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Marketplace Plans With Narrow Physician Networks Feature Lower Monthly Premiums Than Plans With Larger Networks

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ABSTRACT The introduction of health insurance Marketplaces under the Affordable Care Act has been associated with growth of restricted provider networks. The value of this plan design strategy, including its association with lower premiums, is uncertain. We used data from all silver plans offered in the 2014 health insurance exchanges in the fifty states and the District of Columbia to estimate the association between the breadth of a provider network and plan premiums. We found that within a market, for plans of otherwise equivalent design and controlling for issuer-specific pricing strategy, a plan with an extra-small network had a monthly premium that was 6.7 percent less expensive than that of a plan with a large network. Because narrow networks remain an important strategy available to insurance companies to offer lower-cost plans on health insurance Marketplaces, the success of health insurance coverage expansions may be tied to the successful implementation of narrow networks.

The introduction of health insurance Marketplaces under the Affordable Care Act (ACA) has been associated with growth of restricted provider networks.[1–4] Providers available to plan beneficiaries are restricted through a narrow provider network paired with plan benefits that either cover only in-network care or have higher cost sharing for out-of-network care or nonpreferred providers. Early evidence suggests that Marketplace plans with narrow hospital networks tend to be less expensive for consumers;[1,2] however, the association between breadth of physician networks and plan pricing has yet to be established.

There are several mechanisms by which a plan with a narrow network might have lower premiums. First, a narrow network can generate savings in enrollees' health care costs by removing high-cost providers from the network.[5] Second, a narrow network might lower costs by negotiating discounted reimbursement rates with providers in exchange for steering greater volume to them.[6–8] Third, removing providers that high-cost beneficiaries prefer could lead to favorable risk selection for the plan because the healthier and less costly beneficiaries would be more likely to select the plan.[9,10] Independent from these mechanisms, a narrow-network plan might have lower premiums simply as a result of lower consumer willingness to pay for plans with these features.[11]

To date, studies that have investigated the empirical relationship between narrow networks and premiums have used only a single state.[11,12] We used data from all silver plans offered in the 2014 health insurance exchanges in the fifty states and the District of Columbia to estimate the association between the size of a provider network and plan premium. We thus could analyze the full variation across states with varying uninsurance rates, uptake of exchange plans, and competitive environments.

Background

The ACA's health insurance Marketplaces facilitate a structured environment to compare health plans for health insurance that could be subsidized under the ACA. Every state and the District of Columbia participate in a Marketplace that is run by either the state or the federal government. For any plan offered within these Marketplaces, the ACA permits premium variation by an enrollee's age, location, and tobacco use; individual versus family enrollment; and plan category.

Plan categories standardize plans' actuarial value, or the fraction of health care expenses covered by the plan for a standard population. Plans within the silver category—the most popular category—have an actuarial value of 70 percent. Part of the popularity of this category stems from the cost-sharing reduction subsidies for lower-income consumers available only for silver plans.

For an individual nonsmoker of a fixed age who selects a silver plan, the premium for that plan can vary only by location, as determined by geographic "rating areas." These areas are regions defined by each state, typically made up of a collection of counties. Typically, issuers offer plans throughout the rating area, but there are exceptions where an insurer will offer a plan in only a subset of counties within the rating area. We defined the *service area* of a plan as the collection of counties within a rating area where the plan was offered.

Study Data And Methods

DATA For the data on premiums and characteristics of plans offered on the health insurance Marketplaces, we used the Health Insurance Exchange (HIX) Compare data set, 2014.[13] This data set contains information on a number of key plan features, including premiums by rating area, deductibles, and cost-sharing requirements for silver plans offered in 2014 in all states and the District of Columbia. We set out to add information on the size of provider networks for each of the 395 unique provider networks. We used publicly available provider directories on the issuers' websites to gather data on all physicians in specified networks, including characteristics such as specialty, name, sex, and geographic location. This information was cleaned and standardized through a multistep process detailed elsewhere.[4] Data quality controls were performed by comparing physician searches on websites to data collected for randomly selected ZIP codes for each network. The fifty-three networks found to have incomplete capture of providers were excluded. We identified 450,794 physicians participating in at least one valid network. Using a national databank from SK&A, a leading provider of health care data that provides up-to-date information on more than 700,000 physicians, we identified 237,248 physicians not participating in any Marketplace network.

ANALYSIS To compare plan premiums to the size of the plan's provider network, we used the plan–rating area as the unit of analysis, since that is the level at which premiums vary. (The full network of each plan can span different rating areas, so we split up the full network of doctors into rating area regions.) Thus, the network size of a plan must be calculated for each rating area. Network size at the plan–rating area level is the fraction of total physicians located within the plan's service area (that is, the part of the rating area where the plan is sold) that were in the plan's network. Each physician contributed equally to the measure, so our estimate of network size assumed that all types of physicians were equally important to network breadth. The method avoided double counting physicians practicing in multiple locations by weighting each location of the physician by the fraction of times that the location appeared in the data set.

We estimated how insurance premiums were associated with the variation in plan characteristics. We used as our primary outcome variable a plan's premium offer to a twenty-seven-year-old single, nonsmoking policyholder. The regression model estimated is the log model, the standard hedonic price model specification.[14] We also estimated plan premiums priced for different ages and different family statuses (fifty-year-old single, couple with two children), but we reported only the regressions results for the premium for a twenty-seven-year-old single person because the key coefficients from the log model were nearly identical for all possible premium values.

In addition to network size, our main characteristic of interest, we included other plan characteristics that might influence premium variation, such as plan type (plans could be classified as preferred provider organization [PPO], health maintenance organization [HMO], exclusive provider organization [EPO], or point-of-service [POS] plan), in-network deductible (in thousands of dollars), and primary care physician copayment. For plans that have a coinsurance instead of copayment, we used the amount that the given coinsurance rate would yield based on a $150 average physician fee. We also included an indicator for the presence of coinsurance instead of copayment.

Attributes of markets and firms might also drive prices. To control for market attributes such as the level of competition, as well as geo-

graphic variation in the cost of health care and population needs, we included rating area fixed effects in the model. To control for variation in strategy, market power, or brand-name recognition among firms, we included fixed effects for the various issuers that participate in the Marketplace.

In our first specification, we used our continuous measure of network size: percentage of physicians in a service area participating in the network. We estimated a second model in which network size was included as a categorical variable. We categorized network size into five groups, based on the percentage of participating physicians: extra-small (less than 10 percent), small (10–24 percent), medium (25–39 percent), large (40–59 percent), and extra-large (60 percent). In addition to examining the association between network size and premiums, we included a third model that tested whether the network size—premium relationship varied by plan type, using an interaction between network size and plan type, with network size in percentage points from the mean.

In all models, we adjusted standard errors for rating area–level clusters and weight observations by service area population, to reflect the relevant population within rating areas having access to each plan.

LIMITATIONS Our study had several limitations. Because we did not measure and account for all aspects of plans that consumers value, our estimated relationship of network size and premiums might have picked up unmeasured and correlated factors. For example, premiums might reflect not only the size of the network but also the quality of the providers in the network. If quality is correlated with network size, this aspect of networks might be reflected in the coefficient on network size. Relatedly, we emphasize that our study describes the relationship between premiums and network size, instead of identifying the mechanism generating lower premiums. Further work is needed to determine whether lower premiums reflect lower value on the demand side for these products or whether narrow networks generate supply-side savings.

Study Results

Our final analysis sample consisted of 6,048 plan–rating area observations from 1,075 plans sold in 476 rating areas by 192 unique issuers. This sample was derived from the universe of 7,027 plan–rating area pairs identified in the 2014 HIX Compare data set. Excluded observations were primarily the plans attached to the fifty-three networks found to incompletely capture providers, but a few additional exclusions included observations where no physicians were found in the rating area and cases where premium data were missing.

The average network size in this sample was 30 percent of the physicians in the service area participating in network (standard deviation: 20 percent) (Exhibit 1). Slightly fewer than half of the plans had small or extra-small networks, while fewer than one-third had large or extra-large networks. The average monthly plan premium was $266, with an average annual deductible of $2,774 and a copay of $32 for each primary care physician visit. Twenty-three percent of plans had coinsurance. Most plans offered in the Marketplace were either PPOs (38 percent) or HMOs (42 percent). Exhibit 2 illustrates the distribution of network sizes within each plan type. Fifty-six percent of HMOs had extra-small or small networks, compared to 31 percent of PPOs. POS plans and EPOs fell between these two extremes with 46 percent and 51 percent, respectively, of plans that had extra-small or small networks. Average network sizes for the PPO, HMO, EPO, and POS plans were 38 percent, 25 percent, 26 percent, and 30 percent of physicians, respectively (data not shown).

Exhibit 3 shows the results of our regressions of log premium on network size and other plan characteristics. In column 1, the relationship between the continuous measure of network size and log premiums—controlling for plan type, carrier, rating area, and the other aforemen-

EXHIBIT 1

Descriptive characteristics of health insurance Marketplace provider networks

	Mean	Standard deviation
Premium (monthly)	$266	$64
Network size	30%	20%
Network category		
Extra-small	19%	39%
Small	26	44
Medium	23	42
Large	22	41
Extra-large	10	30
Plan type		
Preferred provider organization	38%	49%
Health maintenance organization	42	49
Point-of-service plan	6	23
Exclusive provider organization	14	35
Deductible	$2,774	$1,331
Primary care physician copayment	$32	$17
Coinsurance	23%	42%

SOURCE Authors' calculations based on data from the Robert Wood Johnson Foundation's Health Insurance Exchange Compare data set (2014) and the Leonard Davis Institute of Health Economics' National Database of Physician Networks (2014). **NOTES** Summary statistics are weighted. $N = 6,048$.

tioned plan attributes—was 0.23 ($p < 0.01$; SE: 0.04). The estimates using a categorical instead of continuous measure of network size are shown in column 2. The results suggest that a plan with an extra-large network cost 13 percent more than a plan with an extra-small network. Compared to a large network, an extra-small network cost 6.7 percent less. We did not find a significant difference in premiums among extra-small, small, and medium-size networks, which suggests that very restrictive plans do not tend to be cheaper than moderately restrictive plans.

The estimates for other plan attributes were consistent with expectations about premiums and plan attributes: HMO, EPO, and POS plans had lower premiums than PPOs (the reference category); higher deductibles, the presence of coinsurance, and higher copays were associated with lower premiums.

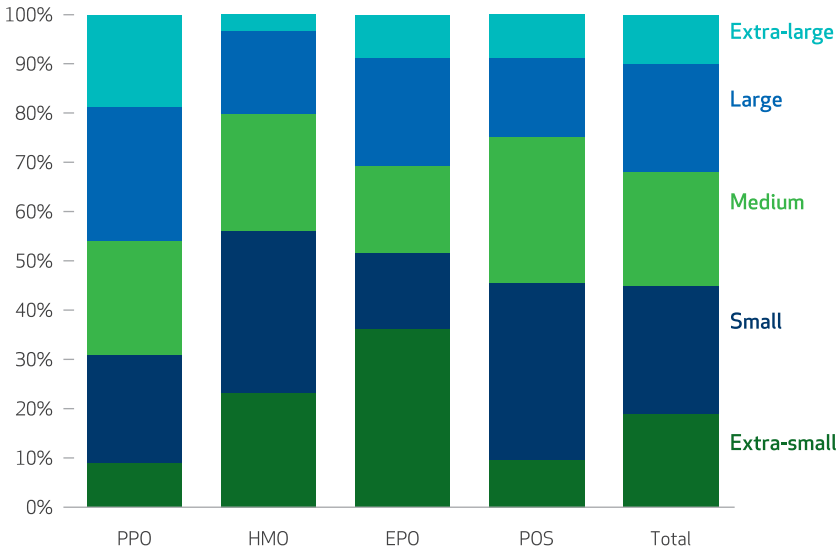
In Exhibit 3, column 3, we investigated whether the relationship between network size varied by plan type. We might expect such variation if, for example, different plan types vary in their cost sharing for out-of-network care or if some plan types have alternative methods for utilization management. We tested this relationship by the interaction of network size with plan type. We found a weakly significant (10 percent) negative coefficient with the HMO interaction, which suggests that HMOs are less negatively associated with premiums and network size increases than PPOs. This finding would be consistent with HMOs' greater ability to manage costs for broad networks, but the result is only suggestive.

To illustrate the magnitude of our findings from Exhibit 3, in Exhibit 4 we converted our primary estimates into dollars of savings between larger and smaller networks. First, we took the 0.23 coefficient between network size and log premiums and converted it to a percentage change from a 1-standard-deviation (SD: 0.20) increase in network size, which would be similar to a change from an extra-small plan (10 percent) to a medium-size plan (30 percent). A coefficient of 0.23 suggests a 4.6 percent change in premiums. The estimates based on network size categories estimate more transparently the percentage change, and we converted to dollars the 6.7 percent change from extra-small to large network. This represents the second set of results.

We evaluated the changes in premiums for different ages and family statuses, at the base rate of both the second-smallest silver plan premium (averaged across rating areas) and the overall mean premium. For a 1-standard-deviation change, evaluated at the overall mean premium, this amounted to $144 annually for a twenty-seven-year-old single individual and $480 annually for a young family of four (second panel of Exhibit 4). For the categorical change from extra-small to large network, this amounts to $212 annually for a twenty-seven-year-old single individual and $692 annually for a young family of four. When evaluated at the premium of the second-lowest silver plan, the amounts are slightly lower.

EXHIBIT 2

Distribution of provider network sizes in the health insurance Marketplaces, total and by plan type, 2014



SOURCE Authors' calculations based on data from the Robert Wood Johnson Foundation's Health Insurance Exchange Compare data set (2014) and the Leonard Davis Institute of Health Economics' National Database of Physician Networks (2014). **NOTES** PPO is preferred provider organization. HMO is health maintenance organization. EPO is exclusive provider organization. POS is point-of-service plan.

Discussion

A plan with a small network had a monthly premium that was 6.7 percent less than a plan with a large network. This estimate was based on within-market differences between plans with otherwise equivalent plan designs, controlling for issuer-specific pricing strategy. In a market with an average-price plan, this percentage reduction could save an individual between $212 and $339 a year, depending on his or her age, and it could save a young family of four up to $692 a year.

The percentage difference across plan types was conservatively calculated based on the full premium instead of the postsubsidy premium. Consider that the average annual net premium after subsidy for a twenty-seven-year-old individual who qualified for a subsidy was only $984 in 2014.[15] For consumers who qualified for this typical subsidy, a $212 monthly reduction in premi-

EXHIBIT 3

Relationship between network size and plan premiums in the health insurance Marketplaces, 2014

	Network size as a continuous variable (1)		Network size as a categorical variable (2)		Network size–plan type interaction (3)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Network size	0.2334***	0.0409	—[a]	—[a]	0.2839***	0.0574
Network size						
Extra-small (ref)	—[a]	—[a]	—[a]	—[a]	—[a]	—[a]
Small	—[a]	—[a]	−0.0134	0.0164	—[a]	—[a]
Medium	—[a]	—[a]	−0.0028	0.0182	—[a]	—[a]
Large	—[a]	—[a]	0.0665***	0.0169	—[a]	—[a]
Extra-large	—[a]	—[a]	0.1311***	0.0248	—[a]	—[a]
Plan type						
PPO (ref)	—[a]	—[a]	—[a]	—[a]	—[a]	—[a]
HMO	−0.1024***	0.0133	−0.1086***	0.0135	−0.1108***	0.0150
POS	−0.0403***	0.0092	−0.0455***	0.0094	−0.0418***	0.0168
EPO	−0.0815***	0.0143	−0.0806***	0.0153	−0.0772***	0.0141
Deductible/$1,000	−0.0216***	0.0019	−0.0219***	0.0018	−0.0216***	0.0018
Primary care physician copayment	−0.0003***	0.0001	−0.0003***	0.0001	−0.0003***	0.0001
Coinsurance	−0.0461***	0.0050	−0.0462***	0.0048	−0.0458***	0.0050
Interaction variables						
Network size, PPO (ref)	—[a]	—[a]	—[a]	—[a]	—[a]	—[a]
Network size, HMO	—[a]	—[a]	—[a]	—[a]	−0.1360*	0.0751
Network size, POS	—[a]	—[a]	—[a]	—[a]	0.0134	0.1436
Network size, EPO	—[a]	—[a]	—[a]	—[a]	−0.0617	0.0693
Constant	5.9730***	0.0279	5.9990***	0.0263	6.0581***	0.0293
R-squared	0.92		0.92		0.92	
Observations	6,048		6,048		6,048	

SOURCE Authors' calculations based on data from the Robert Wood Johnson Foundation's Health Insurance Exchange Compare data set (2014) and the Leonard Davis Institute of Health Economics' National Database of Physician Networks (2014). **NOTES** All specifications include rating area and insurer fixed effects. Observations are weighted using the service area population. Network-size categories, based on the percentage of participating physicians, are as follows: extra-small (fewer than 10 percent), small (10–25 percent), medium (more than 25–40 percent), large (40–60 percent), and extra-large (more than 60 percent). Standard errors are clustered by rating area. PPO is preferred provider organization. HMO is health maintenance organization. POS is point-of-service plan. EPO is exclusive provider organization. [a]Not applicable. *$p < 0.10$ ***$p < 0.01$ ****$p < 0.001$

ums translated to a 22 percent reduction (instead of the 6.7 percent reduction based on full premiums), which suggests that the subsidy was likely to magnify the sensitivity to a given premium difference.

Our results quantify an important trade-off for those participating in a health insurance Marketplace, between higher-price plans that have broader networks and lower-price plans that have narrower networks. If consumers are fully informed about the consequences of network size, this heterogeneity in plan offerings can be welfare enhancing because the varied plan designs might appropriately take into account variation in consumers' preferences. However, if consumers are more likely to select their plan based on the premium, without fully considering other plan characteristics such as network size, then this might diminish the value of narrow-network plans.

There is evidence that consumers often are unaware of the restrictions of their plans. In a McKinsey survey,[16] 26 percent of consumers reported being unaware of the narrowness of their plan or network. This is consistent with other research that has found that consumers lack information on many important dimensions of their health plans and make suboptimal health plan selections based on their limited information.[17] It is also consistent with survey results suggesting that health insurance beneficiaries have little understanding of their plans.[18] When information on networks is made available at the point of purchase, consumers can make informed decisions when selecting plans. Improving how the characteristics of the provider network are communicated to consumers would add to the potential value of a narrow-network strategy by making it easier to match plans to consumers who value these plan designs along with the savings they produce.

The managers of health insurance Marketplaces understand this need and have been expanding decision support tools to assist customers

EXHIBIT 4

Estimated health insurance Marketplace premium changes for increases in network size, by type of insured person or family, 2014

	Mean premium	Premium difference based on: Network size change of 1 standard deviation[a]	Premium difference based on: Categorical change from extra-small to large network[b]
SIMULATION FOR INDIVIDUAL AGE 27			
Monthly premium			
Second-lowest silver	$ 235	$ 11	$ 16
Overall mean	266	12	18
Annual premium			
Second-lowest silver	2,820	132	188
Overall mean	3,192	144	212
SIMULATION FOR INDIVIDUAL AGE 50			
Monthly premium			
Second-lowest silver	$ 382	$ 18	$ 25
Overall mean	425	20	28
Annual premium			
Second-lowest silver	4,584	216	306
Overall mean	5,100	240	339
SIMULATION FOR FAMILY OF FOUR, ADULTS AGE 30			
Monthly premium			
Second-lowest silver	$ 781	$ 36	$ 52
Overall mean	867	40	28
Annual premium			
Second-lowest silver	9,372	432	623
Overall mean	10,404	480	692

SOURCE Authors' calculations based on data from the Robert Wood Johnson Foundation's Health Insurance Exchange Compare data set (2014) and the Leonard Davis Institute of Health Economics' National Database of Physician Networks (2014). [a]Standard deviation: 0.20; coefficient: 0.23; change in premiums: 4.6 percent. [b]Categorical coefficient of 6.65 percent.

shopping for health plans.[19] In the third enrollment period, some Marketplaces have incorporated total cost estimators, integrated provider lookups, and integrated drug lookups to help consumers make better choices.[19] Yet more information while selecting a health plan will not be sufficient, because this decision remains complex. More research is needed to better understand how to best construct a choice environment so that health insurance consumers select the health plan that is best for them.

This study focused on the size of a provider network and avoided using information on size alone to define a specific threshold for when a network could be called "narrow." There is no accepted definition for a *narrow network*, partially because this definition might depend on more than just network breadth. For example, a network's value should also depend on the quality of the providers in the network and the accessibility of those providers.

Developing measures of multiple characteristics of networks will be important to fully characterize networks not only for consumers and their choice of plans, but for policy makers as well. If smaller networks contain higher-quality providers, as shown in a study of hospital networks in California,[20] it is conceivable that narrow networks could have more favorable health effects than in markets where the quality–size relationship was reversed. Also, as networks narrow, ease of identifying in-network providers becomes more consequential. A recent study found that in less than 30 percent of cases were consumers able to schedule an appointment with an initially selected physician provider.[21] This study also identified inaccuracies in provider lists. Narrow networks and list inaccuracies increase the risks of surprise out-of-pocket expenses from out-of-network providers.[22] If narrow networks are to succeed as a strategy of offering products for price-sensitive consumers, it will be critical to improve transparency and address the hidden consequences for consumers who select narrow-network plans.

Conclusion

Our findings confirming lower premiums for narrow-network plans have important policy implications for the successful implementation of narrow networks in the health insurance Mar-

ketplaces. Even with subsidies, the cost of health insurance remains a major barrier to expanding health care access for the uninsured. Because the use of narrow networks is one of the last remaining strategies available to insurance companies to offer lower-cost plans on health insurance Marketplaces, the success of coverage expansions could be tied to the successful implementation of narrow networks. Moreover, given the subsidy structure within the Marketplaces, the benefits of lower premiums not only accrue to the consumer but also generate savings for the taxpayer. Thus, the lower premiums from narrow networks help reduce the number of uninsured people and reduce the cost of achieving that policy objective. ■

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