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The Association Between Hospital Concentration And Insurance Premiums In ACA Marketplaces

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ABSTRACT Keeping the Affordable Care Act's health insurance Marketplaces financially accessible is critically important to their viability. While the relationship between the number of insurers and Marketplace premiums has received widespread attention, the role of hospital market concentration on premiums has been understudied. We examined the relationship between hospital market concentration and Marketplace insurance premiums in the period 2014–17, the extent to which the number of insurers modified this relationship, and whether community-level characteristics were associated with varying levels of concentration. We found that areas with the highest levels of hospital market concentration had annual premiums that were, on average, 5 percent higher than those in the least concentrated areas. Additionally, while an increased number of insurers was independently associated with lower premiums, that was not sufficient to offset the effects of increased hospital concentration on premium costs. Communities with lower socioeconomic status (as measured by median income) were more likely to have higher hospital market concentration. However, this was not consistent across all measures of socioeconomic status, such as measures of unemployment, use of the Supplemental Nutrition Assistance Program, and education. These findings help underscore the importance of exploring antitrust policy and other efforts that may reduce hospital concentration and help keep Marketplace premiums affordable.

During the past decade the US hospital industry has become increasingly concentrated, as many hospitals have merged or closed. Standard economic theory, generally supported by the evidence, suggests that higher levels of health care provider market concentration are associated with higher health care prices.[1–7] However, some people in the hospital industry and others have argued that increased hospital market concentration improves efficiency, reduces duplicative services, and improves care coordination, all of which lead to lower overall spending.[8] Additionally, countervailing factors such as the number of insurers may moderate the effects of higher provider concentration on prices.[2,9–13]

One area where the market dynamics between insurers and hospital providers are particularly important is in the health insurance Marketplaces established by the Affordable Care Act (ACA). The viability of these Marketplaces is of critical policy importance given their high-profile nature and the likely policy implications if the Marketplaces were to fail or be eliminated. While the relationship between the number of insurers participating in the Marketplaces and health insurance premiums has received much attention,

the relationship between hospital concentration and Marketplace prices has received far less.

Prior work on the relationship between hospital consolidation and Marketplace premiums has been limited either to a small geographic area[14,15] or to a single year of data when there was a substantial lag between the exposure (competition) and outcome (insurance premiums).[16] These studies have found a positive correlation between hospital concentration and insurance premiums. However, given the central policy importance of health insurance affordability, more recent and more robust data that carefully quantify this relationship would be immensely helpful.

Therefore, to expand on previous work and better delineate market dynamics, we used recent Marketplace data to answer three questions: First, what are the characteristics of areas with high versus low hospital market concentration? Second, how do Marketplace premiums vary with respect to this concentration? And finally, does the number of insurers modify the relationship between hospital concentration and premium prices?

Study Data And Methods

DATA Data on Marketplace premiums and plan characteristics came from the Robert Wood Johnson Foundation's Health Insurance Exchange (HIX) Compare database.[17] This database contains plan-level information including premiums (not including advance tax credits or cost sharing) and deductibles from the period 2014–17 for Marketplace insurance plans. To calculate hospital market share, we used discharge totals at the hospital ZIP code level for the period 2013–17 from the Hospital Service Area files of the Centers for Medicare and Medicaid Services. These files contain data on the number of Medicare discharges for each hospital from each ZIP code that it serves. Because comprehensive demographic data are not available for all the years of our study, we used baseline (2014) demographic data. Population data at the three-digit ZIP code level (the geographic region used for rating areas in certain states) were obtained from the five-year 2015 American Community Survey through the Census Bureau's American FactFinder. We also used 2014 data from the Area Health Resources Files to obtain baseline county-level demographic characteristics. Lastly, to identify hospital locations, we used a combination of 2014 American Hospital Association survey data and Hospital Cost Report Public Use Files.

VARIABLES: OUTCOME Our primary outcome was the premium for the second-lowest-cost silver plan for a sixty-four-year-old nonsmoker in a given rating area–year. While we could have used premiums for any particular age bracket (prior research has used age twenty-seven),[14,18] the premium for a sixty-four-year-old is particularly important given that people at this age are likely to be among the most expensive to insure. The choice of premiums for the second-lowest-cost silver plan is important because these plans are the most popular choice among enrollees, given that the plans are the benchmark for premium subsidies. Lastly, our choice of the sixty-four-year-old's premium affects only the dollar magnitude of our results—not the direction, relative magnitude, or significance of our estimates (pricing on the Marketplaces is proportional because a sixty-four-year-old cannot be charged more than three times what a twenty-one-year-old is charged).

VARIABLES: EXPOSURE Our primary predictor of interest was the one-year lagged rating-area Herfindahl-Hirschman Index (HHI), a widely used measure of market concentration. (Lagging the HHI ensured that our predictor occurred before our outcome and better approximated how insurers set premiums.) The HHI ranges from 0 to 10,000, with 0 being a completely unconcentrated market and 10,000 being a completely concentrated one. It is calculated by multiplying the sum of squared market shares of each hospital within a geographic market by 10,000. To calculate a rating area–level HHI, we first calculated a ZIP code–level HHI by summing for each ZIP code every hospital–ZIP code combination's squared share of total discharges in that ZIP code. We then calculated a hospital-level HHI by summing for each hospital each hospital–ZIP code share of total discharges for that hospital multiplied by that ZIP code's HHI. Lastly, we calculated a rating area–level HHI by taking a discharge-weighted average of all of the hospital HHIs in that rating area. This follows the approach in prior literature that examined hospital concentration[19] and the Marketplaces.[16]

ANALYSIS In our analytic sample, we excluded any plan variations that included cost-sharing reductions and those that were not offered on the Marketplaces. We also excluded any plans reporting zero-dollar premiums (not counting subsidies) or premiums reported at more than $10,000 per month because these were most likely to be data errors. In addition, we dropped "child-only" plans from our analysis, as they provide coverage only for children. For each rating area–year combination, we then calculated the premium for the second-lowest-cost silver plan for a sixty-four-year-old nonsmoker. (Note that for most states, the age used for premiums would not affect our study's results because the ACA

establishes a standard age-rating band. However, New York and Vermont have more compressed age-rating bands than the maximum permitted under the ACA. Our study accounted for this by using state fixed effects.)

To assess the relationship between hospital market concentration and premiums, we estimated linear least squares models, with standard errors clustered at the rating area level to account for within–rating area correlation. (For full estimating equation details, see online appendix exhibit A1.)[20]

After obtaining our results, we examined the demographic characteristics of markets with varying levels of hospital HHI. We used one-way analysis-of-variance to characterize the extent to which these differences were significant.

Our primary specification included state and year fixed effects and a control for the share of health maintenance organization plans in the rating area. We measured HHI by categorizing it into annual terciles. To better understand how the presence of insurers modifies these results, we added an interaction term of hospital HHI tercile and the number of insurers in the rating area–year. Additionally, we performed an analysis stratified by the tercile of the number of insurers.

We examined several other specifications as well. First, experience with other managed competition programs suggests that status quo bias—where consumers remain in suboptimal insurance plans despite alternatives—plays a role in health insurance markets[21] and that firms may also underprice their products to attract market share early on. To the extent that this occurs on the Marketplaces, strategic pricing would bias our results toward the null if it induced overall convergence of premiums. To address this, we first reran our primary specification excluding the first year of premiums (2014) to account for insurers' mispricing and strategic pricing decisions that might not have fully reflected underlying market conditions. Second, we ran our primary specification with HHI as a continuous predictor. Third, we also ran our primary specification including the prior year's premiums as a control. Lastly, we ran an analysis with HHI as a contemporaneous predictor.

All analyses were performed in Stata/IC, version 14.2.

LIMITATIONS Our study had several important limitations. First, as with any observational study, we cannot be sure that our findings are due to a causal relationship. In particular, one would worry about unobservable confounders. It is possible that high insurance premiums are reflective of high underlying costs of providing care in various areas because of the patient population, which could drive most hospitals out and leave only a dominant provider. We attempted to account for this by adjusting for underlying demographic and hospital characteristics in the area, but such adjustments are imperfect. However, our use of a lagged hospital concentration measure also attempted to address this simultaneity. Because of the short time period during which the ACA Marketplaces have existed, we could not examine changes in hospital concentration and its association with changes in premiums. Therefore, our results should not be interpreted causally.

Second, we did not examine the nonprice effects of hospital concentration. While there is substantial evidence that increased hospital concentration is associated with worse outcomes,[22] we did not examine this issue.

Third, we were able to obtain demographic characteristics only at the county level, so we could not characterize this relationship for rating areas that are based on three-digit ZIP codes. Thus, our specifications excluded those rating areas for which we could not obtain demographic information.

Finally, we recognize that factors other than hospital market power go into insurance premium setting. However, we are uncertain why those other factors, such as strategic pricing to attain market share among insurers, would vary in a way that would lead to higher prices in highly concentrated hospital markets.

Study Results

We first examined the characteristics of populations across the three terciles of hospital market concentration. We found that compared to areas in the first (least concentrated) tercile of hospital HHI, areas in the third (most concentrated) tercile had lower median incomes ($48,848 versus $50,764, $p < 0.001$), a lower percentage of black residents (9.8 percent versus 15.1 percent; $p < 0.001$), more residents older than age sixty-five (16.4 percent versus 15.4 percent; $p < 0.001$), and a lower share of residents with incomes below the federal poverty level (16.3 percent versus 17.1 percent; $p < 0.01$) (exhibit 1). The unemployment rate, rate of Supplemental Nutrition Assistance Program receipt, and share of residents older than age twenty-five without a high school diploma were similarly all lower in the most concentrated markets. Health system characteristics varied as well, with highly concentrated areas having fewer physicians, but more hospital admissions, per 1,000 population. Highly concentrated areas also tended to have much larger shares of their populations living in rural areas.

EXHIBIT 1

Characteristics of populations and health systems, by market concentration tercile

Characteristic	Least concentrated (n = 556)	Moderately concentrated (n = 556)	Most concentrated (n = 555)
POPULATION CHARACTERISTICS			
Black (%)	15.1	12.9	9.8****
Male (%)	49.6	49.3	49.4****
In poverty (%)	17.1	16.9	16.3***
Older than age 65 (%)	15.4	16.9	16.4****
Mean population	1,062,432.2	519,979.1	380,421.6****
Mean Marketplace enrollment	34,490.0	16,028.7	11,482.1****
Median income ($)	50,764.2	47,815.6	48,848.3****
Deaths per 1,000 population	9.1	9.7	9.3****
Unemployment rate (%)	6.5	6.3	6.2**
Supplemental Nutrition Assistance Program participants (%)	16.2	15.9	15.0****
Older than age 25 without a high school diploma (%)	14.4	13.5	13.0****
County rurality (%)	26.0	32.2	29.1**
HEALTH SYSTEM CHARACTERISTICS			
MDs per 1,000 population	2.2	1.9	2.1****
Hospital beds per 1,000 population	2.9	3.3	3.2****
Hospital expenses per 1,000 population	3.1	3.2	3.7****
Admissions per 1,000 population	103.1	112.7	113.9****
ICU beds per 1,000 population	0.1	0.2	0.2
Mean number of carriers	4.1	3.3	3.2****

SOURCE Authors' analysis of data from the Hospital Cost Report Public Use Files, Area Health Resources Files, and HIX Compare (Robert Wood Johnson Foundation). **NOTES** Market concentration is measured by the Herfindahl-Hirschman Index. The education measure is an average for 2011–15. All other measures are for 2014. These measures are all rating area–level measures, which are created as county population–weighted averages. Hospital expenses are the sum of payroll and facility expenses incurred by short-term general hospitals. County rurality is a county population–weighted average of an indicator for rurality. ICU is intensive care unit. **$p < 0.05$ ***$p < 0.01$ ****$p < 0.001$

Next, we examined the relationship between hospital market concentration and Marketplace premiums. (The full regression output is in appendix exhibit A2.)[20] A naive examination of premiums across HHI terciles is consistent with expectations: Across all years and rating areas, the mean premium in the least concentrated markets was $624 less than that in the most concentrated markets ($8,363 versus $8,987; $p < 0.001$). The mean premium in moderately concentrated markets was $8,435. In our initial multivariate analysis we examined market-level second-lowest-cost silver plan premiums for a sixty-four-year-old nonsmoker across 1,667 market-year combinations. When we controlled for relevant market factors, demographic characteristics, state and year fixed effects, and an interaction term for state and year, we found that the most concentrated rating areas had annual premiums $424 ($p < 0.001$) higher than those in the least concentrated areas (appendix exhibit A3).[20] This is about 5 percent of the mean premium across the rating area–years included in our analysis. Because our HHI tercile categories followed a population density distribution, we also investigated a specification that included a control for population density (population per square mile), while another stratified our primary analysis by density categories. None of these analyses appreciably altered our primary findings.

Finally, we examined the extent to which the number of insurers modified the relationship between hospital market concentration and premiums, and we found a small association. We observed that an additional insurer in a market was independently associated with premiums that were $276 lower (appendix exhibit A2).[20] Interacting insurance concentration (the number of carriers in each market-year) and hospital concentration (HHI) yielded a significant coefficient on the third tercile (–$97; $p < 0.05$). However, even after we included these controls, we found that the association between the most concentrated tercile of hospital HHI and premiums was large and significant ($761; $p < 0.001$), relative to the least concentrated tercile. Because we had prespecified these analyses, we chose to run models stratified by the annual tercile of insurance carriers to see whether the relationship between hospital HHI and premiums varied. We found minor effect modification with larger coefficients in the insurance markets with the most carriers.

Supplementary analyses included a control for the prior year's premiums to account for secular growth of premiums at the rating area level, a model that excluded the year 2014, and a model that treated HHI as a continuous variable (appendix exhibit A3).[20] A model with HHI as a contemporaneous predictor was also evaluated and yielded similar results (data not shown).

Discussion

In an analysis of the ACA's health insurance Marketplaces from their inception in 2014 through 2017, we found that markets with high hospital concentration had higher premiums than did markets with low hospital concentration, even after we accounted for certain characteristics and population demographics. While poorer communities (as measured by median income) were more likely to encounter higher levels of hospital concentration, this was not consistent across other measures of socioeconomic status such as education and poverty rates.

Furthermore, we found that while the number of insurers in a market was independently associated with lower premiums, the number of insurers only slightly attenuated the relationship between hospital concentration and premiums. While our findings were not causal, they suggest that less concentrated hospital markets may be associated with lower Marketplace premiums.

To be sure, the increasing trend of hospital consolidation has raised the concern of US policy makers over the past several years. Arguments in favor of increased provider concentration are typically based on the ability to decrease costs and improve outcomes by achieving economies of scale and scope. While our analysis did not examine hospital costs specifically (although we did include a control for marketwide hospital expenditures), we found no evidence that concentrated hospital markets were indeed leading to lower premiums for consumers. Given that hospitals represent one of the largest costs covered by health insurance—and that hospitals often also employ physicians who are critical to the pricing of the insurance product—these findings certainly suggest that market concentration may be related to the premiums consumers are paying. Demographics and hospital supply may also play roles in explaining the association between hospital concentration and insurance premiums. However, our inconsistent results when it comes to measures of socioeconomic status suggest that demographics are unlikely to be a major factor. It could also be that our measure of hospital concentration was simply a function of differences in supply. To the extent that low supply rather than low levels of competition drove our measures of concentration, we could have misidentified an effect of low supply on premiums as an effect of concentration. While we cannot reject this latter explanation, given that our findings are in line with prior research in this area, we believe that this explanation is similarly unlikely.

Our findings suggest that hospital concentration may be playing a detrimental role for consumers and taxpayers.

The more likely explanation for higher premiums being found in areas of greater hospital concentration (and, indeed, the one consistent with prior literature) is related to market power and the ability to negotiate higher prices from insurers and other payers in these areas. One might assume, however, that differences in payer market structure may help counteract higher prices.[23] Our findings underscore the complexity of these market interactions. We found that while having more insurance carriers in a market was associated with lower premiums, it had little effect in mitigating higher premiums in areas with high hospital concentration. This suggests that having larger numbers of insurers may be important in keeping premiums lower, but it is not a substitute for less concentration among hospital providers. A dominant insurer may be able to negotiate lower prices from a hospital, but it would also have little reason to pass those lower prices on to consumers. In markets that have high hospital and high insurer consolidation, economic theory would suggest that the dominant insurer and dominant hospital are likely simply splitting the surplus that comes from monopoly pricing.

Prior work on hospital market concentration has primarily focused on the employer insurance market, public programs, and international health systems.[1] Evidence about the nongroup market (and the Marketplaces in particular) has been limited to examining a limited geographic market for hospital concentration[14,15] or has been restricted to a single year,[24] and it has examined only insurer competition nationally.[18] One study examined data from the federal

Marketplaces, focusing on markets defined by Medicare utilization and using only a single year of data with the exposure (concentration) calculated before the implementation of the ACA.[16] Our analysis extends this work by comprehensively examining the relationship between hospital market concentration and insurance premiums on the ACA's Marketplaces nationally. Moreover, our work helps account for changing dynamics over time by examining multiple years of data from the Marketplaces. Our findings are consistent with both economic theory and prior evidence[25] that provider market power is used as leverage vis-à-vis payers to increase costs to patients. Our finding that the increased number of insurers was associated with reduced premiums is also consistent with prior evidence, in both magnitude and direction.[18]

Our results raise important policy implications, particularly given the challenges surrounding the ACA moving forward. While the ACA offers federal subsidies to help pay for premiums (and cost-sharing reduction subsidies were offered to insurers through 2018), this presents two important considerations. First, because the federal government's subsidy payments are tied to the second-lowest-cost silver plan, changes in the price of this plan directly affect federal outlays. Second, while 83 percent of enrollees through the Marketplaces receive premium tax credits,[26] five million people purchase coverage in the nongroup market outside of the Marketplaces and are not eligible for premium tax credits.[27] These people may face the full burden of higher premiums caused by hospital market concentration. Taken together, these two considerations suggest that policies that reduce hospital concentration (such as increased antitrust enforcement) may help reduce spending for both the federal government and individuals who are not eligible for subsidies.

Conclusion

As federal policy makers struggle with health care costs involved in the Marketplaces, our findings suggest that hospital concentration may be playing a detrimental role for consumers and taxpayers. The impact of hospital concentration on communities with lower socioeconomic status and how it affects insurers' purchasing-power dynamics remain areas that warrant further exploration. ■

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NOTES

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