The Impact of Market Size and Composition on Health Insurance Premiums: Evidence from the First Year of the ACA

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PRELIMINARY DRAFT
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1 Introduction

Approximately 8 million U.S. residents currently obtain private health insurance coverage through one of the marketplaces created by the Affordable Care Act (ACA). Recent research has documented considerable variation across geographic areas in the number of insurers participating in each market, the number of plans offered, and in the distribution of health insurance premiums. This variation may be partially driven by characteristics such as the population, income distribution, and fraction uninsured in each market prior to the Affordable Care Act.

Government regulations are also likely to affect market outcomes in the ACA health insurance exchanges. While the Affordable Care Act was passed at the federal level, state governments have been given considerable latitude to vary certain policies that regulate these marketplaces. For example, each state is allowed to decide the number of coverage regions within its marketplace and the geographic areas covered by each region. Within each region, an insurer is required to make each offered plan available to any eligible individual or family. Thus if N is the number of coverage regions within a state, each insurer has exactly N entry decisions to make.

The private marketplaces for public health insurance that existed before the Affordable Care Act have taken very different approaches to the definition of coverage regions. For example, Medicare Advantage, through which more than 16 million Medicare recipients obtain their coverage, defines each county to be a coverage region. Because of this, a health insurer essentially has 3,100 distinct entry decisions to make. On the opposite extreme, Medicare Part D defines just 34 coverage regions for its prescription drug plans (PDPs) nationally, and many of these coverage regions are larger than an entire state. An additional 25 million Medicare recipients obtain PDP coverage through these Medicare Part D marketplaces.

The size of a coverage region may be especially important for smaller markets — for example in rural areas — which may attract relatively few private insurers. Perhaps partly because of this, in 1998 the federal government set a payment floor for Medicare Advantage plans that substantially raised their reimbursement in counties with low average fee-for-service expenditures (which were typically smaller counties). Despite this policy change, the fraction of Medicare recipients enrolled in MA plans is significantly lower in counties with fewer residents. For example, while 33 percent of Medicare recipients in the most populous 20 percent of counties are enrolled in an MA plan, just 13 percent in the least populous counties are. The opposite relationship holds

for Medicare Part D enrollment (despite no payment floor for smaller counties), with beneficiaries in the smallest counties much more likely to be enrolled in private PDP plans than their counterparts in the largest counties (60 percent versus 42 percent). One possible explanation for the very different pattern of enrollment in smaller counties between Medicare Advantage and Part D is that Part D has much larger coverage regions, which attracts more firm entry and perhaps more intensive marketing.

In this paper, we use data at both the county and coverage-region level to investigate whether the size of the coverage region affects market outcomes in the ACA insurance marketplaces. Theoretically, one would expect a larger market size to increase the number of firms that enter the market. This could lead to improved outcomes in smaller markets with respect to the amount of choice and lower prices through competition. However, if a state defines its coverage regions to be too large, it may discourage some insurers from entering given the need to charge a single price to a more heterogeneous group of consumers.

In our empirical analyses, we focus primarily on smaller counties given their vulnerability to insufficient plan entry. Our sample includes all counties in the 34 states that used the federal government's healthcare.gov site to sign up enrollees. Within this group of states, there is significant variation in the size of the coverage region. On one extreme, states such as Florida followed the Medicare Advantage example, setting each county (regardless of how small) to be its own market. On the opposite extreme, Texas and some other states had on average several counties in their coverage regions. While not as expansive as the Part D coverage regions, these broader regions substantially expanded the effective market size for small counties.

In our first set of analyses, we investigate whether the number of insurers in smaller counties varies with the size of the coverage regions. We control for state fixed effects to account for the possibility that there are unobserved differences between states that are correlated with their decisions on how to define rating regions, such as minimum requirements for the breadth of provider networks. Our findings demonstrate that, controlling for the population of a county, the number of health insurers increases and the benchmark (second lowest cost silver plan) insurance premiums decrease with the size of the coverage region. One concern with this first set of results is that counties bundled with larger areas may differ in important ways, such as proximity to an urban area, from counties that are not. However, our results for the effect of coverage region size on both the number of firms and on average insurance premiums are very similar when we restrict attention to only those counties that are located close to urban counties.

In our next set of analyses, we explore the effects on both the number of firms and on health insurance premiums using data at the coverage region level. This examination complements related work examining the effect of concentration on health market outcomes, including Dafny et al. (2014) and Dafny (2010). Our findings demonstrate that, on average, the number of insurers increases and premiums decline with coverage region size. However, there is substantial variation in this effect, with market outcomes actually somewhat worse in coverage areas that are more heterogeneous (with respect to urban versus rural population). This suggests that states do not necessarily want to simply define their entire state as one coverage area.

Taken together, our results reveal that a state can significantly affect market outcomes when defining its coverage regions. Smaller and more rural counties appear to benefit from being bundled with larger areas with respect to having both more insurers from which to choose and having lower premiums. This is consistent with the difference in the Medicare program between market outcomes, as measured by enrollment (which we do not yet have for ACA exchanges) for MA and Part D plans. However, there is a tradeoff, as market outcomes are on average less favorable in more diverse coverage regions as the region expands.

The outline of the paper is as follows. We begin by describing our data collection and the features of the insurance marketplaces we study in Section 2. We then present our county-level analysis in Section 3, a simple model of insurer entry and pricing in Section 4, and our region-level analysis in Section 5. Section 6 concludes and highlights directions for future research.

2 Data

We collected the premiums, financial characteristics, and associated insurance carrier for every health insurance plan offered on the healthcare.gov website. The website served as a platform for sales of marketplace plans in 36 states. Of these 36 states, 27 are states that chose not to operate their own exchange, yielding all oversight to the federal government. Seven of the states are "partnership" states, which share regulatory oversight with the federal government and use the healthcare.gov platform.[1] The

[1]Federally Run: Alabama, Alaska, Arizona, Florida, Georgia, Indiana, Kansas, Louisiana, Maine, Mississippi, Missouri, Montana, Nebraska, New Jersey, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Wisconsin, Wyoming. Partnership: Arkansas, Delaware, Illinois, Iowa, Michigan, New Hampshire, West Virginia.

remaining two states, New Mexico and Idaho, operate their exchanges independently but adopted the healthcare.gov platform for consumers to enroll in plans. Because we merge the exchange data with county-level covariates from the census, we drop three states—Alaska, Nebraska, and Idaho—that define coverage regions based on zip codes rather than counties. This leaves 33 states and 2,388 counties, representing over 66% of the 8,019,763 people who enrolled in the 2013-2014 open enrollment period.[2] One limitation of these data is the absence of information about the breadth of the provider networks to which plans provide access.

The premiums offered in the marketplaces for a particular plan differ depending on the plan's financial characteristics, summed up in its "tier" rating. Each tier is characterized by an actuarial value, which describes the percentage of a representative consumer's medical expenditures that a plan in that tier would cover. Bronze plans cover, on average, 60% of costs, silver plans cover 70%, gold plans cover 80%, and platinum plans are the most generous, covering 90% of costs. Premiums may also differ based on an enrollee's age, family size, and smoking status. The ratio between the premium of a particular product for any two ages is fixed by the ACA, so we focus on premiums for consumers of a particular age, 51-year-olds, in our summary statistics and analysis.[3] Figure 1 contains an example of a typical menu of contracts available to consumers in one of the federally-administered marketplaces we study. For this example—Shelby County, Tennessee—we illustrate the average and the minimum premiums and deductibles by plan tier in this market. We also list the names of the insurers offering products in this county.

Shelby County's menu is typical. Roughly three to five insurers offer multiple products in each tier, which differ in financial characteristics. In the proceeding sections, our analyses will focus on the premiums and characteristics of a particular product: the second-lowest-priced silver plan. We focus on the premium of this plan for two reasons. First, the premium for the second-lowest-priced silver plan, or "benchmark" plan, is extremely policy relevant, because it is used to determine the level of income-based subsidies provided to assist low and middle income consumers in paying for their chosen insurance plan. The subsidy amount is determined so that a buyer within a given income bracket pays a pre-set fraction of her income for the benchmark plan. Second,

[2]Based on data from Health Insurance Marketplace: March Enrollment Report, October 1, 2013 - April 19, 2014. See HHS (2014).

[3]See Orsini and Tebaldi (2014) for an analysis of the role of age-based pricing in the market outcomes within health insurance exchanges. Complete details of the rating regulations appear in HHS (2013b).

we do not observe detailed demand data, and so choose to focus on the premium of a particular product that was likely to be chosen by many buyers.

In Table 1 we report summary statistics on the premiums and deductibles across all plans in our data. Premiums are not allowed to vary across counties grouped into the same geographic rating region. In the 33 states we study, the included 2,388 counties are divided into 398 regions. While there are on average six counties per region, there is considerable heterogeneity in this figure by state. We illustrate this variation in Figure 3, drawing the region boundaries for three states. At one extreme, Florida defines rating regions uniquely by county–there are 67 regions to cover each of the 67 counties in the state. Near the other extreme, Texas defines rating regions by using one region per major city and then a complementary region that covers all other counties of the state. Thus, Texas divides its 254 counties into only 26 regions. Tennessee, as pictured, defines regions with slightly higher numbers of counties per region than the average, but unlike the large region in Texas, the counties within each Tennessee region are geographically close.

Tennessee's region boundaries represent the modal experience of the states we study. Tennessee combines counties near metropolitan areas into a region. For those counties bordering an urban area, the state chooses which of the counties to bundle in a region with the nearby city or leave out, forming a distinct region with the left out, geographically contiguous counties. There appears heterogeneity within and across states in how policymakers drew boundaries to include or exclude otherwise similar counties bordering major urban centers. We exploit this heterogeneity in our county-level analysis.

Across regions, we observe 24,219 unique region-product combinations. The average annual premium for a 51-year-old single buyer is just under $5500 with a deductible of about $3000. On average, three insurers enter each rating region, though more than 10% of markets have a monopolist provider.

In addition to the plan characteristics, we collect county-level data on health demand characteristics from the Area Health Resources Files (AHRF) from the US Department of Health and Human Services and County Business Patterns from the US Census Bureau.[4] We weight the county-level data by population to compute a region's urbanity, age distribution, income distribution, including the share of the population in households that meet the criteria for federal insurance subsidies, and the share of employees who work in establishments with fewer than 10 employees. In this way, counties with

[4]See HHS (2013a).

larger population have more weight in the region-level averages. Using data from the Centers for Medicare & Medicaid Services and the ARHF, we also collect information on health supply characteristics by county, including the number of hospitals, Medicare's Geographic Adjustment Factor, and the penetration of Medicare Advantage plans within a county, which we use as a measure of the cost of supplying health care in a county.[5]

3 County-level Analysis

To isolate the effect of the rating region definition on pricing and entry, we focus first on counties that share many market characteristics but differ in whether or not they are bundled in with a more populous county in their region. We focus on "small" and "rural" counties, as these markets are most similar and are of particular policy interest because of the historical lack of access to insurance in these markets.[6]

We define small and rural markets as those with population and urbanity below the 75th percentile in population—around 37,000—and below the 50th percentile in urbanity, about 40% urban. In Figure 2, we illustrate the distribution of these small and rural counties across the regions in our data. As a robustness, we repeat this empirical analysis using a broad range of combinations of cutoffs for both urbanity and population size. The results appear in Table 7 in the Appendix. Our main qualitative results on the effects of region size on the benchmark premia and the number of market participants remain unchanged under different small and rural thresholds.

Focusing on only the set of small and rural markets leaves 1,157 of the original 2,388 counties to study. Of these small and rural counties, we define treatment and control counties based on quantiles of the rest of the region's population and the rest of the region's urban share. Specifically, we calculate the rest of the region population as the sum of the population in counties in the region other than the focal county. We calculate the rest of the region's urban share as the population-weighted urban share amongst all counties in a region other than the focal county. We then label as treated those counties that are bundled into regions in which the rest of the region population

[5]See Duggan et al. (2014) for an analysis of the drivers of the entry of Medicare advantage plans in rural vs. urban geographic markets.

[6]In this analysis, we telescope in on counties for which the policymakers market definition will have the sharpest effect on market outcomes. This is similar in spirit to the exercise Cabral and Mahoney (2014) conduct to study the effect of Medigap supplemental insurance on utilization in medicare. They exploit discontinuities within local medical markets that span state boundaries.

is above the 75th percentile and the rest of the region urban share is also above the 75th percentile. Our control counties are those counties in regions in which the rest of the region population and rest of the region urban share fall below the 50th percentile. All other counties fall into an intermediate group. In Figure 4, we plot the counties along the dimensions of population and urbanity in the rest of the region. The upper right quadrant in the plot represents the treated observations; the lower left quadrant represents the set of control counties.[7] Overall, of the 1,157 small and rural counties, 66 fall into the treated category, 335 fall into the control category, and 756 fall into the intermediate grouping.

To make clear the variation underlying our main county-level analysis we return to an example from Tennessee. In Figure 5, we highlight four counties within Tennessee: two small and rural counties, Fayette and Cannon, and two large and urban counties, Shelby and Rutherford. Fayette and Shelby counties share a border in the southwest of the state; Tennessee officials drew the region boundaries in a way that bundled the two counties into Region 6. Thus, in both counties the same four insurers operate and consumers face the same benchmark silver plan premium of $3,396. In the center of the state, Cannon and Rutherford counties share a boundary but officials bundled the two into distinct regions. The larger Rutherford county, placed in Region 4, attracted four insurers to serve the individual market, with a benchmark silver plan premium of $3300. The smaller Cannon county in Region 7 attracted only one insurer entrant, and consumers faced a benchmark silver premium of $3,528, an increase of 7% over the premiums faced in the bordering urban county. Cannon county consumers face a benchmark premium that is also 4% more than the otherwise comparable Fayette county, which officials bundled with its urban neighbor. We conduct this within-state, small county comparison in a regression framework, to add controls for county-level demographics and health market characteristics.

Before presenting the results of the regression analysis, we first provide some support for our use of variation in county boundaries to study pricing and entry. We conduct two tests. First, we examine whether observable measures of provider costs and expected health utilization vary across counties we label as either treatment or control counties. Our observable measures of provider cost include Medicare's Geographic Adjustment Factor, the number of hospitals in a region, and the Medicare Advantage penetration in a county. We proxy for the profitability of the patient population using region

[7] We report the number of insurers in the county over each data point in the two-dimensional plot.

level median income, the share of the 18-64 year old population in the 40-64 year old age bracket, the fraction of the population with incomes that make them eligible for subsidies, and the proportion of employees working for small firms. The results appear in Appendix Table 6. We find few statistically significant differences in the mean levels of the demographic and cost variables across the treatment and control groups. The exceptions are Medicare Advantage penetration and median income. Second, we conduct a statistical test of the differences in these covariates by region by randomly reshuffling the small counties within a state. We then test the null hypothesis that the standard deviation of the cost and utilization measures within assigned regions is larger than that observed in actual regions. We reject this null hypothesis in a large share of states for the demographic and hospital variables. Again, for Medicare penetration and median income, our rate of rejecting the null in each state is much smaller.[8]

The results of our county-level analysis appear in Tables 2 and 3. The dependent variable in these regressions is either the number of unique entrants observed in the region or the premium for the benchmark silver plan available in the region. We focus on this particular plan premium, the second lowest silver plan, because the federal subsidies for consumers are tied to this order statistic of the available silver plans. In these regressions, we include a rich set of controls for observable measures of provider costs and expected health utilization, including those mentioned above: Medicare's Geographic Adjustment Factor, the number of hospitals in a region, the Medicare Advantage penetration in a county, as well as patient demographic variables.

We focus our discussion on the estimated coefficient on the indicator for whether a county observation is in the treated group—i.e. whether state officials bundled the small county into a large, urban region. We find a significant increase in the number of insurers entering these counties. Being grouped in a region with a large urban county increases the expected number of entrants by between .6 and .8 insurers. The bundling also leads to an average decrease in annual premiums of between $200 and $300. Bundling rural counties in with neighboring regions appears to have a meaningful impact on the supply of plans available to rural residents.

[8]In addition, we mapped health market definitions from the Dartmouth Atlas of Health Care to the rating regions that each of the 33 states in our sample define. We use the Dartmouth Atlas' definition of local markets for hospital care, known as hospital service areas (HSAs). We compare the region definitions under the ACA with the HSA definitions and find at least 18% of the HSAs overlap with more than region and, across all states, the median number of HSAs contained within a region is five. That is, it does not appear that states have defined rating regions in ways tightly linked to a typical measure of health markets.

As further robustness, we restrict our county-level sample to only those small and rural counties that are within reasonable driving distance of an urban area. Specifically, we compute the population-weighted centroid of a large, urban region within the state and collect small and rural counties that are within 100 driving miles of this region. Our goal in this analysis is to compare the effect of bundling only for those small and rural counties that border a populous and urban county. The estimates from this robustness appear in the final two columns of Tables 2 and 3. Comparing small counties in close proximity to such large urban counties, those that are bundled into the same rating region have roughly the same difference in premiums observed in the main specification. In the restricted sample, the small markets that are bundled with larger markets see roughly one additional insurer entrant relative to markets that are not grouped with a larger, urban region. This is a slightly larger effect than seen in the main county-level analysis, where we observed grouped counties with between .6 and .8 greater numbers of predicted entrants, all else equal.[9]

4 Model of Entry

Finding some support for the relationship between region size and market outcomes from our county-level analysis, we explore the possible drivers of these differences. In this exercise, we follow a long empirical literature in industrial organization on the decision of firms to enter a cross-section of markets, beginning with Bresnahan and Reiss (1989). Berry and Reiss (2007) provide a survey of many related papers in this literature. Measuring the effect of the region regulation under the ACA also relates closely to previous work on community rating, including Pauly (1970) and Herring and Pauly (2006). Here, we present a simple framework to describe the determinants of the insurer's decision to offer plans in a region in the health insurance marketplace and to set prices for these plans. Firms decide whether to introduce a plan after forming expectations of the joint distribution of costs, c, and consumers' utility for the plan, u. This distribution, labeled $F(u, c)$, depends on the firm's expectations of rivals' entry and on how consumers of different costs will choose amongst available plans.

The decision to enter and set price for a plan depends not only on the characteristics of enrollees, but also the costs of providers in the market, the fixed costs of serving

[9] As a robustness, we vary the threshold driving distance from 100 miles to 200 miles in 25 mile increments. The qualitative results are similar using each of these mileage thresholds. We report these results in the Appendix, Table 8.

the market, and the market size. We assume the provider costs vary by region as a multiplicative factor of patient utilization. Profits in the region are thus:

$$\Pi = M \int_{u(p)>0} (p - \psi(H) * c) dF(u, c) - \Psi(H)$$

Where M is the population in the region, p is the premium the insurer sets, and H is a measure of heterogeneity in the region's characteristics. H can be a measure of population density, urbanity, or patient demographics, for example. In the profit equation, both the provider costs, $\psi(.)$, and the entry costs, $\Psi(.)$, depend on H. For example, with greater region density, it may be cheaper to market a new insurance plan and contract with a network of physicians and facilities to ensure enrollees have access to quality care.

From the profit equation, one can see that greater H—and thus greater entry and provider costs—may reduce entry and increases the optimal premium, p^* conditional on entry. A larger population increases the incentive to enter but may increase p^* depending on the shape of $F(.)$ – how well the firm attracts the healthiest of this larger group of consumers. In our empirical implementation, we condition on several empirical proxies of population, region heterogeneity, measures of provider costs per procedure, and the profitability of the patient population.

5 Region-level Analysis

Our simple model illustrates that region heterogeneity and provider costs creates a tradeoff in an insurer's entry and pricing decision: too much heterogeneity in region size and composition may raise the fixed costs of entry and lead to fewer insurers and possibly higher premiums. We measure this tradeoff empirically at the region level. Conditioning on population, we use land area and urbanity as proxies for density in a region. We control for the same measures of health utilization and cost as in the county-level regressions.

The results of this region-level analysis appear in Table 4. The dependent variable in these regressions is either the log number of unique entrants observed in the region or the premium for the benchmark silver plan available in the region. The coefficient on log population suggests a positive and significant effect of increasing population on the number of entrants and premiums. We convert the estimates to percentage changes

in entrants and premiums from a shift in both log population and land area in 100s of square miles. We report these percentage changes in Table 5.

Moving from the 25th to 75th percentile in log population, the log number of insurers increases between 25 and 35 percent; the same change in population is associated with a decrease in premiums of 3 to 5 percent. However, controlling for population, increasing land area from the 25th to 75th percentile leads to a decrease in the log number of entrants of between 15 and 36 percent. Premiums increase 6 to 7%. Thus, there appears a tradeoff in market outcomes, all else equal, from increasing the size of regions. Greater population size may encourage entry, but more heterogeneous regions appear to have lower degrees of competition and higher premiums.

6 Future Directions

Rural regions appear to attract fewer entrants. Insurers also charge higher premiums to rural residents, controlling for observable measures of consumer and provider costs in these markets. One way for policymakers to improve market outcomes for rural residents is to consider alternative rating region definitions to increase the incentives for insurers to serve rural residents.

In our current analysis, we do not examine how market and firm characteristics like insurer competition or multimarket contact may underlie the premium differentials observed. Examining the specific firms that choose to enter differentially in the urban and rural markets can provide insight into the nature of competition. Early investigation suggests there may be heterogeneity in the entry and pricing decisions of incumbent national firms and newly formed cooperatives.

Furthermore, the pricing and entry decisions of these insurers appears to interact with the federal government's subsidy policy: in regions in which larger shares of the population are eligible for subsidies, we observe slightly larger numbers of insurers entering. Firms may be responding to inelastic demand for consumers in the subsidized population; modeling this pricing and entry problem of the firm can provide insight into how firms respond to the federal government's subsidy program, with consequences for the total cost of the ACA to the federal government.

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7 Figures and Tables

County:	**Shelby**	**Population:**	**575,872**
Region:	**6**	**% Urban:**	**97%**
Insurers:	*BCBS*		
	Cigna		
	Humana		
	Community Health Alliance		

	Monthly Premium			**Deductible**		
	N	Mean	Min	N	Mean	Min
Bronze	14	$276	$208	14	$4,646	$2,500
Silver	30	$352	$272	30	$2,717	$0
Gold	21	$451	$357	21	$1,712	$0
Platinum	7	$526	$482	7	$143	$0

Figure 1: Plan menu, Shelby County, Tennessee

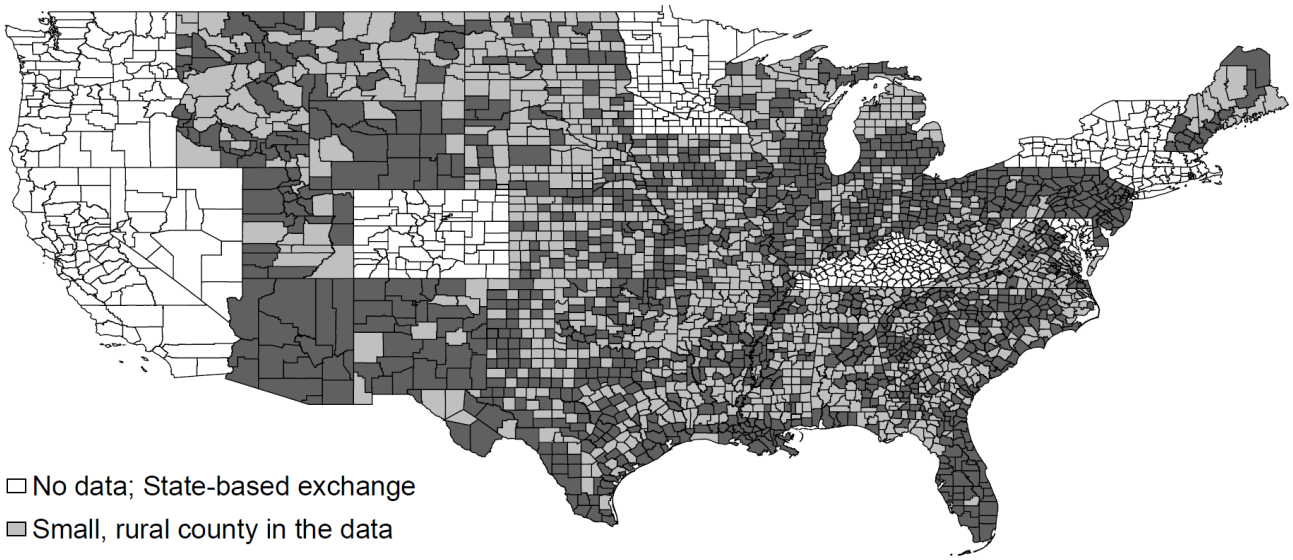


Figure 2: Map of small and rural counties

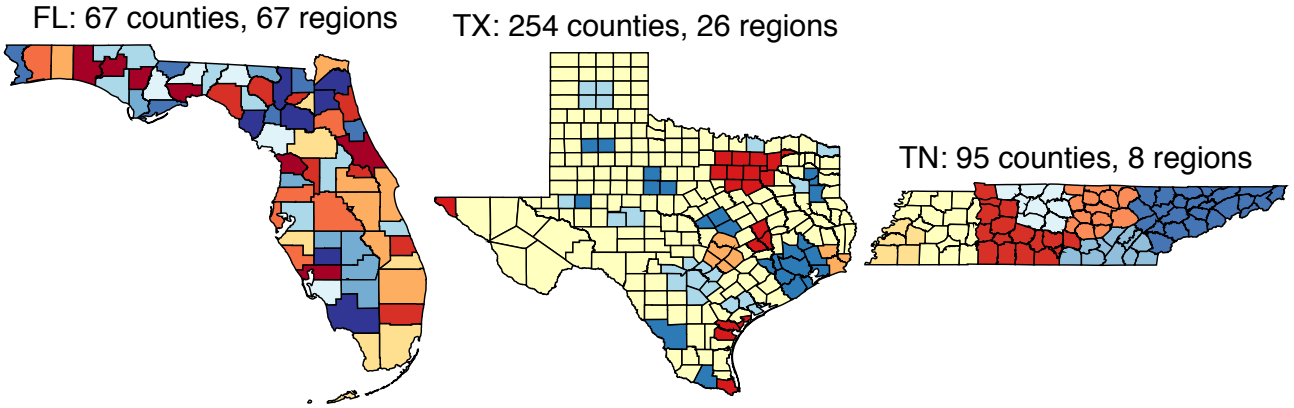


Figure 3: Three region definitions: Florida (FL), Texas (TX), and Tennessee (TN)

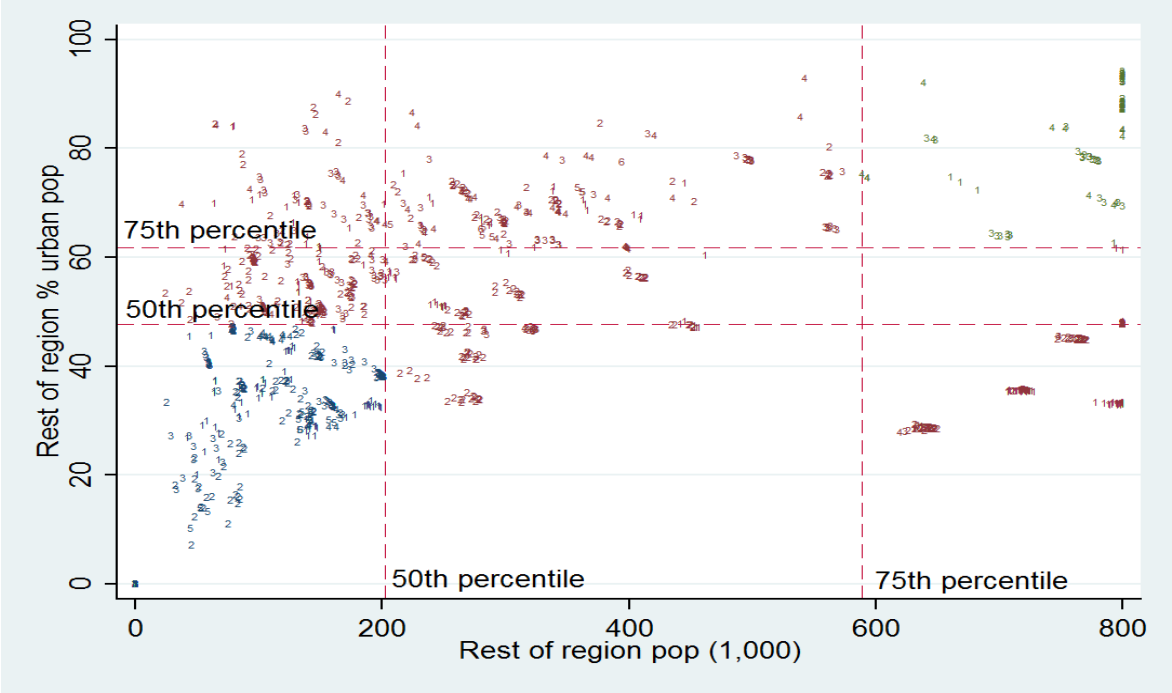
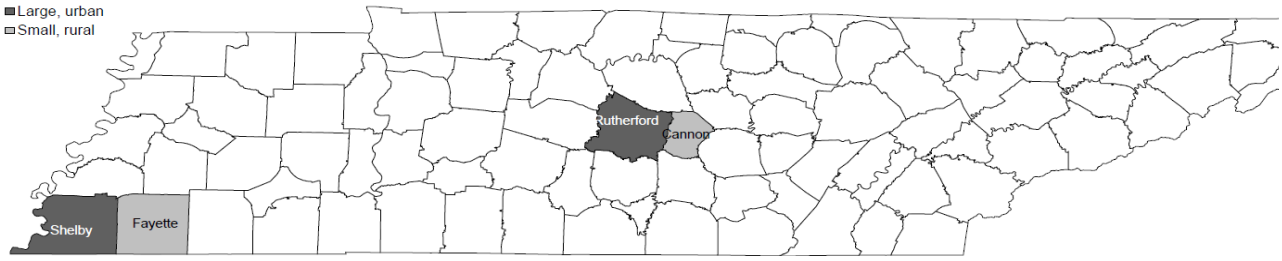


Figure 4: Plot of small and rural counties by "rest of region" population and percentage urban
Key: Blue (lower left) = control counties, Green (upper right) = treatment counties
The numbers plotted by county represent the number of insurers operating in each county.



County:	**Shelby**	**Population:**	**575,872**	**County:**	**Fayette**	**Population:**	**23,595**
Region:	**6**	**% Urban:**	**97%**	**Region:**	**6**	**% Urban:**	**21%**
Insurers:	*BCBS*			**Insurers:**	*BCBS*		
	Cigna				*Cigna*		
	Humana				*Humana*		
	Community Health Alliance				*Community Health Alliance*		
Benchmark silver premium:		**$3,396**		**Benchmark silver premium:**		**$3,396**	
County:	**Rutherford**	**Population:**	**168,768**	**County:**	**Cannon**	**Population:**	**8,437**
Region:	**4**	**% Urban:**	**83%**	**Region:**	**7**	**% Urban:**	**19%**
Insurers:	*BCBS*			**Insurers:**	*BCBS*		
	Cigna						
	Humana						
	Community Health Alliance						
Benchmark silver premium:		**$3,300**		**Benchmark silver premium:**		**$3,528**	

Figure 5: Example: Plan options in four Tennessee counties

Table 1: Summary statistics on plans offered across states, for a 51 year old consumer

Panel A						
Example: 51-year old buyer						
Across 398 regions, have 24,219 (region, plan) combinations						
	N	Mean	Std Dev	Min	Max	Median
Premium	24,219	5,454	1,257	1,594	11,868	5,364
Deductible	24,219	3,027	1,948	0	6,350	2,500
No. of insurers	398	2.92	1.53	1	10	3
No. of plans	398	13.02	8.78	2	48	11.5
Panel B						
Example: 51-year old buyer						
Across 398 regions						
Plan type	N	Mean	Std Dev	Min	Max	Median
Bronze	7,441	4,441	814.5	1,594	8,196	4,428
Silver	8,807	5,412	908.2	2,083	10,020	5,388
Gold	6,490	6,337	1,111	2,284	11,868	6,276
Platinum	1,481	6,924	1,198	3,744	11,712	6,780

Table 2: County-level regression estimates for the benchmark premium

	Premiums			
Sample selection: distance	None		<100 miles	
	(1)	(2)	(1)	(2)
Grouped in large, urban region	-300.7***	-208.0**	-293.3***	-238.4***
	(108.2)	(105.1)	(0.000)	(0.002)
Deductible	0.0120	0.0207	0.117	0.142
	(0.0505)	(0.0501)	(0.458)	(0.375)
Median income (1000's)		-7.749***		-4.368
		(2.725)		(0.199)
Proportion HH w/ inc 25k-100k		-59.26		-1453.1**
		(277.5)		(0.031)
Geographic Adj. Factor		-7282.3***		-2308.0
		(2623.4)		(0.314)
Medicare Advantage Penetration		-351.6		-306.3
		(240.6)		(0.347)
Share of 45-65 over 18-65		-887.8*		-495.8
		(530.2)		(0.498)
Proportion of employees in small establishments		5.624		-24.05
		(3.946)		(0.104)
Number Short Term General Hositals		-16.10		2.713
		(24.03)		(0.963)
N	1157	1157	96	96
R2	0.725	0.732	0.914	0.917

Notes:
An observation is a small county in one of the 33 states adopting the federal platform and not using zip-codes to define a pricing region. Small means below the 75th percentile of population and 50th percentile of share of urban population. The sample selected based on distance is restricted to counties whose distance from the population-weighted centroid of a large, urban region within the state is less than 100 driving miles. 100 miles is the maximum distance between any "grouped" county and the rest-of-region with which it was grouped. Dependent variable is the second lowest priced "silver" tier product in the county. Group dummies are as follows: "Not grouped" (the omitted category) refers to counties with rest-of-region population and share of urban population below the 50th percentile among small counties, "Grouped in large, urban region" refers to counties with rest-of-region population and share of urban population above the 75th percentile among small counties, "Intermediate group" refers to all other small counties. Specification (2) includes as controls: median income, share of households with income 25K-100K, Medicare Geographic Adjustment Factor, share of adult population in 40-64 age bin, % of employed population working in establishments with fewer than 10 employees, and number of short-term general hospitals. Price regressions include as an additonal control the deductible of the second lowest priced silver plan. All regressions include state fixed effects. Standard errors (clustered at the region level) in parentheses. ***: p<0.01, **: p<0.05, *: p<0.10.

Table 3: County-level regression estimates for the number of insurer entrants

	No. of Insurers			
Sample selection: distance	None		<100 miles	
	(1)	(2)	(1)	(2)
Grouped in large, urban region	0.790***	0.614***	1.078***	0.946***
	(0.206)	(0.205)	(0.000)	(0.001)
Deductible				
Median income (1000's)		0.0144***		0.0317***
		(0.00483)		(0.005)
Proportion HH w/ inc 25k-100k		0.735**		0.450
		(0.353)		(0.811)
Geographic Adj. Factor		7.714**		14.64*
		(3.124)		(0.076)
Medicare Advantage Penetration		0.529		0.138
		(0.322)		(0.915)
Share of 45-65 over 18-65		0.0488		-5.489
		(0.628)		(0.231)
Proportion of employees in small establishments		-0.00203		0.0930*
		(0.00621)		(0.075)
Number Short Term General Hositals		0.0654**		0.00228
		(0.0306)		(0.993)
N	1157	1157	96	96
R2	0.589	0.604	0.498	0.511

Notes:
An observation is a small county in one of the 33 states adopting the federal platform and not using zip-codes to define a pricing region. Small means below the 75th percentile of population and 50th percentile of share of urban population. The sample selected based on distance is restricted to counties whose distance from the population-weighted centroid of a large, urban region within the state is less than 100 driving miles. 100 miles is the maximum distance between any "grouped" county and the rest-of-region with which it was grouped. Dependent variable is the number of insurers selling plans on the health insurance exchange in the county. Group dummies are as follows: "Not grouped" (the omitted category) refers to counties with rest-of-region population and share of urban population below the 50th percentile among small counties, "Grouped in large, urban region" refers to counties with rest-of-region population and share of urban population above the 75th percentile among small counties, "Intermediate group" refers to all other small counties. Specification (2) includes as controls: median income, share of households with income 25K-100K, Medicare Geographic Adjustment Factor, share of adult population in 40-64 age bin, % of employed population working in establishments with fewer than 10 employees, and number of short-term general hospitals. Price regressions include as an additonal control the deductible of the second lowest priced silver plan. All regressions include state fixed effects. Standard errors (clustered at the region level) in parentheses. ***: p<0.01, **: p<0.05, *: p<0.10.

Table 4: Region-level regression estimates

Region level estimates	Log N insurers			Log Premium		
	(1)	(2)	(3)	(1)	(2)	(3)
Log Population	0.222***	0.244***	0.177**	-0.0226***	-0.0361***	-0.0292**
	(0.0657)	(0.0725)	(0.0688)	(0.00494)	(0.00800)	(0.0132)
land area in 100s of square miles		-0.0821**	-0.0335		0.0483***	0.0410***
		(0.0343)	(0.0420)		(0.00993)	(0.0133)
Proportion Population Urban			-0.630**			0.240**
			(0.259)			(0.0964)
Urban squared			0.838***			-0.237*
			(0.282)			(0.116)
Deductible (100's)					-0.00186*	-0.00193*
					(0.000981)	(0.00101)
Median income (1000's)		-0.00376	-0.00451*		-0.000363	-0.000234
		(0.00233)	(0.00246)		(0.00112)	(0.00109)
Proportion HH w/ inc 25k-100k		0.810	0.987		-0.210	-0.276
		(0.941)	(0.874)		(0.162)	(0.168)
Geographic Adj. Factor		-0.247	-0.741		0.415	0.548
		(1.060)	(0.930)		(0.418)	(0.419)
Medicare Advantage Penetration		0.326	0.267		-0.0284	-0.00380
		(0.280)	(0.255)		(0.104)	(0.0989)
Share of 45-65 over 18-65		-0.729	-0.858		-0.0224	-0.00984
		(0.875)	(0.874)		(0.145)	(0.146)
Proportion of employees in small establishments		-0.0213	-0.0262**		-0.00564	-0.00419
		(0.0132)	(0.0127)		(0.00505)	(0.00544)
Number Short Term General Hositals		-0.00294	-0.00221		-0.000802	-0.000776*
		(0.00214)	(0.00177)		(0.000583)	(0.000435)
N	398	398	398	398	398	398
R2	0.635	0.668	0.673	0.640	0.672	0.675

Notes:
An observation is a pricing region in one of the 33 states adopting the federal platform and not using zip-codes to define a pricing region. Dependent variables are the log of the second lowest priced "silver" tier product in the pricing region and the log of the number of insurers selling plans on the health insurance exchange in the region. Specifications (2) and (3) include as controls: median income, share of households with income 25K-100K, Medicare Geographic Adjustment Factor, share of adult population in 40-64 age bin, % of employed population working in establishments with fewer than 10 employees, and number of short-term general hospitals. Price regressions include as an additonal control the deductible of the second lowest priced silver plan. All regressions include state fixed effects. Premium, deductibles and number of insurers vary at the region level. Adult population and number of short-term general hospitals are calculated at the region level by summing over the included counties. All other variables are calculated at the region level as adult-population-weighted averages. Standard errors (clustered at the state level) in parentheses. ***: p<0.01, **: p<0.05, *: p<0.10.

Table 5: Region-level prediction exercises

	Log N Insurers		
% Change in dependent variable with change to covariate:	(1)	(2)	(3)
Move from 25th-75th in logPop	32.0	35.2	25.5
Move from 5th-95th in logPop	99.1	108.9	79.0
Move from 25th-75th in landArea		-13.9	-5.7
Move from 5th-95th in landArea		-26.9	-11.0
	Log Premium		
% Change in dependent variable with change to covariate:	(1)	(2)	(3)
Move from 25th-75th in logPop	-3.3	-5.2	-4.2
Move from 5th-95th in logPop	-10.1	-16.1	-13.0
Move from 25th-75th in landArea		8.2	6.9
Move from 5th-95th in landArea		15.8	13.4

Notes:
Columns (1) through (3) in the table correspond to specifications (1) through (3) of the region-level regressions. The difference in the 25th to 75th percentiles of log population is 1.44 while the difference in the 5th to 95th percentiles is 4.46. The difference in the 25th to 75th percentilse of land area is 170 square miles while the difference in the 5th to 95th percentiles is 327 square miles.

Table 6: Appendix: Covariate balance in treatment and control counties

	Income	Share subsidized	GAF	MA penetration	Share 45-64	Working in small firms	Hospitals per capita
All Small Counties							
Not bundled	38.90	0.59	0.92	0.16	0.62	13.87	0.76
Intermediate	38.46	0.58	0.92	0.16	0.60	12.77	0.74
Bundled	44.82	0.59	0.94	0.25	0.60	10.93	0.65
Restricted Sample on Distance from Large Region							
Not bundled	38.54	0.59	0.94	0.20	0.61	12.98	0.74
Bundled	44.82	0.59	0.94	0.25	0.60	10.93	0.65

Notes:
Table reports the average value of the observed covariates used as controls in the county-level analysis. There are 1,157 small counties in the main analysis and 96 counties in the restricted sample based on distance to a large region.

Table 7: Appendix: Coefficient on the treatment indicator, under various definitions of "small" and "rural" used to form the treatment group

Price Regression

Population Centile \ Urban Population Centile	50	55	60	65	70	75	80
50	-116.570	-137.265	-129.518	-143.931	-149.524	-158.817	-153.704
	0.157	0.116	0.131	0.107	0.096	0.080	0.090
55	-143.501	-169.438	-158.633	-169.766	-176.453	-158.871	-177.701
	0.094	0.054	0.068	0.051	0.042	0.066	0.045
60	-153.601	-176.588	-173.147	-129.698	-157.656	-155.526	-162.508
	0.075	0.043	0.042	0.104	0.058	0.063	0.055
65	-187.742	-208.545	-200.575	-164.151	-158.690	-184.698	-183.940
	0.031	0.019	0.025	0.048	0.055	0.035	0.034
70	-219.823	-220.354	-226.361	-187.513	-173.835	-196.368	-181.424
	0.018	0.020	0.019	0.039	0.051	0.033	0.043
75	-207.979	-210.519	-219.694	-203.165	-193.200	-221.233	-206.742
	0.024	0.023	0.019	0.025	0.030	0.017	0.024
80	-207.697	-206.874	-219.127	-197.209	-215.602	-233.175	-219.506
	0.025	0.024	0.018	0.030	0.020	0.014	0.018

N. Insurers Regression

Population Centile \ Urban Population Centile	50	55	60	65	70	75	80
50	0.541	0.509	0.522	0.562	0.556	0.541	0.565
	0.003	0.004	0.004	0.003	0.003	0.002	0.001
55	0.613	0.642	0.634	0.616	0.625	0.621	0.629
	0.000	0.000	0.000	0.001	0.001	0.001	0.000
60	0.592	0.618	0.574	0.586	0.568	0.574	0.591
	0.000	0.000	0.000	0.001	0.001	0.001	0.000
65	0.633	0.692	0.657	0.567	0.630	0.664	0.678
	0.000	0.000	0.000	0.001	0.000	0.000	0.000
70	0.627	0.604	0.578	0.548	0.609	0.604	0.629
	0.001	0.003	0.003	0.004	0.001	0.002	0.001
75	0.614	0.581	0.571	0.525	0.577	0.563	0.583
	0.001	0.003	0.003	0.005	0.002	0.003	0.001
80	0.609	0.591	0.566	0.482	0.557	0.525	0.570
	0.001	0.002	0.003	0.008	0.003	0.004	0.002

Table 8: Appendix: County-level analysis under multiple distance threshold cutoffs

NUMBER OF INSURERS

MILES	100 miles	125 miles	150 miles	175 miles	200 miles
Grouped in large, urban region	0.944	0.758	0.752	0.652	0.608
	0.002	0.002	0.002	0.002	0.004
Median income (1000's)	0.031	0.027	0.020	0.010	0.012
	0.007	0.010	0.062	0.272	0.178
Share of 45-65 over 18-65	-5.524	-3.550	-1.547	-2.010	-1.787
	0.153	0.281	0.647	0.447	0.433
Proportion of employees in small establishments	0.089	0.079	0.065	0.045	0.031
	0.065	0.026	0.044	0.092	0.109
Medicare Advantage Penetration	0.149	-0.134	-0.282	0.342	0.491
	0.895	0.896	0.784	0.688	0.561
Proportion HH w/ inc 25k-100k	0.526	1.292	0.524	0.320	0.397
	0.797	0.457	0.751	0.811	0.763
N	96	121	146	171	186
R2	0.515	0.535	0.519	0.551	0.587

BENCHMARK PREMIUM

MILES	100 miles	125 miles	150 miles	175 miles	200 miles
Grouped in large, urban region	-241.523	-292.064	-226.451	-223.812	-279.779
	0.002	0.000	0.005	0.003	0.001
Deductible	0.155	0.194	0.098	0.042	0.070
	0.306	0.082	0.321	0.543	0.321
Median income (1000's)	-4.231	-5.462	-6.528	-4.586	-4.838
	0.209	0.116	0.054	0.123	0.100
Share of 45-65 over 18-65	-525.512	81.855	-153.681	-403.099	-681.108
	0.445	0.918	0.841	0.581	0.267
Proportion of employees in small establishments	-23.446	-22.342	-27.730	-17.237	-11.030
	0.097	0.064	0.019	0.128	0.206
Medicare Advantage Penetration	-314.066	135.910	-93.506	-395.544	-421.739
	0.351	0.686	0.792	0.159	0.138
Proportion HH w/ inc 25k-100k	-1471.876	-1683.768	-1508.798	-1535.761	-1536.730
	0.028	0.013	0.019	0.016	0.010
N	96	121	146	171	186
R2	0.919	0.912	0.899	0.886	0.878