How Much Do Consumers Save on Premiums When They Purchase a Narrow Network Plan on the Health Insurance Marketplaces?

The introduction of the 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 only cover in-network care or have higher cost-sharing for out-of-network care or non-preferred providers. Early evidence suggests that marketplace plans with narrow hospital networks tend to be less expensive [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 the 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 [6-8]. Third, removing providers that high cost beneficiaries prefer could lead to favorable risk selection [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 restrictive plans [11].

To date, studies that have investigated the empirical relationship between narrow networks and premiums have only used a single state [11-12]. We use data from all silver plans offered

in the 2014 health insurance exchanges in the 50 states and DC to estimate the association between the size of a provider network and plan premium and thus can 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 may be subsidized under the ACA. Every state and DC participate in a marketplace that is either run by the state or the federal government. For any plan offered within these Marketplaces, the ACA permits premium variation by age, location, tobacco use, individual vs. family enrollment, and plan category.

Plan category standardizes its 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%. Part of the popularity of this category stems from the reduced cost-sharing available to lower-income consumers only for silver plans.

For an individual non-smoker of a fixed age who selects a silver plan, the premium for that plan can only vary 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 only

offer a plan in a subset of counties within the rating area. We define the *service area* of a plan as the collection of counties within a rating area where the plan is offered.

Data

For the data on premiums and characteristics of plans offered on the health insurance Marketplace, we use the Health Insurance Exchange (HIX) Compare Dataset (2014) [13]. HIX Compare 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 DC. 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 issuer websites to gather data on all physicians in specified networks, including characteristics such as specialty, name, gender, and geographic location. This information was cleaned and standardized through a multi-step 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 53 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 that provides up-to-date information on over 700,000 physicians from SK&A, we identified 237,248 physicians not participating in any marketplace network.

Methods

To compare plan premiums to the size of the plan's provider network, we use the plan/rating area as the unit of analysis, since that is the level at which premiums vary. We calculate network size at the plan/rating area level by identifying the fraction of total physicians located within the plan's service area that are in the plan's network. Each physician contributes equally to the measure and thus our estimate of network size assumes all types of physicians are equally important to network breadth. The method avoids double counting physicians practicing in multiple locations by weighting each location of the physician by the fraction of times that location appears in the dataset.

We estimate how insurance premiums are associated with the variation in plan characteristics. As our primary outcome variable, we use plan's premium offer to a 27-year-old single, non-smoking policyholder. The regression model estimated is the log model which is the standard hedonic price models. We also estimated plan premiums priced for different ages and different family status (50-year-old single, couple with two children), but we report only the regressions results for premium for a 27-year-old-single because the key coefficients from the log model are nearly identical for all possible premium values.

In addition to network size, our main characteristic of interest, we include other plan characteristics that might influence premium variation, such as plan type (plans can be classified as Preferred Provider Organization (PPO), Health Maintenance Organization (HMO), Exclusive Provider Organizations (EPO), or Point of Service (POS) plans), in-network

deductible (in thousands), and primary care physician copay. For plans that have a coinsurance instead of copay, we use the amount that the given coinsurance rate would yield based on a $150 average physician fee. We also include an indicator for the presence of coinsurance instead of copay.

Attributes of markets and firms may also drive prices. To control for market attributes such as the level of competition, as well as geographic variation in the cost of health care and population needs, we include rating area fixed effects in the model. To control for firm variation in strategy, market power, or brand name recognition, we include fixed effects for the various issuers that participate in the marketplace.

In our first specification, we use our continuous measure of network size: the percentage of participating physicians. We estimate a second model where network size is included as a categorical variable. We categorize network size into 5 groups, based on the percentage of participating physicians: x-small (less than 10%), small (10%-25%), medium (25%-40%), large (40%-60%), and x-large (more than 60%). In addition to examining the association between network size and premiums, we include a third model testing whether the network size-premium relationship varies by plan type using an interaction between network size and plan type with network size in percentage points from mean.

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

Results

Our final analysis sample consists of 6048 plan-rating area observations from 1075 plans sold in 476 rating areas by 192 unique issuers. This sample was derived from the universe of 7027 plan-rating area pairs identified in the 2014 HIX Compare dataset. Excluded observations were primarily the plans attached to the 53 networks found to incompletely capture providers, but a few additional exclusions included observations where no physicians were found in the rating area and for cases when premium data were missing.

The average network size in this sample is 30% (sd=20%) (Exhibit 1). 19% of plans have x-small networks, and 26% of plans have small networks. At the other end of the spectrum, 10% of plans have x-large and 22% of plans have large networks. The average monthly plan premium is $266 (sd=64), with an average deductible of $2,774 (sd=1331) and a copay of $32 (sd=17) for each primary care physician visit. Twenty-three percent of plans have coinsurances. Most plans offered in the marketplace are either PPOs (38%) or HMOs (42%). Exhibit 2 illustrates the distribution of network size within each plan type. Fifty-six percent of HMOs have x-small or small networks compared to 31% of PPOs. POS and EPO plans fall between these two extremes with 46% and 51% of plans having x-small or small networks. Average network sizes for the PPO, HMO, EPO and POS plans are 38%, 25%, 26% and 30% of physicians, respectively.

Exhibit 3 shows the results of our regressions of log premium on network size and other plan characteristics. In column I, the relationship between the continuous measure of network size and log premiums, controlling for plan type, carrier, rating area and the other aforementioned plan attributes, is 0.23 (p-value<.001 and se 0.04). The estimates using a categorical instead of continuous measure of network size are shown in column II of Exhibit 3. The results suggest that, compared to a plan with an x-small network, a plan with an x-large network costs 13% more. Compared to a large network, an x-small network costs 6.65% less and a small network costs 8% less (0.0665+(-0.0134)). We don't find a significant difference in premiums between x-small, small, and medium size networks suggesting that very restrictive plans do not tend to be cheaper than moderately restrictive plans.

The estimates for other plan attributes are consistent with expectations about premiums and plan attributes: HMO, EPO and POS plans have lower premiums than PPOs; and higher deductibles, the presence of coinsurance, and higher copays are associated with lower premiums.

In column III, we investigate whether the relationship between network breadth and premiums varies in plan type. We may 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 test this relationship by the interaction of network size with plan type. We find a weakly significant (10%) negative coefficient with the HMO

interaction, suggesting HMOs, relative to PPOs, are less negatively associated with premiums and network size increases. 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 convert our primary estimates into dollars of savings between larger and smaller networks. First, we take the .23 coefficient between network size and log premiums and covert it into a percentage change from a 1 standard deviation (sd=.20) increase in network size which would be similar to a change from an x-small plan (10%) to a medium plan (30%). A coefficient of 0.23 suggests a 4.6% (0.23*0.20*100) change in premiums. The estimates based on network size categories more transparently estimate percentage change and we covert to dollars the 8 percent change from small to large network. This represents the second set of results.

We evaluate the changes in premiums for different ages and family status; at the base rate of both the second smallest silver plan premium (averaged across rating areas) and overall mean premium. For a one standard deviation change, evaluated at the overall mean premium, this amounts to a $144 annually for a 27 year-old single individual and $480 annually for a young family of four. For the categorical change from small to large, this amounts to $255 annually for a 27 year-old single individual and $831 annually for a young family of four. When evaluated at the premium of the second-lowest silver plan, the amounts are slightly lower.

Study Limitations

Because we do not measure and account for all aspects of plans that consumers value, our estimated relationship of network size and premiums may pick up unmeasured and correlated factors. For example, premiums may reflect not only the size of the network, but the quality of the providers in the network. If quality is correlated with network size, this aspect of networks may be reflected in the coefficient on network size. Relatedly, we emphasize that our study describes the relationship between premiums and network size, rather than 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.

Discussion

A plan with a small network has a monthly premium that is 8 percent less than a plan with a large network. This estimate is based on within-market differences between plans with otherwise equivalent plan design, controlling for issuer-specific pricing strategy. In a market with an average priced plan, this percent reduction could save an individual between $225 and $407 a year depending on age and a young family of four up to $831 a year.

The percentage difference across plan types was conservatively calculated based on the full premium rather than the post-subsidy premiums. Consider that the average annual net premium after subsidy for those who qualified for a subsidy was only $984 in 2014 [15]. For consumers who qualified for this typical subsidy, a $225 monthly reduction in premiums

translates into a 23 percent reduction (rather than the 8 percent based on full premiums), which suggests that the subsidy is likely to magnify the sensitivity to a given premium difference.

Our results quantify an important tradeoff for those participating in the health insurance marketplace: between higher priced plans that have broader networks and lower priced 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, as the varied plan designs may appropriately take into account variation in customer 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 may 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% of consumers reported being unaware of the narrowness of their plan/network. This is consistent with other research that has found that consumers lack information on many important dimensions of their health plans and make sub-optimal health plan selections based on their limited information [17] and consistent with survey results that suggest that health insurance beneficiaries have little understanding of their health insurance 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.

Health insurance Marketplaces understand this need and have been expanding decision support tools to assist customers 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. Yet, more information while selecting a health plan will not be sufficient, as this decision remains complex. More research is needed to better understand how to best to 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 has avoided using information on size alone to define a specific threshold for when a network can 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 then 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.

Our findings confirming lower premiums for narrow network plans have important policy implications for the successful implementation of narrow networks on the health insurance marketplace. 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 health insurance coverage expansions may be tied to the successful implementation of narrow networks. Moreover, given the subsidy structure within the Marketplace, the benefits of lower premiums accrue not only to the consumer, but generate savings for the taxpayer. Thus, the lower premiums from narrow networks help to both reduce the number of uninsured and lower the cost of achieving that policy objective.

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EXHIBIT 1 (table)

Caption: **Summary Statistics-weighted**

SOURCE: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks. NOTES: None.

EXHIBIT 2

Caption: **Size of Networks for Health Insurance Marketplace Plans: Overall and by Plan Type**

SOURCE: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks. NOTES: None.

EXHIBIT 3 (table)

Caption: **Relationship Between Network Size and Plan Premium**

SOURCE: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks. NOTES: All specifications include rating area and insurer fixed effects. Observations are weighted using the service area population. Standard errors are clustered by rating area. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

EXHIBIT 4 (table)

Caption: **Estimated Change in Premium by Increases in Network Size**

SOURCE: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks. NOTES: None.

Exhibit 1		
Summary Statistics		
N=6048	**Mean**	**SD**
Premium ($)	266	64
Network size (%)	30	20
Network category (%)		
X-Small	19	39
Small	26	44
Medium	23	42
Large	22	41
X-Large	10	30
Plan type (%)		
PPO	38	49
HMO	42	49
POS	6	23
EPO	14	35
Deductible ($)	2774	1331
PCP Copay ($)	32	17
Coinsurance (%)	23	42

Source: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks.

Exhibit 3						
Relationship Between Network Size and Plan Premium						
	I		**II**		**III**	
	Network size as a continuous variable		**Network size a categorical variable**		**Network size-plan type interaction**	
	Coeff.	**Std.Er**	**Coeff.**	**Std.Er**	**Coeff.**	**Std.Er**
Network size	0.2334***	0.0409	-	-	0.2839***	0.0574
T-shirt size						
XSmall (ref)	-	-	-	-	-	-
Small	-	-	-0.0134	0.0164	-	-
Medium	-	-	-0.0028	0.0182	-	-
Large	-	-	0.0665***	0.0169	-	-
XLarge	-	-	0.1311***	0.0248	-	-
Plan type						
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/1000	-0.0216***	0.0019	-0.0219***	0.0018	-0.0216***	0.0018
PCP Copay	-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*HMO	-	-	-	-	-0.1360*	0.0751
Network size*POS	-	-	-	-	0.0134	0.1436
Network size*EPO	-	-	-	-	-0.0617	0.0693
Constant	5.9730***	0.0279	5.9990***	0.0263	6.0581***	0.0293
R^2	0.92		0.92		0.92	
Observations	6048		6048		6048	

Source: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks.

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: x-small (less than 10%), small (10%-25%), medium (25%-40%), large (40%-60%), and x-large (more than 60%). Standard errors are clustered by rating area. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Exhibit 4. Estimated Change in Premium by Increases in Network Size						
			1 std change (std=0.20, coeff=0.23, change=4.6%)		X-small to Large network: change=6.65%	
	Mean 2nd lowest silver monthly (annual) $	Mean monthly (annual) $	Estimated change for mean 2nd lowest monthly (annual) $	Estimated change for mean monthly (annual) $	Estimated change for mean 2nd lowest monthly (annual) $	Estimated change for mean monthly (annual) $
Indiv age 27	235 (2820)	266 (3192)	11 (132)	12 (144)	16 (188)	18 (212)
Indiv age 50	382 (4584)	425 (5100)	18 (216)	20 (240)	25 (306)	28 (339)
Family 2+2,age30	781 (9372)	867 (10404)	36 (432)	40 (480)	52 (623)	58 (692)

Source: Author calculations based on RWJ's Health Insurance Exchange (HIX) Compare Dataset and LDI's National Database of Physician Networks.