%
Riverside; San Bernardino	56	1,354	54.5%	35	1,500	66.8%
Los Angeles	208	899	50.2%	44	1,459	67.5%
Orange	55	883	50.9%	32	1,191	59.6%
Mean for all MSAs ⁵	22	3,166	82.5%	27	2,452	81.1%

Notes:

- (1) Includes only groups with 6 or more physicians and at least one risk or non-risk contract with one or more health plans
- (2) Herfindahl-Hirschman Index (refer to text for more detail)
- (3) Four-firm concentration ratio indicates the market share of the four largest firms in the market
- (4) Includes only full-service Knox-Keene licensed health plans (refer to text for more detail)
- (5) Statewide means differ from those reported on Table 1 because Table 1 means are based on counties and Table 2 means are based on MSAs.

Source: Cattaneo and Stroud, Inc.

Figure 1.
Distribution of Physician Market Concentration in 25 California MSAs

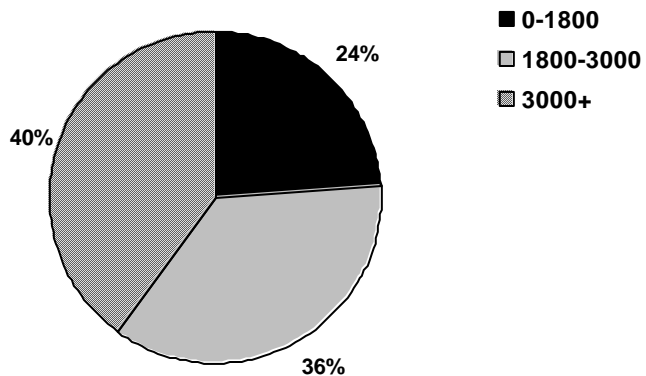


Figure 2.
Distribution of Physician Market Concentration in 25 California MSAs

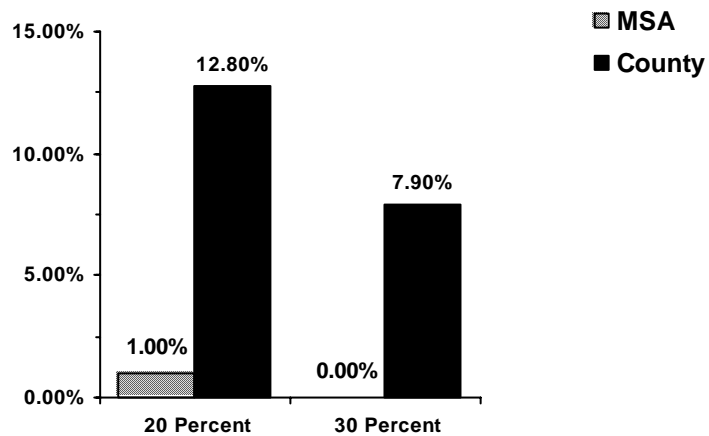


Table 3
Multivariable Analysis of Effect of Market Structure on Physician Prices

Independent variable ¹	Dep. Var.= Log (Part B AAPCC ₀₂)		Dep. Var.= Log (Outpatient charge ₀₂)	
	β	S.E.	β	S.E.
Log (outpatient visit per 1000 pop.)	0.0022	0.0338	0.0424	0.0867
Log (per capita income)	0.0946*	0.0463	0.1303	0.1188
Log (MDs per 1000 pop.)	-0.0141	0.0317	-0.0322	0.0813
Log (ratio of specialists to total MDs)	-0.0563	0.1184	-0.0353	0.3034
Log (percent pop. > age 65)	-0.0868	0.1015	-0.6330**	0.2601
Log (medical group HHI)	-0.0644*	0.0353	0.2169**	0.0904
Constant	4.8919**	0.5981	-0.8527	1.5329
Number of observations	24		24	
F (6,18)	2.64*		3.12**	
R-squared	0.47		0.51	

Notes:

(1) Independent variables are based on data from 2000 or 2001

*Significant at 0.10 (t-test)

**Significant at 0.05 (t-test)

Source: Refer to Table 1 and text.

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