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The Pricing Impact of Decreasing Competitiveness of the Health Insurance Market

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THE PRICING IMPACT OF DECREASING COMPETITIVENESS OF THE HEALTH INSURANCE MARKET
by
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Abstract

The Affordable Care Act created the national insurance exchanges of qualified health plans (QHP) to encourage a higher insured rate, larger risk pools, and lower prices for quality health coverage (Aaron et al., 2017). Consolidation of insurers can have opposing effects. The insurers' risk pools will grow, allowing insurers to better hedge for risk. However, consolidation decreases the prevalence of competition in the market, and past research shows that insurer consolidation decreases market competition and increases prices (Dafny, 2015).

This study examines how the number of plans offered and firms in a set market, plan pricing components, and country health variables impact monthly premium pricing for plans sold on the individual market. This study also analyzes how effective the exchanges are at keeping insurance prices low. Using an ordinary least squares regression technique, I model the premium prices of individual insurance plans sold on the QHP Landscape SHOP Medical Market through Healthcare.gov with controls for county health variables and other insurance plan pricing components. This method helps show the relationship between premium price and the number of plans sold from 2014 to 2017. The study's findings show that the top three influential variables on premium price are the presence of a maximum out of pocket, the rate of excess drinking, and the unemployment rate. I also conclude that more plans in a market are associated with lower premium prices.

1. Introduction

In 2017, approximately 35,000 of the United States citizens who sought individual health insurance from the Obamacare exchanges were uncertain if their counties would have a plan listed to purchase for 2018 (Park & Carlsen, 2017). There were 45 counties at risk of having zero plans listed on the exchange, making these counties potential "bare counties" (Park & Carlen, 2017). Furthermore, nearly three million people in 1,388 counties may have had only one insurer from which to choose from for 2018 as identified in Figure 1.1 below. Currently, about 45% of U.S. counties are at risk of being a bare county unless another insurance provider steps into those markets. This could greatly impact nearly twelve million Americans who buy their own coverage on the individual market. At the opposite end of the spectrum, 57% of individual market enrollees had a choice of three or more insurers in 2016, compared to the 22% with a choice between two and the 21% with only a single insurance carrier option (Frank & McGuire, 2017). The number of counties with only one insurer has doubled since 2014, and the number of counties with three or more insurers has significantly fallen.

Figure 1.1 Number of Insurers in Each U.S. County for the 2018 Enrollment Period, 2017

Note: Park & Carlsen, 2017. Originally from KFF, 2017. This map only includes plans on the the Obamacare marketplace.

Most individuals who buy from the ACA exchange receive the insurance subsidies meant to offset premium prices. Recent analysis shows that insurers are choosing to exit the ACA marketplace to sell exclusively in markets where customers are ineligible to use government subsidies (Abelson & Park, 2017). In February 2017, Humana announced it would pull out of the Obamacare markets (Luhby, 2017). Three months later, Blue Cross Blue Shield (BCBS) announced that it would enter the Knoxville, TN market that would have otherwise been left void of coverage since Humana had been the coverage region's sole insurance provider. The President and CEO of BlueCross BlueShield of Tennessee J.D. Hickey said that getting and keeping Tennesseans covered had been "challenging" with the three prior years seeing volatility and losses greater than $400 million (Trexler, 2017). Despite great losses in the overall Tennessee market, Hickey cited that their performance in 2017 was stabilizing, setting them up to enter Rating Area 2, the Knoxville market. In June 2017, Anthem announced that it would be pulling

from the Ohio market by 2018, leaving 18 counties "bare," or without an insurance provider (Abelson & Park, 2017).

Research has shown that markets with fewer insurers have seen larger increases in price (Holahan et al., 2017). However, this research does not address the price effects in markets with fewer plans. As of 2015, the private insurance premium for the average family was almost $17,000 with out-of-pocket spending reaching $800 per person (Dafny, 2015). Consolidation of insurers has also lent itself to a decrease in the number of insurers. Health insurers have been consolidating since the 1990s with over 400 mergers since 1996 (Frank & McGuire, 2017). Between 2011 and 2015, the amount of healthcare consolidation doubled (Barker 2017). Meanwhile, national healthcare expenditures have increased nearly 45% in the last thirty years (Barker 2017). Healthcare spending has grown to almost 20% of US GDP, currently double the Organization for Economic Co-operation and Development (OECD) per capita average (Einav & Levin, 2015). With significant price changes and decreases in the number of providers per county, this raises concern for the prices of the American consumer. The U.S. government tried to make the health insurance markets more competitive, but health insurance companies may have too much market power.

In the following paper, I review the policy background of the health insurance market in the United States. Then, I discuss the past literature about health insurance, competition, pricing, and the interaction of the three. I then explain my data sources and methods, followed by the empirics and visualization of my findings. This research addresses the impact that changes in the number of plans per county has on the price of insurance plans sold on the ACA Individual Marketplace. I explore the effect on monthly premium prices as the number of silver plans offered per county and the number of firms offering silver plans changes. I look specifically at silver plans because they are the most common plan metal level, for the age group 40-49 and for the family size of a couple with 2 children (KFF, 2016b). My research shows that in a model looking at the number of plans, as the number of plans increases, the premium price decreases. In a model looking at the number of firms, as the number of firms increases, the premium price decreases. Lastly, in a model looking at the number of plans and firms holding the number of plans constant, as the number of firms increases, the premium price increases.

2. Background

The longevity of the individual market is a critical policy issue. The United States is seeing a rise in the cost of healthcare, bringing into question the affordability of the health insurance system (Barket, 2017). The individual market is inherently a coverage tool for non-traditional or more vulnerable populations (Court, 2016). The complexity of the ACA and the uncertainty surrounding repeal-and-replace legislation have notable consequences for both insurance companies and payers into the individual market (Aaron, 2017). Despite this complexity and continued debate, the ACA did lead to a successful expansion of coverage (Court, 2016). However, this expansion did initially come at a cost to insurers, who faced increased regulation, unstable exchange participation, and original prices set too low to cover costs. Currently, the destabilization of ACA is causing more uncertainty while premium prices are still going up, making the success of the individual market in the long-term unclear.

The rise in healthcare expenditures in a consolidating marketplace has unveiled a key policy issue: whether or not health insurance markets have a sufficient number of plans and/or firms for competitive forces to work. It is the role of the Department of Justice and the Federal Trade Commission to determine the intensity of concentration when evaluating firm consolidation. National healthcare expenditures as a percentage of GDP have increased 44% since 1990, from 12.5% to 18%, although this growth has rendered off since 2010 (Barker, 2017). In the healthcare business model, consolidation has become a key factor. Since 2009, consolidation activity, such as mergers, acquisitions, joint ventures, and affiliation, has continued to increase, and fewer companies control more of the market share, as seen in Figure 2.1 below. Between 2011 and 2015, that activity doubled (Barker, 2017). There is great debate surrounding the impact of this activity on healthcare delivery and cost reduction, as mergers and acquisitions reduce competition.

Figure 2.1 Estimated National Market Shares of the Four Largest Insurers, 2006-2014

Note: Dafny, 2015. In eight years, the four-firm concentration ratio of private insurers rose percentage points. Between 2006 and 2014, the ratio increased from 74% to 84%. For comparison, this ratio for the airline industry in 62%.

The individual market is an integral component of healthcare markets, but it is also polarizing. Policymakers debate the functionality of the individual market due to the high administrative costs, ineffectual state regulations, and high degrees of market concentration (Abraham et al., 2014). The individual market is a place to buy health insurance for people who may be self-employed, lower-wage or part-time workers, early retirees, or people who simply lost coverage through life events like job loss or divorce (Court, 2016). Since the ACA, the individual market is built into regulated state insurance exchanges, which heavily rely on regulations to ensure that plans offer baseline benefits, consumers have the power to choose, and risk selection is limited (Einav & Levin, 2015).

Political actions have significant impacts on the functionality of the individual market. In May 2017, the House of Representatives passed the American Health Care Act, which repealed the

individual mandate retroactive to the 2016 plan year. The Congressional Budget Office estimated that many healthier enrollees would exit the market with no individual mandate, driving a 20% increase in market premiums for 2018 (Aaron, 2017). The individual mandate elimination could lead to a "death spiral" of rising premiums and an exodus of healthy, young payers from the market (Court, 2016). Additionally, discussion concerning cost-sharing reimbursement payments to insurers is still uncertain. The Kaiser Family Foundation estimated that without the reimbursements, the premiums for silver plans could increase as much as 19% on average (Aaron, 2017). National subsidization was a tool to encourage healthier, lower-risk, and lower-income individuals to enter the marketplace, and without their participation, the risk pool could become full of higher risk individuals paying even higher premiums.

The ACA created a system of subsidization to improve the affordability of health insurance and required people to pay for a health plan on their own or with subsidies or else pay a fee under the individual mandate. Despite its imperfections, the ACA's individual market successfully expanded coverage through reforms that banned insurers from denying coverage or price gouging due to preexisting conditions (Aaron, 2017). In 2013, the policy provisions led to an additional 6 million enrollments in the individual market, from 11 million in 2013 to 17 million in 2017. Between 2013 and 2014, the individual market enrollment size increased by nearly 50% (Court, 2016). Three out of five people who were able to access coverage through ACA policy reforms said that they would not have been able to afford or access health care before (Court, 2016). As of 2018, 11.8 million Americans enrolled in the exchanges, as compared to 12.2 million in 2017 (Cauchi, 2018).

However, health insurers began to announce losses, which they attributed to regulation and their exchange participation. Under the ACA's minimum medical loss ratio (MLR) regulation, insurers in the individual market are required to spend at least 80% of premium dollars on claims and payer care after taxes, licensing, and regulatory fees under the (Abraham et al., 2014). The Affordable Care Act introduced a new level of scrutiny to insurance rate hikes through Effective Rate Reviews (ERR), ensuring that large increases be analyzed to check that the increases are based on reasonable assumptions and evidence with the intention to provide payers with great value for their dollar (CMS). The Department of Health and Human Services assists states in reviewing plans with proposed increases greater than 10% in the individual market and conducts the review process or provides grants if the states lack the resources to conduct the review on their own. As seen in Table 2.1, the rate increases that are greater than 10% are numerous.

Table 2.1 Average Silver and Average Second Lowest Cost Silver Plan Premiums, 2017-2018

Note: Cauchi, 2018. Originally from Avalere Health, LLC, 2017. The states with an asterisk are instances where the second lowest cost silver plan is costlier than the average silver plan, stemming from the limited number of plans. Often the second lowest cost plan is also the highest cost in that region.

Insurer losses cannot be entirely attributed to one lone factor. Originally, the insurers selling on the exchanges set premiums too low to cover the claims of the new enrollees, which generated significant losses for the companies from 2014 through 2016. These losses led some insurers to exit the exchanges, which left 1 out of 5 enrollees with only one company offering coverage in their market. However, some of this exit is due to the natural adjustment patterns that new markets undergo, with poorly-performing sellers exiting the marketplace and successful sellers

expanding (Aaron, 2017). The insurance providers that remained on the exchanges in 2017 raised premiums 22% on average for the benchmark plan.

The destabilization that characterized ACA policies in 2017 occurred despite insurers doing better financially throughout the year. In July of that year, the Centers for Medicare and Medicaid Services announced that only 141 insurers applied to participate on the exchanges for 2018, which had fallen from 227 applicants the year prior (Cauchi, 2018). In August 2017, the HHS announced a 90% cut in health enrollment program funding, in addition to the cuts to navigator nonprofit organizations that help people enroll in the marketplaces (Cauchi, 2018). Leading up to the open enrollment period for 2018, the ACA faced shorter timeframes, federal budget cuts, and public confusion surrounding the repeal-and-replace debates (Cauchi, 2018).

3. Literature Review
The insurance market may be classified as a monopolistic competitive market. In this case, the suppliers (ie., insurers) differ primarily on location and the plan quality provided (Busso & Galiani, 2015). Firms with market power may use that position to maximize profits and may do so by reducing quality and/or raise prices (Tirole, 1988). In contrast, increased competition in a market puts downward pressure on price, incentivizing organizational efficiencies, or puts upward pressure on quality (Nickell, 1996). The first experiment on the effect of increased competition on prices and quality of goods showed that six months after randomly opening 61 retail firms into the Dominican Republic market, product prices in the treated areas had fallen by 6%, although quality did not (Busso & Galiani, 2015). In the insurance market, a comprehensive review shows that markets with more insurers have lower premiums (Frank & McGuire, 2017). This is informative in that it suggests that policymakers should pay attention to the supply conditions because the majority of policy targets the supply side. However, insurers may not end up with the right incentives to engage in competition as insurance markets tend to be highly concentrated and consumers must be informed and price-sensitive which is not observed in actuality (Einav & Levin, 2015). Therefore, it is highly important to carefully make market design decisions.

Recent studies have shown that there is much variation across geographic areas in the US when it comes to the number of insurers conducting business in a market, the number of offered plans, and the distribution of premium costs (Dickstein et al., 2015). One would expect larger market sizes in terms of quantity demanded to be associated with increases in the number of firms in those markets (Brenshan and Reiss, 1991). This could lead to a bundling of smaller markets with larger ones, which could improve the amount of choice and lower premiums. However, too large of coverage regions could create too heterogeneous of insurance pools, which may inefficiently mitigate risk (Dickstein et al., 2015). The findings show that after controlling for the county's population, the number of health insurers increases and premiums decreases when small counties are bundled with a more populous county, although the effect varies when grouped coverage areas are heterogeneous (Dickstein et al., 2015). When grouping counties together, adding a dissimilar county may force additional costs onto the rest of the counties in the region.

Research has documented that consolidation of private health insurers leads to premium increases (Dafny, 2015). This effect occurs despite the increased market share allowing the

insurers to get lower prices from health care providers, which decreases the insurer's marginal costs. Dafny noted that there is limited evidence on the impact of consolidation on quality. In a study on the price effects of the merger of UnitedHealth-Sierra Health Services in 2008, researchers found that premiums in the Nevada markets increased over 13% more than the control group post-merger, suggesting that UnitedHealth-Sierra took advantage of the increased market power (Guardado et al., 2013). Dafny categorizes this consolidation as attempts for regional insurers to broaden their service areas, for national insurers to broaden their geographic reach, for incumbents to acquire local HMOs and provider plans, and for Anthem to consolidate for-profit BlueCross BlueShield. This consolidation creates a monopsony effect in that the large insurers drive prices down from the providers. Additionally, mergers not only lead to premium increases for the merger parties but also for the rival insurers in areas where the merging firms significantly overlapped, so insurers did not pass cost savings to the consumers (Dafny, 2015). Growing concentration in the healthcare sector is symptomatic of the decreasing availability of community hospitals and the evolution of insurance products (Glied & Altman, 2017). To what extent consolidation in health plans benefits consumer has also been studied in depth. In the past, consolidation has not necessarily resulted in lower prices for consumers. According to Harry Kraemer, a clinical professor of strategy at Northwestern University's Kellogg School of Management, consolidation will benefit the consumer under two conditions: if the consolidation gets the benefits of efficiency and economies of scale and if it doesn't reduce competition to the point where the resulting company denies the customer receiving as good of a price as before the merger or acquisition (Barker, 2017).

Researchers have also documented the high degree of concentration that exists in the individual market (AMA, 2017), while also noting the connection to market power. The American Medical Association found that 69% of 389 metropolitan statistical areas (MSA) studied were highly concentrated. That same study found that in 43% of those MSAs, one insurer has 50% of the market share. Further research looked at the antitrust impact of the potential Aetna-Humana merger (AMA, 2016a). The results of that study showed that the merger would likely enhance their market power in Georgia and Kentucky's commercial combined markets and warrant scrutiny in Utah, Texas, Florida, and Kansas. The AMA also looked at the antitrust impact of the potential Anthem-Cigna merger and found that the merger would enhance their market power in 10 of the 14 states that Anthem is licensed to cover. In the other four states, their market share would warrant additional scrutiny (2016b). Concentration is slightly lower in urban markets, but that is relative because it is highly concentrated everywhere (Frakt, Pizer, & Feldman, 2012). Because there is less concentration at the national level, researchers suggest that fixed costs are at the regional level instead (Einav & Levin, 2015). However, exchanges reduce the fixed costs of marketing a carrier's products to consumers, thus reducing barriers to entry (Ginsburg, 2016). Because the exchanges make it simpler for consumers to gain the information needed to make decisions, they help make the individual market more competitive (Ginsburg, 2016).

The ACA exchanges rely on the participation of insurance carriers, with the intention of those carriers engaging in dynamic market competition (Cantor & Monheit, 2016) to lower premiums. Premium increases from consolidation generally have not been offset from new insurers entering the market. There are several barriers to entry that new firms face, which include, building provider networks, negotiating reimbursement rates, establishing a good reputation, meeting with

brokers, and achieving economies of scale (Dafny, 2015). An HHS analysis showed that an increase in the number of carriers offering coverage in a local rating area lowered premiums of the second-lowest cost silver plan by 4% in the first year of the exchanges (Frank & McGuire, 2017). An average of 4 insurance companies participated in each rating areas for the states using the federal insurance exchange, and researchers found that, had all the insurers who sold individual market insurance prior to the ACA participated in the marketplace, premiums would have been 11% lower (Dafny et al., 2014). In counties with three or more issuers in 2015, benchmark premiums were more than 9% lower than in counties with only one or two insurance carriers participating in the exchange (Sheingold et al., 2015). That same study found that counties with a net gain in insurers had an adjusted premium growth rate 8.4% lower than counties with no net growth or net losses.

The individual market encapsulates the negative relationship between MLRs and payer volume, in addition to the negative relationship between an insurer's MLR and its preexisting market power. In the individual market, insurers that have more payers in their other market segments have lower MLRs on average. Research shows that there is some evidence that these larger insurers with low MLRs may also have increased market power due to their size (Abraham et al., 2014). To explore how insurers responded to the MLR regulation, one study examined how insurers adjusted the component parts of the MLR calculation (Abraham et al., 2014). The 2014 study found that the 2011 administrative costs were lower than in 2010, which increased MLRs in the individual market. Although insurers can increase their MLR by reducing premiums, the researchers' could not provide evidence that insurers acted in this way (Abraham et al., 2014). Further analysis showed that MLR changes were caused by increases in medical claims, not through decreases in premiums. However, consumers shopping on the insurance exchanges do respond to premium differences (Frank & McGuire, 2017). In 2016, over 40% of renewing payers switched marketplace plans, and most of the switches occurred in the same metal tier. This suggests that marketplace consumers shop based on price, not coverage. Achieving and maintaining coverage in the individual market that is affordable and accessible without an individual mandate is a structural challenge, in that there is a constant threat of adverse risk selection (Cantor & Monheit, 2016). The individual market is often considered a "bridge" market, with a large portion of enrollees using the coverage for a short time period to fill coverage gaps caused by changes in jobs, marital status, early retirement, or aging off a parent's plan (Ziller et al., 2004). The limited demand for individual market plan raises concerns that the market may not be effective at pooling risk, although proponents argue that this market encourages competition and reduces job lock (Cantor & Monheit, 2016). The individual market by default is more likely to appeal to individuals with higher expected medical expenses.

The ACA banned denying coverage and price gouging for consumers with preexisting conditions which creates heterogeneous risk pools. Insurers are less able to set premiums that reflect a payer's true health risk, leading to people who are high risk paying the same premium as payers who are low risk (Cantor & Monheit, 2016). Without the ability to charge premiums based on health risk, payers make coverage choices that do not reflect their respective risk. When the risk pools are not separated, the pool is heterogeneous, and the premium for that pool will rise over time due to the high-risk payers making significantly more costly claims (Cantor & Monheit, 2016). This in effect leads to the exodus of low-risk enrollees to change plans or exit the market

altogether. Repeating cycles of premium increases and low-risk payer withdrawal may result in the adverse selection "death spiral" that is unsustainable in the long run if not regulated (Cantor & Monheit, 2016). The individual mandate addresses adverse selection or a disproportionate enrollment of poor health payers opting into a market with open enrollment and no exclusions. Without the individual mandate, adverse selection may lead to the "death spiral" of increasing premiums and impacting market stability but more drastically than previously expected (Eibner & Saltzman, 2015). The textbook solution to adverse selection is to charge high-risk payers higher premiums. However, this may be seen as immoral, and this is regressive since higher income is associated better health, so risk pricing may mean higher premiums for lower-income payers (Einav and Levin, 2015).

Insurers may not have the right incentives to engage in competition that is known to put downward pressure on price (Nickell, 1996). Additionally, there is some variation in geography for the number of insurers and plans in each market (Dickstein et al., 2015). Therefore, I build upon past research to look at how the variation in both the number of plans and firms affects the price of premiums, after accounting for other plan pricing factors in addition geographically-varied health and socioeconomic factors.

4. Data

The original data for this study comes from the healthcare.gov website, which compiles plan information from the QHP Landscape Individual Medical Market. This is panel data with the unit of analysis being the plan ID each year from 2014 to 2017. Therefore, for each plan ID and year combination, there is also information on the pricing and location of the plan. The data include all states that participate in the federal marketplace except for the state of Virginia, due to its structure of counties and independent cities. I collected the following variables from the data set for every plan ID categorized as a silver plan by state, county, rating area, and year: issuer, plan type, monthly premium for a couple aged 40-49 with two children, medical deductible, prescription deductible, maximum out-of-pocket for medical costs, standard costs associated with primary care physician visits, specialist visits, emergency room visits, generic prescriptions and preferred brand prescriptions. There are 111,932 plans in 1,574 counties in 408 rating areas throughout 35 states.

For all of the standard cost variables, I separated all the costs into copayment amounts and coinsurance percentages. Data that was presented as a decimal or with a percentage symbol was assumed to be a coinsurance rate. Data that was presented as a whole number with no symbol or with a dollar sign was assumed to be a copayment amount. In Table, 4.1 below, a summary shows that there were 111,932 plans in the data set, though many plans were counted twice if they spanned different counties.

Table 4.1 Summary Statistics of QHP Landscape Individual Medical Market Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	111,932	2015.4760	1.0406	2014	2017
FIPS Code	111,932	31759.770	14970.2100	1001	56045
Plan Type	111,932	2.8258	1.0940	1	4
Premium for a Couple with Two Children	111,932	1028.6030	235.2209	489	2844
Standard Medical Deductible for Family Coverage	111,932	4990.4400	3535.0970	0	13700
Standard Drug Deductible for Family Coverage	111,932	131.0800	466.6082	0	7000
Maximum Medical Out of Pocket	111,932	5808.4880	5936.5480	0	13200
Maximum Drug Out of Pocket	111,932	10.2133	175.6451	0	4800
Standard Coinsurance for Primary Care Physician	111,932	0.0567	0.1159	0	0.5
Standard Copayment for Primary Care Physician	111,932	21.9179	16.8300	0	125
Standard Coinsurance for Specialist	111,932	0.0686	0.1256	0	0.5
Standard Copayment for Specialist	111,932	37.6663	30.5313	0	180
Standard Copayment for ER	111,932	222.2335	213.7491	0	1000
Standard Coinsurance for ER	111,932	0.1376	0.1415	0	0.5
Copayment for Generic Drugs	111,932	9.0410	7.4101	0	40

Coinsurance for Generic Drugs	111,932	0.0356	0.1067	0	0.5
Coinsurance for Preferred Brand Drugs	111,932	0.0606	0.1341	0	0.5
Copayment for Preferred Brand Drugs	111,932	34.9329	22.3815	0	120
No Medical Maximum Out of Pocket	111,932	0.4986	0.5000	0	1

Note: No Medical Maximum Out of Pocket was coded as 1 if there was no maximum and 0 if there was a maximum.

Further building upon the original set of data, I include demographic, socioeconomic, and health variables to account for variability amongst the population of those purchasing silver plans from the ACA exchanges. The following control variables originated from County Health Rankings and Roadmaps, a program through the Robert Wood Johnson Foundation: poor or fair health, adult smoking percentage, adult obesity percentage, excess drinking percentage, the unemployment rate, and the violent crime rate. The control following variables originated from the National Center for Health Statistics: expected death from cancer and expected death from heart disease. I created the final two dependent variable, number of firms and number of plans per county using Stata command. The summary statistics for pricing, health, and socioeconomic variables are in Table 4.2 below.

Table 4.2 Summary Statistics of HealthCare.gov Data with Additional County-Level Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Year	1,574	2015.5290	1.120279	2014	2017
State & Rating Code	1,574	29239.5200	16238.6	1001	56003
Premium for a Couple with Two Children	1,574	1065.1010	233.4612	667.6839	2805
Standard Medical Deductible for Family Coverage	1,574	4827.2590	3355.609	0	11466.67
Standard Drug Deductible for Family Coverage	1,574	106.3178	209.4872	0	1892.308
Maximum Medical Out of Pocket	1,574	5383.7810	5738.32	0	13200

No Medical Maximum Out of Pocket	1,574	0.5348	0.4931459	0	1
Standard Coinsurance for Specialist	1,574	0.0603	0.055988	0	0.5
Standard Copay for Specialist	1,574	41.1119	16.68245	0	90.90909
Coinsurance for Preferred Brand Drugs	1,574	0.0522	0.0702993	0	0.5
Copay for Preferred Brand Drugs	1,574	37.5855	13.30909	0	75
Plan Type	1,574	2.4903	0.9987405	1	4
Poor or Fair Health Ranking	1,574	0.1708	0.045699	0.049636	0.358
Adult Smoking %	1,574	0.1913	0.0418934	0	0.336833
Adult Obesity %	1,574	0.3136	0.0405381	0.137	0.443
Excess Drinking %	1,574	0.1509	0.0477459	0	0.291667
Unemployment Rate	1,574	0.0703	0.021485	0.022	0.1855
Violent Crime Rate	1,574	333.8504	200.5911	33.832	1411.36
Expected Death from Cancer (4yr lag)	1,538	223.7848	40.22412	138.8	880.1
Expected Death from Heart Disease (4yr lag)	1,574	564.8825	426.5581	31	1569
Number of Plans per County	1,574	14.5910	9.684738	1	57.85965
Number of Firms per County	1,574	3.0392	1.693404	1	12

Note: For the purposes of summarization, the values in the table represent the average of all values within each county.

5. Methods

For this analysis, I run three ordinary least squares (OLS) models. I use OLS regressions because this method allows me to predict the values of the continuous dependent variable (premium) and

because OLS allows me to identify the strength of the relationship of the dependent and control variable with the premium price. I estimate the dependent variable, monthly premium for a couple aged 40 to 49 with two children, using components of the plan's pricing structure, the county health variables, and the socioeconomic county variables as controls. My three models vary the independent variable of interest. The first model includes the number of plans per county. The second model includes the number of firms per county. The third model includes the number of plans and firms per county. I run each regression clustering at the state rating area level and absorbing the categorical variable for each state's rating areas. Therefore, I am absorbing the fixed effects that stem from a large number of dummy variables in my dataset. Below are the three model specifications used for this study. For all three regressions, each β is for each plan ID i, plan type j, and year t.

Model 1: The Effect of the Number of Plans per County on Premium Price

$$couplechild2\_40_{ijt} = \beta_0 + \beta_1 \ meddeduct\_famstd_{ijt} + \beta_2 \ drugdeduct\_famstd_{ijt} + \beta_3 \ medpocket\_famstd_{ijt} + \beta_4 \ nomax_{ijt} + \beta_5 \ spec\_std\_coins_{ijt} + \beta_6 \ spec\_std\_copay_{ijt} + \beta_7 \ prefbranddrugs\_std\_coins_{ijt} + \beta_8 \ prefbranddrugs\_std\_copay_{ijt} + \beta_9 \ poor\_or\_fair\_health_{ijt} + \beta_{10} \ adult\_smoking_{ijt} + \beta_{11} \ adult\_obesity_{ijt} + \beta_{12} \ excess\_drinking_{ijt} + \beta_{13} \ unemp\_rate_{ijt} + \beta_{14} \ violent\_crime\_rate_{ijt} + \beta_{15} \ exp\_death\_cancer_{ijt} + \beta_{16} \ exp\_death\_heart_{ijt} + \beta_{17} \ numplan_{ijt} + \beta_{18} \ i.ntype_{it} + \beta_{19} \ i.year_{ij} + \varepsilon_{ijt}$$

Model 2: The Effect of the Number of Firms per County on Premium Price

$$couplechild2\_40_{ijt} = \beta_0 + \beta_1 \ meddeduct\_famstd_{ijt} + \beta_2 \ drugdeduct\_famstd_{ijt} + \beta_3 \ medpocket\_famstd_{ijt} + \beta_4 \ nomax_{ijt} + \beta_5 \ spec\_std\_coins_{ijt} + \beta_6 \ spec\_std\_copay_{ijt} + \beta_7 \ prefbranddrugs\_std\_coins_{ijt} + \beta_8 \ prefbranddrugs\_std\_copay_{ijt} + \beta_9 \ poor\_or\_fair\_health_{ijt} + \beta_{10} \ adult\_smoking_{ijt} + \beta_{11} \ adult\_obesity_{ijt} + \beta_{12} \ excess\_drinking_{ijt} + \beta_{13} \ unemp\_rate_{ijt} + \beta_{14} \ violent\_crime\_rate_{ijt} + \beta_{15} \ exp\_death\_cancer_{ijt} + \beta_{16} \ exp\_death\_heart_{ijt} + \beta_{17} \ numfirm_{ijt} + \beta_{18} \ i.ntype_{it} + \beta_{19} \ i.year_{ij} + \varepsilon_{ijt}$$

Model 3: The Effect of the Number of Plans and Firms per County on Premium Price

$$couplechild2\_40_{ijt} = \beta_0 + \beta_1 \ meddeduct\_famstd_{ijt} + \beta_2 \ drugdeduct\_famstd_{ijt} + \beta_3 \ medpocket\_famstd_{ijt} + \beta_4 \ nomax_{ijt} + \beta_5 \ spec\_std\_coins_{ijt} + \beta_6 \ spec\_std\_copay_{ijt} + \beta_7 \ prefbranddrugs\_std\_coins_{ijt} + \beta_8 \ prefbranddrugs\_std\_copay_{ijt} + \beta_9 \ poor\_or\_fair\_health_{ijt} + \beta_{10} \ adult\_smoking_{ijt} + \beta_{11} \ adult\_obesity_{ijt} + \beta_{12} \ excess\_drinking_{ijt} + \beta_{13} \ unemp\_rate_{ijt} + \beta_{14} \ violent\_crime\_rate_{ijt} + \beta_{15} \ exp\_death\_cancer_{ijt} + \beta_{16} \ exp\_death\_heart_{ijt} + \beta_{17} \ numplan_{ijt} + \beta_{18} \ numfirm_{ijt} + \beta_{19} \ i.ntype_{it} + \beta_{20} \ i.year_{ij} + \varepsilon_{ijt}$$

According to the literature, increased competition, which in my model is measured by the number of plans and firms, reduces prices (Frank & McGuire, 2017). Therefore, I expect to find that as the number of plans or the number of firms increases, the premium prices will fall.

6. Data Analysis & Visualization

After running the three models, I get the following listed in Table 6.1 below. Model 1 is the model that includes the controls and only the number of plans per county. Model 2 is the model that includes the controls and only the number of firms per county. Lastly, Model 3 is the model that includes the controls and both the number of plans and firms per county.

Table 6.1 Regression Output for the Three Premium Models

The first piece of this analysis is to observe the effects that deductibles and out-of-pocket maximums have on premium prices. In all three models, when the standard medical deductible for family coverage increases holding all else constant, the premium decreases. For example, according to Model 1, when the medical deductible increases by $100, the premium decreases by

$1.03, holding all other factors constant. This makes economic sense, given that consumers are responsible for a greater share of initial health costs, which saves the insurer money. Therefore, the consumer sees lower monthly premiums (LaMontagne, 2014). Next, in all three models, when the medical maximum out of pocket increases, we expect an increase in premiums holding all else equal. From Model 2, if the medical maximum out of pocket increased $1000 and all else stayed constant, we would expect premiums to increase $7.46. This may be contributable to adverse selection in that if consumers demanded a plan with a higher maximum out of pocket, then insurers may assume that the consumer expects to spend more money relative to the amount of the maximum out of pocket expense. For many health insurance plans, there is no maximum out of pocket. According to all three models, if there is no maximum out of pocket (nomax=1), then we expect premiums to be lower. According to Model 3, if there is no maximum out of pocket mechanism present, then premiums will be $95.39 lower, holding all else constant. This follows economic sense because if consumers have no out of pocket limit, then they will have to pay for a greater portion of total health expenses. Therefore, they pay lower premiums month to month because insurers expect higher payments toward the end of the coverage period.

The second piece of this analysis looks at what effect coinsurance rates and copayments have on monthly premiums. If the standard coinsurance for a visit with a specialist increases, holding all else equal, we expect premiums to decrease. More specifically, if the coinsurance rate increases ten percentage points, we would expect premiums to decline $5.63 cents each month holding all else equal, according to Model 1. If the standard copayment for a specialist increases, i.e., $10 a visit, then premiums will decrease over $3.00 a month holding all else equal, according to all three models. Coinsurance and copayments on preferred brand drugs follow this same pattern. This pattern makes economic sense in that, if the consumer is expected to pay a larger portion of each visit or each prescription, the insurance can charge a lower premium per month.

The third piece of this analysis explores how health and socioeconomic factors correlate with premiums. For all three models, in counties with higher rates of excess drinking, we expect premiums to be higher. More specifically, according to Model if the rate of drinking increases 10%, then we expect the premiums in that county to be $11.92 higher, all else held equal. This follows economic sense given the vast number of negative health risks excess drinking has on an individual and his or her community. The unemployment rate has a positive relationship with the premium price in all three models. According to the second model, if the unemployment rate increased 10%, then the premiums would increase $68.28 monthly, all else held equal. This follows the theory that unemployment would increase the uninsured rate or push people with no income towards the individual market. A higher uninsured rate in a community negatively affects those who are insured in that the cost burden of care for the uninsured falls on the insured through higher premiums (Stoll & Bailey, 2009). The violent crime rate has a negative relationship with premiums. This follows sound logic given that reduced violence also reduces the need for and the total cost of emergency care, which allows insurers to shave down the price of premiums. While the expected death rates from cancer and premiums have a negative relationship, the expected death rate from heart disease has a positive relationship. These relationships hold in each model. However, further investigation shows that there is a clear multicollinearity problem between these two variables. Going forward, only one of the two factors should be included.

The fourth part of the analysis looks at the plan types and years. Compared to Exclusive Provider Organizations (EPOs), Point of Service (POS) plans and Preferred Provider Organizations (PPOs) are significantly more expensive in terms of premiums. This price increase is over $84 more for a POS and over $103 for a PPO across all three statistical models. As PPOs and POSs have more flexibility than EPOs, higher premiums help pay for that freedom to see providers out of the insurance network. Compared to the year 2014, each consecutive year is associated with larger increases in premiums. This association deserves further examination since this could be an omitted variable bias issue. This may be due to rising inflation, increased total healthcare spending, or a policy instability issue that cause insurers to increase prices.

The final piece of the analysis looks at the two key variables of interest addressed in my research question. In Model 1 and 3, I find that holding all else equal, the creation of one plan in a county is associated with a $4.49 decrease and a $5.85 decrease in premiums respectively. In Model 2, I find that holding all else equal, the entrance of one firm into a market is associated with a $9.71 decrease in premium prices. These findings follow the economic thought that more competition puts downward pressure on price (Busso & Galiani, 2015). In Model 3, I find that holding all else equal, which includes holding the number of plans equal, the addition of one firm into the market is associated with an increase in the premium price of $12.10. Because the model holds the number of plans equal, adding another firm would divide up the risk pool among more firms, thus potentially decreasing each firm's ability to mitigate risk through the pooling mechanisms.

7. Conclusion, Policy Recommendations, & Future Research

The goal of this research was to examine how the number of firms and the number of plans offered in a county impact the premium price, after accounting for other components of a plan's price as well as health and socioeconomic factors of the county. This question is timely because of the decreasing longevity of the Obamacare exchanges (Aaron, 2017) and the amount of consolidation activity that may be affecting the competitiveness of the health insurance market (Frank & McGuire, 2017). My findings show that an increase in the number of silver plans offered on the exchanges for the 40 to 49-year-old couples with two children is associated with a decrease in premium prices, holding all other factors constant. My findings also show that an increase in the number of firms, holding all else but the number of plans equal, is associated with a decrease in premium price. However, when accounting for the number of plans as well, an increase in the number of firms leads to an increase in the premium price.

There are many implications of my findings. First of all, this shows that in the insurance markets that look like monopolistic competition, firms may be using market power to raise prices more often than they use economies of scale to pass cost-savings to consumers. To determine what level insurance markets are sustainable and fair, the analysis is two-fold based on the number of firms and the number of plans offered. Therefore, when thinking about how competitive a marketplace is, it may be just as important for academics and policymakers to consider the number of product or plan offerings in addition to the number of firms operating in a market. This research supports the findings of Nickell (1996), Dafny (2015), Sheingold et al. (2015), and Frank and McGuire (2017).

Potential policy recommendations reflect what I have found. First, when looking at a potential merger, the Antitrust Division of the Department of Justices should include the change in the number of products or plans into their decision-making process. Next, some markets may never attract enough insurers to encourage competition, so states should employ long-term active purchasing arrangements with insurers to help create a sense of stability in the market (Frank & McGuire, 2017)A similar option would be for Congress to authorize the federal government to contract with private insurers to serve as last resort options in rating areas that were without coverage (Aaron, 2017). Another policy recommendation would be to apply the carrier "play or pay" mandate used in New Jersey. This would require insurance providers to sell their portion of individual market policies or pay a fine that would help pay for the losses that other carriers incurred. A play-or-pay option would also help keep counties at risk of having no providers stay covered (Cantor & Monheit, 2016). The most expedient but also most unlikely recommendation would be for Congress and the President to gather funds to reimburse insurers on the individual market for cost-sharing reductions as owed and prevent further disruptive changes to ACA (Aaron, 2017).

Much more research is necessary on the competitiveness of the US insurance markets. Building off my research, one next step would be to broaden my analysis to insurance plans of different metal levels, age groups, and family sizes to see if the associations between the factors and the premium prices are similar. Another place for future research is to create an index similar to the Herfindahl-Hirschman Index (HHI) that incorporates the product offerings. One additional research path for the future is to model how prices would have changed had the New Jersey play-or-pay model had been implemented through ACA.

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<u>Appendices</u>

Appendix 1: Summary of Model

Appendix 2: Model 1 Stata Output

Appendix 3: Model 2 Stata Output

Appendix 4: Model 3 Stata Output