ACA Exchange Premiums and Hospital Concentration in California

By T. Scott Thompson, PhD[1]
Bates White Economic Consulting

Introduction

This article describes my research on the relationship of hospital concentration to health insurance premiums in California.[2]

Recent press about the Affordable Care Act (ACA) highlights geographic differences in commercial health insurance premiums.[3] The ACA exchange structure creates new transparency about health insurance premiums, raising public awareness about geographic variation in the price of insurance. National studies have demonstrated substantial geographic variation in medical care spending that cannot be explained by differences in utilization or health status. Indeed for commercially insured patients, differences in provider prices are an important driver of geographic differences in healthcare costs.[4]

Because hospital costs represent approximately one third of total medical costs nationally,[5] hospital prices are likely an important source of geographic variation in healthcare costs. Economic theory predicts that the bargaining power of a commercial health plan negotiating reimbursement rates with a hospital will be related to the availability of alternative hospitals that are sufficiently good substitutes as

[1] Scott Thompson is a Partner at Bates White Economic Consulting based in Washington, DC.

[2] This research was sponsored by America's Health Insurance Plans. A more technical version of this paper, describing all aspects of the data and data preparation used in this study, as well as details about the regression analysis summarized in this paper, is available from the author.

[3] *See* Jim Sanders, "Geography Affects Premiums on California Health Insurance Exchange," *Sacramento Bee*, June 5, 2013; Ledyard King and Maureen Groppe, "Health Care Premiums Vary Widely in Florida," *Florida Today*, Dec. 2, 2013; and Sandhya Somashekhar and Sarah Kliff, "Health Premiums Will Vary Widely in Government Exchanges," *Denver Post*, Sept. 25, 2013.

[4] An Institute of Medicine report concluded that "variation in spending in the commercial insurance market is due mainly to differences in price markups by providers." The report found that "70 percent of variation in total commercial spending is attributable to price markups, most likely reflecting the varying market power of providers." *See*, Institute of Medicine of the National Academies, *Variation in Health Care Spending: Target Decision Making, Not Geography* (Washington, DC: National Academies Press), 6.

[5] The Centers for Medicare & Medicaid Services reported that in 2011 hospital costs accounted for 34.2% of private health insurance premiums. Since premiums also include administrative costs and profits, the percentage of hospital costs in medical costs is at least this high. *See* Centers for Medicare & Medicaid Services, Private Health Insurance Premiums, Benefits and Net Cost; Levels, Annual Percent Change and Percent Distribution, Selected Calendar Years 1960–2011 (Washington, DC: CMS), Table 20, accessed Dec. 11, 2014, http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/tables.pdf.

perceived by substantial numbers of the plan's enrollees. The theory is largely confirmed by academic research showing an empirical connection between hospital concentration and pricing, and demonstrating adverse price impacts from hospital mergers.[6]

This article investigates the empirical relationship between hospital concentration and health insurance premiums for individual coverage offered by 13 private insurers through Covered California—the new state-sponsored health insurance exchange in California set up under provisions of the Affordable Care Act. I show a significant empirical relationship between hospital concentration and premiums when these are compared across regions of California. The relationship is confirmed by regression analysis that controls for differences in plan characteristics and a limited set of regional characteristics. Subject to some caveats, the regression analysis predicts that premiums would be substantially lower in the most concentrated regions of California if concentration in those regions were to be reduced to levels seen in the least concentrated regions.

Insurance Premiums and Hospital Concentration Data

Approved 2014 premiums for individual coverage plans sold through Covered California are available from the California Department of Managed Health Care (DMHC).[7] Premiums for plans offered by 13 insurers in 19 rating regions were obtained.[8] Each region consists of one or more counties, with the exception of regions 15 and 16, which divide Los Angeles County by zip code.[9] Not all plans are available in all regions, and for a few plans, availability is further restricted by zip code.

Premiums vary by plan, region, and age of enrollee. Starting from a base level for each plan, premiums are adjusted proportionally for different ages and for different regions. All payors use the same age adjustments. While each payor sets its own geographic adjustment factors, these are held constant across the different plans offered by a given payor. As a consequence, the geographic pattern of premium variation is very similar across the platinum, gold and silver metal tiers that are offered by every payor. Therefore, only the premiums for 24 year olds enrolled in gold metal tier plans were analyzed.[10]

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[6] *See, e.g.*, William B. Vogt and Robert J. Town, *How Has Hospital Consolidation Affected the Price and Quality of Hospital Care?* RWJF Research Synthesis Report No. 9 (Princeton, NJ: Robert Wood Johnson Foundation, Feb. 2006); Martin Gaynor and Robert Town, *The Impact of Hospital Consolidation—Update (The Synthesis Project)* (Princeton, NJ: Robert Wood Johnson Foundation, June 2012).

[7] Department of Managed Health Care, Premium Rate Review Filings [Approved Electronic Rate Filings for Individual Coverage Exchange Plans Effective Jan. 1, 2014] (Sacramento, CA: DMCH, updated July 29, 2013), accessed Dec. 11, 2014, http://wpso.dmhc.ca.gov/ratereview/. Exchange premiums for 2015 enrollment were not yet published at the time this research was completed.

[8] Covered California, *Health Insurance Companies for* 2014 (Sacramento, CA: Covered California, May 23, 2013, updated Oct. 2013), accessed Dec. 11, 2014, https://www.coveredca.com/coverage-basics/PDFs/CC-health-plans-booklet-rev3.pdf.

[9] Regions 15 and 16 were treated as if they were separate counties for purposes of this study.

[10] Because all plans offered by a commercial payor on the exchange use a common set of geographic rating factors, premiums for one metal tier must follow the same pattern of geographic variation as premiums for other tiers offered by the same payor. Similarly, because all payors use the same age multipliers, independent of region or plan, the geographic pattern of variation in premiums does not vary by age.

Measures of hospital concentration used here were based on each hospital's share of patient-days for patients with commercial insurance who were discharged from California hospitals in 2011.[11] Discharge data were obtained from the California Office for Statewide Health Planning and Development (OSHPD).[12] Hospitals under common ownership or control were grouped into hospital systems using financial disclosure information for 2011, also obtained from OSHPD.[13]

In order to account for heterogeneity in patient preferences for hospitals, shares were first calculated separately for groups of patients based on county of residence and major diagnostic code (MDC). These shares were used to calculate a Herfindahl-Hirschman Index (HHI) of concentration for each group. The HHI is obtained by squaring the share of each hospital and then summing.[14] A weighted average HHI was then calculated for each region.

The number of "effective hospital competitors" in each region was used as an alternative measure of concentration. The number of effective competitors is (10,000 times) the inverse of the average HHI for a region. When it is an integer, it can be interpreted as the number of hospitals that would yield the same HHI as the average HHI for the region if all hospitals were to have equal shares. For example, if there are two hospitals, each with a 50% share, then the HHI is $50^2 + 50^2 = 5{,}000$, and the number of effective competitors is $10{,}000 \div 5{,}000 = 2$. In this case the number of effective competitors is the same as the actual number of competitors. However, if competitors have asymmetric shares, then the HHI will increase and the number of effective competitors will be less than the number of actual competitors. For example if the same two hospitals had shares of 80% and 20% then the HHI would be $80^2 + 20^2 = 6{,}800$, and the number of effective competitors would be only $10{,}000 \div 6{,}800 = 1.47$ (approximately).

As can be seen from this example, the number of effective competitors will be less than the number of actual competitors when shares are uneven within county and MDC groups.[15]

The regression models also used various regional characteristics calculated from US Census Bureau data.

[11] Discharges from Kaiser system hospitals were excluded from this calculation on the theory that Kaiser is an integrated health system mostly serving its own members, who are largely limited to using Kaiser's own facilities. Therefore hospitals cannot compete directly for most of these patients.

[12] California Office for Statewide Health Planning and Development, 2011 Patient Discharge, accessed Dec. 11, 2014, http://www.oshpd.ca.gov/HID/Products/PatDischargeData/PublicDataSet/.

[13] California Office for Statewide Health Planning and Development, Healthcare Information Division, 2011 Annual Financial, accessed Dec. 11, 2014, http://www.oshpd.ca.gov/hid/Products/Hospitals/AnnFinanData/SubSets/SelectedData/default.asp.

[14] Hospitals under common ownership are combined for purposes of this calculation. The HHI index is a standard measure of market concentration widely used in the analysis of mergers. The HHI ranges from zero to 10,000, with the latter value reached only when a single competitor has 100% share. Generally, it is greater when there are fewer competitors or when shares are unequal between competitors. For further discussion, see Justice.gov, Herfindahl-Hirschman Index, accessed Dec. 11, 2014, http://www.justice.gov/atr/public/guidelines/hhi.html.

[15] In particular, if some MDC and county groups account for a large share of patient-days but are not served by all of the hospitals serving the region then the share for the hospitals not serving the group will be zero, leading to fewer effective competitors than actual competitors in the region.

Correlation of Hospital Concentration and Insurance Premiums

Both hospital concentration and health insurance premiums vary considerably across the 19 regions of California defined by the new exchange. For example, the number of effective hospital competitors for the provision of inpatient hospital services ranges from fewer than 2 to more than 16 across the Covered California regions; and the most expensive regions have premiums more than 50% greater than the least expensive regions for some plans.

The calculated concentration measures and the insurance premium data are displayed in Exhibits 1 and 2. Each data point represents the monthly premium for a specific gold plan offered in a particular region. Twenty-three plans from 13 payors are represented. However, since not all plans are offered in all regions, there are 86 unique data points.

Although premiums display significant variation even within a region and across regions with similar levels of concentration, the Exhibits show clear evidence that premiums and hospital concentration are related across the regions. The simple correlations are highly statistically significant.[16]

Exhibit 1 displays a clear positive relationship between premiums and HHI, with the exception of four outlier data points with average HHI exceeding 5,000 but lower premiums than some less concentrated regions.[17] Likewise, Exhibit 2 shows that regions with many effective competitors tend to have the lowest premiums.

Notably, the four least concentrated regions,[18] which have average HHI's below 2,000 and more than five effective competitors, have noticeably lower average premiums than the other regions. These regions have two to seven times as many effective competitors as one of the most concentrated regions—Region 4 (San Francisco, average HHI = 4,304, 2.3 effective competitors). Moreover, each of the plans offered both in San Francisco and in one of the four least concentrated regions (all in Southern California) is 16% to 48% more expensive in San Francisco than in the Southern California region.

Regression analysis of premiums

The plan offerings on Covered California differ across payors and regions. Differences in plan design, available healthcare provider networks, medical costs other than inpatient hospital costs, and a variety of other differences between plans undoubtedly contribute to differences in premiums.

In order to control for such differences, I conducted a series of regression analyses using "fixed effects" to control for plan-specific influences on premiums. Fixed effects regressions are equivalent to adjusting the data points for each plan upward or downward until each plan has the same average value for each variable. Therefore any measured relationship between premiums and concentration in these regressions is determined by variation between regions and not by variation between plans.

[16] The correlation of insurance premium with average HHI is 0.55 ($p < 0.001$), and the correlation of insurance premium with the number of effective competitors is –0.62 ($p < 0.001$).

[17] These four points are from region 11 (Fresno – Kings – Madera counties). Reasons for this exception to the general trend are unknown.

[18] These are regions 15 (Los Angeles), 16 (Los Angeles), 17 (San Bernardino – Riverside), and 18 (Orange County), all in Southern California.

Exhibit 1. 2014 Gold Tier Individual Coverage Premiums versus Regional Average HHI

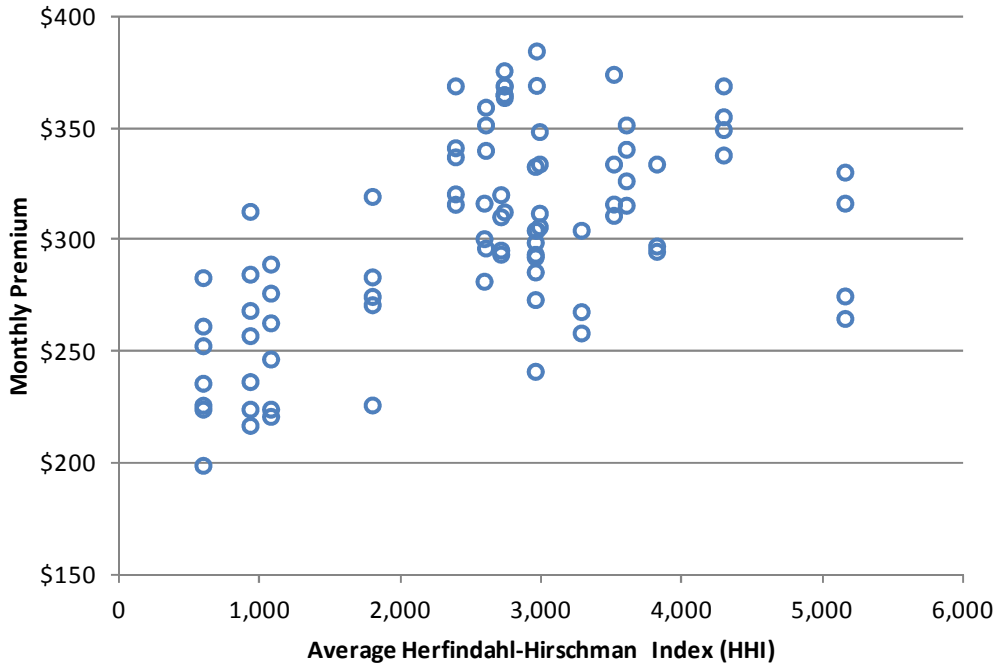
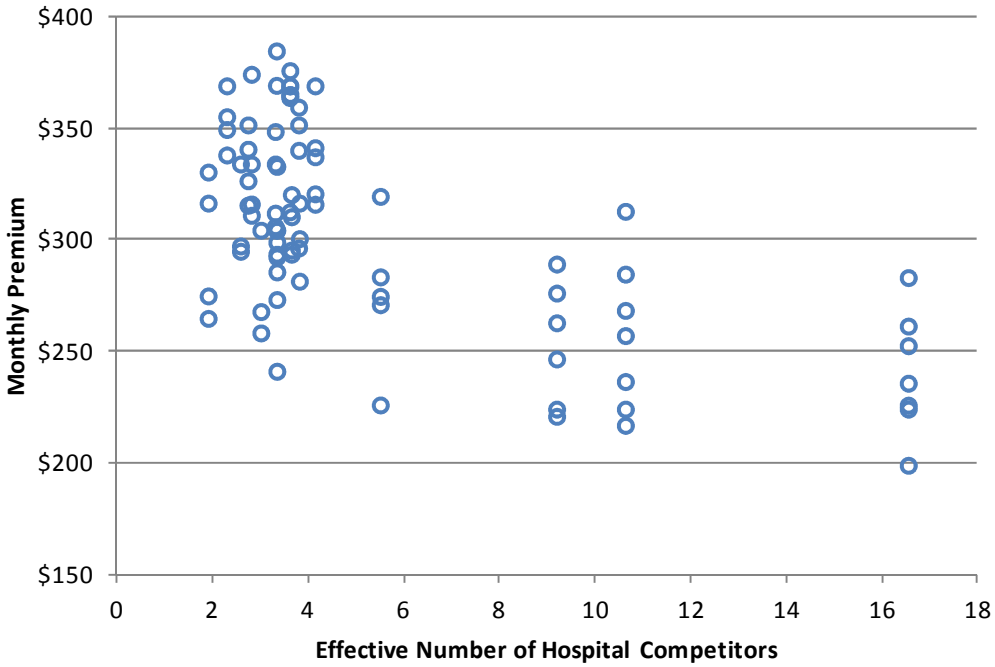


Exhibit 2. Gold Tier Individual Coverage Premiums versus Regional Effective Competitors



The dependent variable in the regressions was the logarithm of the insurance premium and the independent variables included the fixed effects and an average measure of hospital concentration in the region. A variety of regressions of premiums on the HHI or on the number of effective competitors were considered, including regressions allowing for nonlinear effects of hospital concentration.

In each case, the regression relationship between hospital concentration and insurance premiums was both economically and statistically significant. For example, a regression using the number of effective competitors to explain premiums indicated that each additional effective competitor is associated with a 1.5% reduction in the price of insurance ($p < 0.01$). The magnitude of the effect is striking given that hospital costs represent only a fraction of the total healthcare costs covered by the insurance plans, and that plan networks and benefits are sometimes designed to prevent or discourage use of expensive providers when good alternatives are available.

Additional regressions also included one or more regional characteristics. For example, it is plausible that general cost of living differences might affect wages and rents paid by hospitals and other healthcare providers, causing insurance premiums to be higher in regions with higher general costs of living for reasons unrelated to hospital competition. In order to control for this possibility, some regressions included a regional measure of home values as a proxy for living costs.[19] The effect of home values is statistically significant, but inclusion of this variable (and sometimes other regional variables as well) does not appreciably reduce the estimated dependence of premiums on hospital concentration, which remains highly statistically significant. For example, the reduction in premiums from an additional effective competitor is reduced by only a small amount (from 1.5% to 1.3%) and remains statistically significant ($p < 0.01$) when regional variables are added to the example in the previous paragraph.

[19] The home value measure may also proxy for omitted demand factors that are correlated with home value.

To aid interpretation, I calculated and compared various predicted premium values from the regressions under a tentative assumption (discussed below) that the regressions accurately capture a causal effect. For each region, I calculated the percentage premium reduction predicted by the regression models should hospital concentration be reduced to the level of HHI = 1,000 in each of the regions outside Los Angeles. This level of concentration, corresponding to ten effective competitors, is roughly comparable to that found in the two regions (15 and 16) in Los Angeles County, which have average HHI's of 603 and 938 respectively.

The implied premium reductions from reduced hospital concentration were sometimes quite large, exceeding 8% for every model in regions with fewer than 3.5 effective competitors, with one exception discussed below. In particular the implied premium reduction for San Francisco, which has just 2.3 effective competitors, was 9.3% or greater, depending on the specific model.

Premium reductions of this magnitude would substantially reduce enrollee costs in some cases. Monthly savings of $20 or more are implied for the more concentrated regions. For example, the models predict average monthly savings of $32.90 or greater for 24-year-old singles living in San Francisco and not receiving any subsidies.

Discussion

My research shows a statistically significant relationship between hospital concentration and Covered California exchange premiums across regions of California. The relationship is robust to various regression specifications including plan fixed effects that control for differences in plan characteristics, and for a limited set of regional characteristics.

When given a causal interpretation, the regressions imply savings of 9.3% ($32.90 per month on average) in San Francisco if the number of effective competitors there were to be increased to numbers found in Los Angeles. However these results require cautious interpretation because they implicitly assume that the regression models fully capture a causal effect of concentration on premiums—a premise that is not testable given the limited nature of the available data. I cannot rule out, for example, the possibility that higher input costs (not fully explained by my regional variables), cause both greater concentration and higher hospital prices in some regions, leading to a correlation even after applying regression analysis to control for some regional differences.

My research analyzed premiums on the Covered California exchange only, and the correlation between concentration and premiums for employer sponsored commercial plans sold outside the exchange may be different from that measured here. Press reports indicate that the Covered California plans have been designed to reduce premiums through the use of "narrow networks" that exclude the highest cost providers,[20] which could increase or decrease the correlation depending on whether it is more effective in low concentration regions where many alternatives are available or in highly concentrated regions with high prices. Furthermore, some plans may subsidize premiums in high cost regions using revenues from increased premiums where costs are lower, which would tend to reduce the correlation measured here.

Despite these caveats, the strong empirical relationship that emerges from my research suggests that hospital concentration *may be* an important driver of healthcare premiums in California.

The results imply that policies should be pursued to protect and invigorate hospital competition through, at a minimum, appropriate antitrust enforcement and possibly through other means. As noted in the introduction, other research has demonstrated that hospital consolidation often leads to elevated prices. Although policy measures that would increase competition by unwinding past consolidations may be unlikely, this study provides additional evidence that further provider consolidation could exacerbate growth in healthcare expenditures. Furthermore, there may be benefits from new approaches to stimulating competition in markets that are already highly concentrated.

Proposed hospital consolidation should be scrutinized carefully to ensure that competition is protected and that patients and payors are unlikely to suffer from price increases. Furthermore, claims that a proposed merger or alliance will generate cost efficiencies or improvements in care should be evaluated carefully to determine whether they are likely to be achieved or could be achieved through alternative means that are less destructive to competition.[21]

[20] Chad Terhune, "Insurers Limiting Doctors, Hospitals in Health Insurance Market," *Los Angeles Times*, Sept. 14, 2013.

[21] For example, in a recent victory for the Federal Trade Commission, a federal judge blocked acquisition of Saltzer Medical Group by St. Luke's Health System. The court noted efforts by St. Luke's to improve delivery of medical care but concluded that there are other ways to achieve these benefits that avoid the risk that the merged entity would raise prices. *See* Eduardo Porter, "Health Law Goals Face Antitrust Hurdles," *New York Times*, Feb. 4, 2014.

While the metal tier system of the ACA exchanges was designed to facilitate price comparisons and thus competition among plans, it does not directly encourage consumer choice among providers based on cost or quality.[22] Other or additional measures that directly encourage price and quality competition among providers within plans could result in healthcare cost savings, even in regions with highly concentrated provider markets.

For example, tiered benefit plans and plans with cash incentives to encourage patients' use of cost efficient providers have been shown to slow the growth in costs in Massachusetts.[23] Use of such plans within the exchanges potentially could offset some of the cost pressures coming from provider market power even in regions with concentrated hospital markets by steering business to providers who provide quality service at a lower cost.[24] This approach likely will be most effective if exchanges also provide tools to facilitate consumer comparison of plan features and to identify cost efficient providers within plan networks.[25] Some health plans and state hospital associations already provide transparency tools to facilitate patient cost comparisons.[26] Such tools, which are increasingly also available as commercial services,[27] could be adapted to the ACA exchange environment.

[22] Plans offered through the exchanges have tools to encourage the use of providers who are less costly and have other attributes (e.g., meeting certain quality criteria), and many likely do so. However the metal tier system does not require this. Nor does it itself provide direct mechanisms to encourage increased competition among providers.

[23] Julie M. Donnelly, "Health Plans Steering Members to Tiered Networks," *Boston Business Journal*, May 25, 2012.

[24] Tiered plans are similar to narrow network plans already in common use, but can offer patients more choice, possibly leading to greater member acceptance.

[25] Martha Bebinger, "'Tiered' Insurance Confounds Consumers, Docs in Mass," *Kaiser Health News*, Jan. 17, 2012, *available at* http://www.kaiserhealthnews.org /stories/2012/january/17/mass-tiered-insurance.aspx.

[26] For example, Aetna and UnitedHealthcare provide online transparency tools that enable members to estimate actual costs based on plan characteristics, medical conditions and provider. *See* Aetna, Member Payment Estimator, accessed Dec. 11, 2014, http://www.aetna.com /individuals-families/member-tools-forms/member-payment-estimator.html; UnitedHealthcare, Family and Individual Health Insurance, accessed Dec. 11, 2014, http://www.uhc.com/individuals_families/member_tools/ myhealthcare_cost_estimator.htm.

The Wisconsin Hospital Association's PricePoint service provides a similar tool for comparison of costs and quality for providers in Wisconsin. *See* PricePoint, Welcome to Wisconsin PricePoint, accessed Dec. 11, 2014, http://www.wipricepoint.org/.

[27] Companies such as Castlight Health offer employers tools for encouraging use of cost efficient providers and drugs by their employees. Similar tools could be adopted to facilitate comparisons of plans, or to incentivize cost efficient use within plans in the context of the ACA markets for individual coverage. *See* Castlight Health, Stop Paying the Most to Get the Least, accessed Dec. 11, 2014, http://www.castlighthealth.com/solutions/.