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Decision-Making Behavior for Health Insurance Firms in the Individual Insurance Market

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Abstract

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State-level exchanges created and regulated by the Affordable Care Act provide individual health insurance coverage for over ten million people in the United States. This population and their coverage are not well studied, especially given that they tend to fall between those covered by employer-based insurance and those covered under public insurance. As such, I investigate the motivating factors behind firm decision-making to exit the individual health insurance market. Using linear probability models, I determine the effects of three main independent variables including profit reported and experienced within the last year as well as the effect of competition on the dependent variable of a firm's exit from the state-level market from 2014 to 2019. I then introduce control variables at the firm level, including the share of plans at each rating level for the firm, total health care utilization for the firm's covered individuals, and total health care costs for the firm's covered individuals. Thirdly, I introduce state-level control variables including the socioeconomic status of people living in the state, the proportion of people individually insured in the state, and the partisan composition of the state. With all these controls, I find that neither profit nor competition are significant predictors of market exit given these control variables. In conclusion, these findings highlight the importance of risk adjustment and insurance firms being involved in multiple markets to ensure viability. This information can inform policy decisions and negotiations between hospitals, physicians, insurers, and consumers by providing a guide to the motivations of the firms as they offer insurance coverage to this under-supported population. They also provide a need for future study into the unique factors of the individual health insurance market and its population.

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Introduction

Between ten and twenty million people are enrolled in health insurance plans from the state-level individual insurance market exchanges every year. Their utilization of health care services while covered by these plans significantly affects the functioning of the national health insurance system as well as the general health of the United States population. As a result, understanding the factors that can influence these outcomes is critical to understanding how best to improve population health from an economic perspective. However, the individual insurance market has not been studied as extensively in health economics research as the employer-sponsored or public insurance markets (ex. Medicare, Medicaid, VA systems) have been.

The Affordable Care Act regulated these state-level exchanges for individual health insurance and provide restrictions on the ratings and requirements for different plans offered by insurance firms. Although this policy did increase coverage for previously uninsured populations (not covered by employer-based or public insurance), there are only an average of 4.3 firms in each state exchange with one firm on five states. Additionally, many firms choose to exit the market each year because of massive insurance losses not well studied, which is disruptive to the people and markets and potentially destabilizing the individual health insurance system. Federal subsidies and risk adjustments are offered to offset insurer losses in the market but are often determined too late for an insurance firm to decide whether to exit the market or not. As such, it is important to study the determinants of market exit as potential predictors of market stability and coverage for this critical insurance population.

By examining the factors that affect the types of plans that are offered each year, we can better predict and manage how insurance firms provide plans that are financially sustainable and practically efficient in terms of covering necessary health services. In the exchange market for individual health insurance in the United States, independent firms choose which plans to offer with specifically designated cost-sharing mechanisms, services covered, and promoted providers. Additionally, insurance firms may undertake certain actions to mitigate their risks within a certain market. Examples include offering lower coverage levels, increasing premiums and deductibles, or increasing cost sharing with the consumer. These decisions by the firm can affect multiple factors including the broader insurance market, health care market, labor market, and general population health.

To understand decision-making in the individual insurance market, we must analyze the impact of market competition, profit margins, and price setting on insurer exit in state-level exchanges across the United States. All health insurance markets (individual, employer-sponsored, public) work together in a complex network and have different supplier characteristics that affect how they make market decisions. Individual insurance market firms are flexible in that they can adjust cost-sharing, types of plans offered, and services offered within a given plan, which all immediately affect their profit even before they decide whether or not to exit the marketplace. In order to effectively comprehend decision-making in this market, this flexibility must be considered when calculating the relative impact of profit and competition. Additional external factors specific to the insured population (including general care utilization and costs), the socioeconomic landscape, and network of providers can also affect how firms make decisions. However, these multiple factors have not been integrated in

current research, so their relative impacts on firm decision-making have not been accurately established. The central question explored in this paper is to understand how insurance firms make the decision to exit an individual health insurance market exchange. In order to develop this analysis, I will be considering the factors that are most important in a firm's consideration process based on predictions from research on the individual and other health insurance markets.

Review of Literature

The first major area of research currently being conducted in this field explores how firm-level factors affect how insurers make market entry and exit decisions. Firm-level factors can affect how firms react to external changes in the market as well as their fundamental motivations for deciding to enter a market. Feldman et al. (1997) has investigated the effect of firm size on how firms interpret their profits and therefore make a decision to offer a certain health insurance plan in the post-ACA marketplace. The firms included in their analysis vary in size and geographic area covered, so they examined how the number of employees, size of profits, and categorical size of the company affected how they decided to offer specific plans. This research has investigated the role that firm size plays in the predicted elasticity of supply for health insurance. Even when considering all these differences, the researchers found that firms retain their flexibility in setting premiums to maximize their profits and market-level factors have a much more significant impact on a firm's decision-making. Reported differences suggest that small firms consider premiums and profit margins to be more important in market entry compared to larger insurance firms but is not significant enough when measured in the

three ways given. Essentially, firm size measured by any of these factors is not a relevant factor when considering their market entry and exit behavior because they all retain a similar flexibility in deciding their cost-sharing amounts. Therefore, since profit margins were found to be important to the firm regardless of size, firm size is not included in my analysis.

Another potentially important firm-level factor explored in recent research is the nonprofit status of the insurance firm. Dafny et al. (2012) explored the effect of for-profit status of a health insurance company on premiums. Their paper found that regardless of profit status, insurance companies tend to work in similar ways. Regardless of explicit profit-seeking motivations (from their nonprofit status), their analysis predicts that health insurance firm behavior is informed by profit margins. Based on the examples discussed above, firm characteristics may influence the mechanisms available for insurers to adjust their ability to offer certain plans within a market. Studying market exit can help us to understand the numerous other factors that affect how a firm functions while within the individual health insurance market. This analysis will allow me to identify what factors about health insurance firms uniquely affect their response to market changes differently than other insurance firms. As such, it is important to consider the differences between health and other types of insurance firms and how the inelasticity of demand for certain types of health care can affect how health insurance firms operate in a market and respond to market characteristics. Although individual firm-level characteristics like size and non-profit status have been investigated, there is not substantial evidence that they affect firm decision-making in the health insurance marketplace. As such, these firm-level characteristics will not be included in this paper.

The second major area of research centers around the importance of profit as firms decide whether to exit the health insurance market. An article by Kunreuther and Pauly (2005) explores how insurers model risk based on their population in order to achieve their objective of maximizing expected profits. Their model predicts that premium-setting is the major factor that firms can control (outside of external risk) in order to maximize their profits. Additionally, insurers could not identify who might be high or low risk after the pre-existing conditions clause of the ACA passed. However, adverse selection can be a special concern in the individual insurance market since most of the population is 18-65 years old and do not have employer-sponsored insurance but feel the need to purchase personal health insurance. Although these individual factors cannot be analyzed due to privacy concerns, this effect should remain fairly similar. To account for individual choice affecting demand for certain plans in the individual insurance market, this analysis will control for both health care utilization and costs within the state of the insurance market exchange. I will also consider the percentage of the state that has purchased individual health insurance to account for the responsibility that a firm may feel to cover the affected state population. By integrating these factors into the model, we can better predict how insurers interpret their profit and respond whether to exit the market or not.

Overall, firms have different ways of anticipating external risks such as population health. In a study by Abraham et al. (2017), researchers examined entry patterns of new insurers to the individual marketplace after the passage of the Affordable Care Act based on organizational, market, and policy-related factors. Their analysis suggests that insurance firms will initially adjust premiums, then coverage levels, and finally remove a plan from the market as enrollment and premium set prices remain at a high fixed ceiling over time. According to this

model, insurance firms have much more flexibility to adjust premium prices and therefore their enrollment numbers and total profits. Additionally, Gaynor et al. (2014) examine the organization of health care markets, specifically the process of determining premiums and cost-sharing as the primary sources of revenue for insurance firms. Gaynor et al. note that insurers compete on premiums as well as their provider network, which affects consumer willingness to purchase a certain plan. Although they look at the effect of long-term insurance contracts, these factors are less important in the individual insurance market where insurance plans are purchased from year to year even though individual consumers can still retain loyalty to certain plans. To supplement this research, the 2014 ASPE research brief on premiums, competition, and choice in the health insurance marketplace found that competition is associated with lower benchmark premiums and a wider range of plan choices (Burke et al., 2014). However, the report notes that customer loyalty to certain plans as well as the ratings of those plans can have a significant effect on consumers' decisions to stay with the plan and therefore its profitability for the insurer. As a result, plan type will be integrated into this paper's predictive model as a control variable to anticipate whether the insurers' share of different levels of plans will affect their expected profit and therefore decision to exit the marketplace. I will also control for individual's inertia to stay with the same plan over time by considering the type of plans offered by each firm as well as the utilization of care by each firm's insured population.

The third major area of research examines the effect of market competition on health insurance firm decision-making. A study by Gaynor and Town (2011) integrates a discussion of profit motivations and competition as it models insurer determination prices in the health insurance market based on competition. This paper explores all types of health insurance but

notes that the individual insurance marketplace lacks the selection of healthy workers (covered usually by employer-sponsored insurance) as well as low-income (Medicaid) or elderly people (Medicare). The vast majority of studies examining competition in health insurance markets do not examine the individual insurance market, even though a significant portion of people are individually insured across the United States. The essential model still predicts that higher competition will lead to decreased profits, therefore encouraging market exit until each market has reached a stable number of firms and plans in the exchange. For the purposes of this paper, the HHI will be used as the measure of competition (explained in more detail in the methodology) and calculated based on plan-level market shares for each firm and consolidated for the state exchange that each insurer participates in. I will be basing this analysis on Pauly's (2005) article on competition in health insurance markets as well, which is grounded in mathematical calculations of the competitive ideal. As a result, this paper will uniquely focus on the individual insurance market and allow a more developed understanding of how this market functions and how coverage and plan factors are determined and affect health care utilization.

Current studies that examine market share effects on premiums suggest that less competition leads to higher premiums, but this is to be considered at each level of insurance offered at the different plan levels. This analysis emphasizes the importance of controlling for plan types offered by the insurer as affecting their market decision-making behavior. Another study by Lissenden (2017) explores the effect of insurer entry on cost-sharing and premiums in marketplace plans. The results suggest that insurers in a less competitive market have higher bargaining power with health care providers, so can drive down their expenditures on health care within their network. As such, their profits can doubly increase both as having a larger

market share allows them to set higher prices for consumers and negotiate lower prices to pay for health services. Although this insurer-hospital bargaining will not be explicitly investigated in the scope of this paper, the number of services utilized and cost of those services will be used as a control variable when investigating the effect of competition in this analysis. Including these variables should provide some control these market power effects in the final analysis. As a special note, Bates et al. (2012) highlights the importance of competition on a firm's decision to enter or exit the market at a specific insurance level in an individual insurance exchange. This study explores the effect of market competition on the share of people that purchase individual health insurance, showing that higher competition in the previous year leads to a smaller percentage of people with individual insurance. As such, this control variable becomes endogenous with HHI as a measure of competition. This endogeneity will be explored further in the analysis and tested for impact in the post-ACA market in this paper.

Overview of Paper

The overall analysis will focus on firm exit from the state-level individual health insurance market exchange. This variable is binary but coded as an event history with the outcome of interest as firms exiting the market in a given year. Profit and competition are taken as the main independent variables but the analysis includes several different control variables as identified through the review of prior literature above. The main control variables at the firm level are the share of different plan types offered in the state (bronze, silver, gold, platinum, catastrophic) and utilization levels and cost of health care for each firm. At the state level, the main variables considered are the size of the individual insurance market (percentage of

individually insured people in the state), the socioeconomic status of the state (measured by percent of people living in poverty and annual average household income). Another control that will be included are any relevant political factors (operationalized by the partisan composition of the state legislature). The state legislature's partisan composition could affect how insurers function within the state especially if a state is consistently Democratic or Republican, either through policy on their allowed actions in the state marketplace or more informal considerations. Understanding partisan composition could also give an insight into the financial and ethical considerations of the people within the state based on their political views. A series of OLS regressions will be conducted by combining these different independent and control variables as potential explanations of the dependent exit variable. The specific models will be explained in the methodology section with additional analyses for issues of potential endogeneity.

Taken as a whole, this work could inform how we regulate the individual insurance market and affect how individual consumers work within the market. When firm-level factors are considered, we can analyze whether profit margins, market competition (at various market levels), or firm characteristics are major drivers of insurance market entry and exit. The following analysis will provide a sense of the weight that different firms take and potentially provide a measure of risk aversion that each firm has based on individual characteristics. These measures can inform policy decisions from a political standpoint as well as hospital reimbursement negotiations or consumer activity while purchasing plans within the market. Analyzing firm decision-making can also inform how policy can be created to ensure high-quality insurance plans are being offered and predict the likely actions that insurance firms will

take in case certain policies are enacted to mandate different insurance plan characteristics. As a result, this analysis will allow us to understand the broad factors that affect what types of plans are offered in the individual insurance market and how we can encourage insurance firms through policy to provide a variety of beneficial plans to people within the individual health insurance market.

This introduction serves as the background and context for the main research question within the larger field of economic research on health insurance market considerations. In the next section, I introduce the methodology developed to study firm factors and their decision-making strategies within the individual insurance marketplace as well as the sources and processing of data for the analyses. The various factors explained in the introduction will be integrated into different regressions and checks are conducted for robustness and potential endogeneity of included variables. I then move into a summary of results and finally a discussion of the potential implications of the results as well as future areas of study in this topic area.

Data and Variables

The primary source of data for tracking individual firms within state exchanges is Rate Filing (RF) data, published by the Centers for Medicare & Medicaid Services through Healthcare.gov after the Affordable Care Act passed in 2014. This source provides state-level data for each firm in the exchange including premium revenue, incurred and allowed insurance claims, and administrative costs. The information given for each year's RF data collection is for an experience period from two years before (ex. 2014 RF data provides information on statistics

from the firm's 2012 records). This data was used to track a firm's existence in the market and the firm's profits when in the market.

For the dependent variable of market exit, each firm was tracked over the time period covered in the RF data set. If a firm had no information listed for a given year (meaning that they were no longer required to report RF data), they must have exited the market at the end of the previous year. In this way, an event history was built for each firm with one of three options coded for each year. The firm was given a value of zero for a given year until it became a value of one in the year that it exited and given a missing value for any year after exiting. Any firms that reentered the market after exiting during the given time period were still considered missing after their first exit from the market. This event history was built for each firm (identified by an insurer ID given when it entered each state market at the start of the experience period).

The first main dependent variable used in this analysis was the annual profit of the insurance firm, essentially their revenues minus their costs. The major source of revenue for any insurance firm is the premium and their expenditures occur on claims and administrative expenses. Using the RF data, each firm's profit was calculated for the year and compiled to track over time from data reported 2014-2019 (experience period 2012-2017). For the purposes of this analysis, only incurred claims were used to calculate profit because they are the final cost of accepted claims to the insurance firm. Allowed claims reflect issuer liabilities and cost sharing amounts paid by the insured individual or covered by public supplemental funding. Therefore, the incurred claims are the technical cost to the insurer after the cost-sharing of the

individual is paid off, meaning that this value would contribute to their final calculated profit.

The basic calculation for the profit function (π) is given as:

$$\pi = \text{premium revenue} - \text{incurred claims} - \text{administrative costs} \quad (i)$$

The second main independent variable was market competition. To measure competition, enrollment data from 2014 to 2017 published by the Centers for Medicare & Medicaid Services was used. These data provide the number of enrollees for each individual insurance plan within a state market, which was then compiled to calculate market share and the Herfindahl-Hirschman Index as a measure of competitiveness for each state for each year.

The basic equation for HHI calculation is given as:

$$HHI = s_1^2 + s_2^2 + s_3^2 + \dots \quad (ii)$$

In this case, the market share (s) was calculated for each firm as the percentage of insured people for that firm of the total number of insured people in the state. These market shares were then squared and summed so the HHI could be calculated for each state. In interpretation, a higher HHI signifies that a smaller number of firms has a larger market share each, meaning that a value closer to 10,000 would be closer to a monopoly market. This HHI data was then matched using issuer IDs (linked to the parent insurance company) to the profit and market existence data from RF records for further data analysis.

The three firm-level control variables were also found in the RF data set. The first was the share of different plan levels for each insurance firm. The RF data set also provides plan level information, including plan ranking (bronze, silver, gold, platinum, catastrophic, not applicable). The percentage of each type of plan offered by each firm was calculated for each of the six categories and made into dummy variables that were included as control variables. The

second variable from the RF data set was health care utilization, measured in three categories of inpatient services, outpatient services, and other medical services that was provided for each firm in a given state. These were listed as three different variables and combined in the regression to create the utilization control. The third variable gathered from the RF data set was health care costs, also combining the three categories of inpatient costs, outpatient costs, and other medical costs to form the cost control.

The state-level control variables were gathered from two different data sets. The first data set is yearly partisan composition data given for each state published by the National Conference of State Legislatures. This variable was coded as either majority Democratic, majority Republican, or divided and considered as a control. Finally, data for the control variable of percentage of people covered by individual health insurance as well as the control variable for socioeconomic status (measures for average household income and percentage of people living below the poverty line) in each state was found from survey results published by the United States Census Bureau from the Current Population Survey Annual Social and Economic Supplement for 2014-2017.

Methodology

This paper primarily considers the role of firm profit and market-level competition as predictors of market exit for insurance firms within state-level individual insurance market exchanges. All models are linear probability models, regressed using Stata with robust standard errors to account for heteroskedasticity. Additionally, all models include controls for years (2014-2019) as well dummies for states that are not listed in the regression models.

Section I: Basic Linear Probability Models

Section I of the data analysis outlines the basic models using profit and competition as the independent variables predicting market exit.

For the purposes of this analysis, two different iterations were considered to measure the impact of profits in a firm's decision to exit the marketplace. The first empirical model for profit's role in determining market exit is estimated as:

$$X_t = \beta_0 + \beta_1(\pi_{(t-1)}) \quad (1.1)$$

Market exit (X_t) for a given time period is predicted as a function of profit from two different times that firms could justifiably use to make market decisions. The first profit time period used was the profit reported from the year before, since this would determine if the firm would exit in the next year. Although this profit measure would be completely accurate for the year, the profit reported at this time would be based on an experience period two years prior in the RF data so may not be the best predictor of market exit decisions since the firm could privately have more recent information on profit.

In order to account for firms having more private knowledge than released as part of the RF data set, the second profit measure that is used is the profit experienced in the year prior to market exit. The model is given as:

$$X_t = \beta_0 + \beta_1(\pi_{t+1}) \quad (1.2)$$

Although the firm would not have their exact profit for the year by the time they must decide whether or not to offer a plan the next year, they would reasonably have enough information from the first 6-9 months of the year to predict if their profit is enough to sustain

another year in the market. Since this second measure is not available directly in the RF data but rather only to the firm, the RF data from two years forward is used to find as an estimate of what the firm might have calculated as their previous year experience period before exiting the market. For this reason, I consider every model with both the previous year reported profit and previous year experienced profit as potential predictors of market exit.

As described in the previous section, the HHI for each state was calculated and matched to the insurers within that state. Based on this, an empirical model was created to examine the effect of competition on firm's market behavior as follows:

$$X_t = \beta_0 + \beta_1(HHI_{t-1}) \quad (1.3)$$

In this case, market exit for the year is given as a function of the market competitiveness (measured by HHI). The time for this HHI was selected as the year prior to the firm's decision to leave since firms have this most recent information on their market competitiveness and is the best predictor of competitiveness for the following year.

The fourth and fifth models combine the two measures of profit with the competition measure into a complete basic model. The fourth model identifies the relative effects of the previous year reported profits compared to the previous experienced competition on market exit decisions and is given as:

$$X_t = \beta_0 + \beta_1(\pi_{(t-1)}) + \beta_2(HHI_{(t-1)}) \quad (1.4)$$

The fifth model identifies the relative effects of the previous year experienced profits compared to the previous experienced competition on market exit decisions and is given as:

$$X_t = \beta_0 + \beta_1(\pi_{t+1}) + \beta_2(HHI_{(t-1)}) \quad (1.5)$$

There is a potential issue of endogeneity in including profit and competition in the same model. A firm in a less competitive market (higher HHI measure) would likely earn higher profits compared to a firm in a more competitive market, purely because of the number of people that are insured by the single firm. As such, predicted endogeneity would suggest a positive correlation between the two variables. A robustness check is performed here in the analysis to ensure that neither measures of profit are endogenously related to the competition measure used to predict market exit in the total models.

Section II: Firm-Level Control Variables

Section II of the data analysis introduces firm-level characteristics as control variables added to the two basic profit and competition models (Model 4 and Model 5). All the models below are repeated for both measures of profit (previous-year experienced and reported) along with competition as the two explanatory variables.

The first model in this section introduces the control variable of a firm's share of each plan type with six percentage variables for each category (bronze, silver, gold, platinum, catastrophic, and not applicable). As noted in the review of literature, introducing this control variable allows us to control for the flexibility of firms to adjust plan categories from year to year, especially as a measure of the quality and coverage levels of the plan. This model is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + P_b + P_s + P_g + P_p + P_c \quad (II.1)$$

The different plan shares included are for the different plan types with the first letter of the plan type given as the subscript of the control variable. Since the total percentage of plan

shares sums to 100, the plans designated as not applicable were removed to allow for a robust analysis using the control variable.

The second firm-level control variable is the health care utilization by people insured with the firm in a given year. This model is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + inpt + outpt + othermed \quad (II.2)$$

This utilization is explained by three control variables with *inpt* as the inpatient utilization, *outpt* as outpatient utilization, and *othermed* as utilization of any other health care services including pharmaceutical or clinical treatments.

The third firm-level control variable is the health care costs incurred to the firm by people insured in a given year. This model is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + inptcost + outptcost + othermedcost \quad (II.3)$$

These incurred costs is explained by three control variables with *inptcost* as costs for inpatient care, *outptcost* as costs for outpatient care, and *othermedcost* as costs for any other health care services including pharmaceutical or clinical expenses.

This section also combines the two firm-level health care-based factors, utilization and costs into a fourth model:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + inpt + outpt + othermed + inptcost + outptcost + othermedcost \quad (II.4)$$

Since an increase in utilization of health care services should lead to an increase in health care costs, these two variables could potentially be endogenous. As such, these two variables were tested for positive correlation as a check for robustness of the model in the final analysis.

Finally, all firm-level factors are integrated into the fifth model given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + P_b + P_s + P_g + P_p + P_c + inpt + outpt + othermed + inptcost + outptcost + othermedcost \quad (II.5)$$

Section III: State-Level Control Variables

The third section of analysis introduces the three state-level control factors identified through the review of literature. All the models below are repeated for both measures of profit (previous-year experienced and reported) along with competition as the two explanatory variables.

The first state-level factor is the partisan composition of the state legislature, since this could affect how the firm is allowed to function and also provide some information on the economic thought process of the state's insured individuals. This model is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + pol \quad (III.1)$$

In this case, the pol variable is expanded into four dummy variables for states identifying as majority Democratic, majority Republic, undecided majority, and majority not listed. Three of the variables were included in the regression for robustness.

The second state-level factor is the percent of people in the state with individual insurance, since this can affect the firm's responsibility or representation in the state market exchange. This model is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + ins \quad (III.2)$$

The third state-level factor is the socioeconomic status of people within the state measured by two different variables. The first of these two models is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + pov \quad (III.3)$$

To operationalize socioeconomic status, *pov* is a variable measuring the percentage of the state living below the national poverty line.

The second model for socioeconomic status is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + hhinc \quad (III.4)$$

To operationalize socioeconomic status in this case, *hhinc* is a variable listing the average household income for the state in a given year.

Both the socioeconomic status measures could be combined into another model. However, since a higher percentage of people living in poverty could be linked to a lower average household income, a robustness check was conducted to identify any potential correlation between the two control variables. Since potential endogeneity was established with a strongly negative correlation between the two variable values, this model was not included in the final analysis.

Instead, two separate models are given combining the different state-level control variables. The first complete model combines the partisan composition and poverty socioeconomic status controls and is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + pol + ins + pov \quad (III.5)$$

The second complete model combines the partisan composition and household income socioeconomic status controls and is given as:

$$X_t = \beta_0 + \beta_1(\pi) + \beta_2(HHI_{(t-1)}) + pol + ins + hhinc \quad (III.6)$$

Section IV: Aggregate Regression Analysis

The fourth section aggregates all the control variables into a single model, with two models for each of the two profit measures. The first model is based on previous year reported profit and is given as:

$$X_t = \beta_0 + \beta_1(\pi_{(t-1)}) + \beta_2(HHI_{(t-1)}) + P_b + P_s + P_g + P_p + P_c + inpt + outpt + othermed + inptcost + outptcost + othermedcost + pol + ins + pov \quad (IV.1)$$

The fifth model identifies the relative effects of the previous year experienced profits compared to the previous experienced competition on market exit decisions and is given as:

$$X_t = \beta_0 + \beta_1(\pi_{t+1}) + \beta_2(HHI_{(t-1)}) + P_b + P_s + P_g + P_p + P_c + inpt + outpt + othermed + inptcost + outptcost + othermedcost + pol + ins + pov \quad (IV.2)$$

Results

Section I: Basic Linear Probability Models

The first section of analysis provides regression models for exit based on different combinations of profit and competition as the independent variables. The first type of profit is that reported in the previous year (based on a two-year prior experience period) while the second type of profit is that experienced in the previous year (reported one year after market exit). When isolated in the models with only year and state controls, neither of these two measures of profit were significant in predicting market exit for the firms in the 2014-2019 time period.

Competition was also isolated with the state and year controls and was found to be a statistically significant predictor of market exit in the time period at an alpha value of 1%. The

positive calculated coefficient of 0.0000213 suggests that a higher level of competition will lead to increased market exit.

As discussed in the methodology, the correlation between both measures of profit and competition were tested to ensure that they were not endogenously related as a robustness check. The correlation coefficient on both was negative but below 0.05 for both so an insignificant enough relationship to rule out endogeneity. Since this endogeneity was not a significant factor, the two measures of profit were regressed with the competition measure into two full basic models. Even when combined, the profit variable was not a significant regressor although competition was significant at an alpha value of 5% when regressed in the model with the profit experienced in the year prior to market exit.

Section II: Firm-Level Control Models

In the second set of models, the firm-level controls of plan type share, health care service utilization, and health care costs are integrated into the basic model including both previous year reported profit and competition. The first iteration only uses the share of each plan type for the firm as a control variable along with year and state. In this model, reported profit had a negative coefficient predicting market exit but statistically insignificant. Competition had a positive but statistically insignificant coefficient as well. Each of the plan types had insignificant coefficients as well.

The second iteration only examined health care utilization as control variables. In this case, both profit and competition had insignificant coefficients as predictors of market exit. Inpatient service utilization was the only utilization control that was statistically significant at an

alpha value of 5% and was negatively correlated with market exit, meaning that higher care utilization was correlated with not exiting the marketplace.

The third iteration only examined health care costs as control variables. In this case, both profit and competition had insignificant coefficients as predictors of market exit. None of the control variables had statistically significant coefficients so this model did not effectively predict market exit.

As described in the methodology section, the different service types could be endogenously related to the health care costs in those areas. However, a correlation was calculated for robustness which showed that all three service utilization amounts were not significantly correlated with the service costs calculated for that year. As a result, the fourth iteration combined health care utilization and costs as control variables into a single model. Even with these controls, reported profit and competition were not statistically significant predictors of market exit at all.

In the final iteration for the reported profit subsection, all three control variables were combined into a single model. However, the coefficients for reported profit and competition were still statistically insignificant as well as the individual control variables.

The same models were used for the second subsection but replacing reported profit with experienced profit from the previous year. In all the five iterations of the model used experienced profit, both the profit and competition measures were found to be statistically insignificant predictors of market exit.

Section III: State-Level Control Models

In this third set of models, the state-level control variables are introduced including state legislature political majority, percentage of people covered by individual insurance in the state, and measures of socioeconomic well-being including percentage of the state living in poverty and average household income. The main variables of profit and competition are retained along with the year and state controls, with two repetitions of each model for the two different profit measures.

The first model includes reported profit, competition, and the political landscape variable measured by dummy variables for each option of partisan majority. The second model isolates the effect of the state's individually insured percentage, and the third and fourth models isolate the poverty and household income measures as control variables. In all three models, competition was found to have a statistically significant positive coefficient at an alpha level of 5% when predicting market exit, while the reported profit's coefficient was statistically insignificant.

Since both poverty and household income were taken as measures of socioeconomic status, the two variables were tested for potential endogeneity in a robustness check as outlined in the methodology. There was a significant negative correlation, meaning that a higher percentage of people in the state living in poverty was correlated with a lower average household income. To prevent this endogeneity from interfering with the final model, two separate composite models were built for the state-level controls combining the three different control variables but with one iteration using poverty as the measure of socioeconomic status and the second iteration using household income as the measure of socioeconomic status. In both iterations, competition was still found to be statistically significant at an alpha value of 5%

but profit reported in the previous year remained an insignificant predictor of exit from the marketplace.

The same six models were used for the second subsection but replacing reported profit with experienced profit from the previous year. In all repetitions of the model using previous year experienced profit, both the profit and competition measures were found to be statistically insignificant predictors of market exit at the same 5% alpha level.

Section IV: Aggregate Linear Probability Model Analysis

Two models were created in the aggregate analysis. The first model used the profit measure reported in the year prior to market exit while the second model used the profit measure experienced in the year prior to market exit. The only variables with potential endogeneity were the two measures used for socioeconomic status that were separated into the two composite models in the third analysis section. The household income was better supported as explained in the review of literature to be predictor of socioeconomic status, so only this variable was used in both models. Overall, every control variable was integrated into these two models. The regressions showed no significant coefficient for either measures of profit or competition as predictors of market exit when all control variables (year, state, firm-level, and state-level) were included in the regression analysis.

Discussion

The first section of basic models only includes the control variables for year and state in which the insurance market exchange takes place. In the composite models from this section,

competition was found to be a significant predictor for market exit in the following year. Essentially, a more competitive market encouraged market exit when not accounting for additional control variables that could affect this relationship.

The second section integrating firm-level controls into the models showed that these firm factors mediated the role of competition since neither measure of profit nor competition was a significant predictor of market exit in the final model. In these regressions, plan type share, health care utilization, and health care costs minimized the effect of competition on market exit in their individual models. As such, these three firm-level factors should be considered as important predictors of how firms interpret competition. A firm with a more equal share of each plan type is less likely to exit the market in the face of high competition. This result could be explained by the fact that a firm with a more diverse portfolio of insurance plan options has increased flexibility in plan structure and type so they would not have to exit the market immediately. Additionally, a firm with higher utilization of health care services and expenditures on these services in the inpatient, outpatient, and other medical categories is also less responsive to competition when making market decisions. A potential interpretation of this observation is that insurers who have higher utilization and costs on health care services are responsible for the health of a larger population or of a less healthy population. Therefore, they may be reluctant to exit the market since they have enough of a population base to sustain their operations even if competition is high. This result could lead to further studies about the issue of adverse selection in the individually insured population. These studies could determine whether the population is less healthy or potentially even overusing health care services, which

could then be relayed back to health care providers and insurance companies to ensure more efficient usage of health care services and reduced unnecessary expenditures.

The third section introduced the three state-level controls including political views, individual insurance coverage, and socioeconomic status within each state for the exchanges. Within each of these models, higher competition was found to a significant predictor of market exit when the reported profit from the previous year was used but not when actual profit was used. This effect can potentially be explained by considering that firms in the state exchange have information on their competitors' profits from the experience period (reported but not experienced profit). As such, they may make decisions at the state level of whether to exit the marketplace or not based on whether they have enough profits to sustain another year given the expected changes in the competitiveness of the market in the following year (assuming that firms with extremely low or negative profits may choose to exit the market). This section relies on state-level controls for the regressions, which is where firms make their market decisions. With this information, competition may only be important in firm decision-making if they have information on other firms' profits and can decide their relative ability to sustain themselves in the marketplace.

After investigating each of the control variables separately, all controls were combined to form the aggregate regression analysis. Based on the results of these regressions, both measures of profit and the measure of competition were found to be insignificant predictors of firm decisions to exit the individual health insurance marketplace. Excluding potentially endogenous variables, the controls were framed to provide estimates of the effects of price and competition on market exit decisions. Although previous literature suggests that these two

factors provide information on the market decision-making abilities of the firms, the different iterations and models suggest that these two variables are not enough to explain how firms make decisions for the individual health insurance marketplace.

Conclusion

In this paper, I aimed to understand the factors that affected how insurance firms decided to exit the individual health insurance state marketplaces. The main two variables considered throughout the analysis were profit (reported and experienced in the year prior to exit) as well as competition experienced in the previous year. Several firm-level and state-level control variables were built slowly into the basic models, culminating in an aggregate model with all potential confounding and control variables at the different levels of firm decision-making. The results established in this paper are significantly different compared to those found for other markets, especially those for health insurance, in the literature review. The differences can be explained by a number of factors including those explained in the individual interpretation of each set of models in the previous section

In general, the individual health insurance market is much more flexible than the employer-sponsored or federal insurance marketplaces because people are not tied to a specific employer's plan offerings or federally-funded plan suggestions. This detail offers people more options in choosing and moving between plans. A potential future investigation can be conducted to examine the inertia of individual insurance consumers compared to consumers in other health insurance marketplaces where their ties to employers or government plans may increase the consumer's inertia to stay with a certain health insurance plan. If people are less

inclined to stay with a plan, the firm may have to adjust offering within the plan (such as coverage or network shares) that affect their profits or competition without affecting market exit decisions. One significant note for this analysis is also that firm profits were only calculated from the individual insurance marketplace, but most of these firms also work in the small group, employer-based, and federal supplemental insurance market exchanges. As such, their profits and competition in these other markets can affect their decision-making in this marketplace but are unobservable if considering only individual health insurance marketplace factors.

Another important difference for the individual health insurance market compared to those explored in current literature could be in the demographic and health-based population-level factors. These variables were not included in this analysis but may lead to different health coverage and network needs for the individually insured population which lead to firms differently interpreting their profit and competitiveness in the market. A future study could explore such demographic differences and the role they play in health service needs for the individually insured population, as well as the implications for insurance firms functioning within the marketplace.

Overall, the Affordable Care Act allowed us to obtain information on health insurance firm profit measures as well as utilization and expenditure on health care services. This data is incredibly valuable and can be used to better understand how these individual marketplaces function, as well as what factors firms consider to be important. In the end, the role of health insurance is to provide coverage for medical and health-related needs for the population they serve. Since the individual insurance marketplace serves such a large percentage of the United

States population, these firms are partially responsible for the health and well-being of their customers. Information on how different factors affect these firms' interactions with consumers is critical to improve health of the eligible population and decrease costs in the overall health care system.

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Appendix of Tables

Table 1: Basic LPM Models

	(1)	(2)	(3)	(4)	(5)
	exit	exit	exit	exit	exit
Reported profit	-0.0000171 (-1.24)			0.00000414 (0.24)	
Experienced profit		0.00000868 (0.06)			-0.000181 (-0.79)
HHI (competition)			0.0000213** (2.60)	-0.00000120 (-0.60)	0.0000320* (2.22)
<i>N</i>	2060	2219	2691	1793	1553

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2a: Firm-Level Controls with Previous Year Reported Profit

	(1) exit	(2) exit	(3) exit	(4) exit	(5)
Reported Profit	-0.0000341 (-0.97)	0.00000188 (0.08)	0.00000326 (0.13)	0.00000213 (0.08)	4.49e-08 (0.00)
HHI (competition)	0.00000216 (0.45)	0.00000156 (0.34)	0.000000976 (0.22)	0.000000974 (0.22)	0.00000122 (0.27)
Bronze Plan Share	-0.0438 (-0.97)				0.00877 (0.30)
Silver Plan Share	0.0241 (0.57)				0.00826 (0.24)
Gold Plan Share	0.0233 (0.50)				0.0112 (0.33)
Platinum Plan Share	0.183 (1.69)				0.107 (1.90)
Catastrophic Plan Share	0.0208 (0.40)				0.00977 (0.22)
Inpatient services		-0.00000112* (-2.11)		-0.000000502 (-1.23)	-0.000000379 (-0.90)
Outpatient services		5.30e-08 (0.56)		6.95e-08 (0.77)	6.15e-08 (0.61)
Other services		-2.24e-08 (-0.11)		-3.69e-08 (-0.18)	2.90e-08 (0.14)
Inpatient Cost			0.000000360 (1.66)	0.000000349 (1.62)	0.000000324 (1.63)
Outpatient Cost			0.00000474 (1.55)	0.00000472 (1.55)	0.00000443 (1.46)
Other Costs			0.00000102 (0.41)	0.000000943 (0.38)	0.000000191 (0.08)
<i>N</i>	1264	1254	1254	1254	1254

Table 2b: Firm-Level Controls with Previous Year Experienced Profit

	(1)	(2)	(3)	(4)	(5)
	exit	exit	exit	exit	exit
Experienced Profit	-0.00000302 (-0.25)	-0.000000621 (-0.06)	-0.00000129 (-0.10)	-0.00000111 (-0.09)	-0.00000136 (0.11)
HHI (competition)	0.00000130 (0.66)	0.00000145 (0.74)	0.00000116 (0.61)	0.00000115 (0.60)	0.00000129 (0.67)
Bronze Plan Share	-0.0331 (-1.75)				-0.0213 (-1.14)
Silver Plan Share	-0.0262 (-1.40)				-0.0148 (-0.79)
Gold Plan Share	-0.0194 (-1.26)				-0.0156 (-0.99)
Platinum Plan Share	0.0546 (1.62)				0.0531 (1.67)
Catastrophic Plan Share	-0.0178 (-1.02)				-0.0173 (-0.90)
Inpatient services		-0.000000675 (-1.96)		-4.90e-08 (-0.18)	1.33e-08 (0.05)
Outpatient services		-5.87e-09 (-0.06)		1.99e-08 (0.24)	4.80e-08 (0.56)
Other services		-2.80e-08 (-0.13)		-0.000000104 (-0.47)	-7.94e-08 (-0.36)
Inpatient Cost			0.000000232 (1.06)	0.000000229 (1.04)	0.000000224 (1.08)
Outpatient Cost			0.00000751 (1.67)	0.00000752 (1.66)	0.00000734 (1.60)
Other Costs			-0.00000143 (-0.60)	-0.00000146 (-0.61)	-0.00000172 (-0.72)
<i>N</i>	1521	1517	1517	1517	1517

Table 4: Aggregate LPM Analysis

	(1)	(2)
	exit	exit
Experienced Profit	0.00000369 (0.30)	
Reported Profit		-0.00000857 (-0.32)
HHI (Competition)	0.00000140 (0.69)	0.000000911 (0.20)
Bronze Plan Share	-0.0342 (-1.61)	-0.00398 (-0.15)
Silver Plan Share	-0.0278 (-1.31)	-0.00473 (-0.15)
Gold Plan Share	-0.0276 (-1.46)	-0.00104 (-0.03)
Platinum Plan Share	0.0396 (1.41)	0.0948 (1.75)
Catastrophic Plan Share	-0.0305 (-1.31)	-0.00438 (-0.11)
Inpatient services	9.88e-08 (0.34)	-0.000000364 (-0.82)
Outpatient services	-2.97e-08 (-0.34)	-8.03e-09 (-0.08)
Other services	-3.41e-08 (-0.15)	0.000000133 (0.64)
Inpatient Cost	0.000000218 (1.03)	0.000000330 (1.65)
Outpatient Cost	0.00000769 (1.64)	0.00000461 (1.48)
Other Costs	-0.00000210 (-0.86)	-6.07e-08 (-0.02)
Democratic	0.106 (1.11)	0.109 (0.92)
Republican	0.0926 (0.99)	0.0896 (0.76)
Undecided	0.0964 (1.02)	0.102 (0.85)
Individually Insured	0.00497 (1.37)	0.000318 (0.08)
Household Income	0.00000336 (1.73)	0.00000490 (1.62)
<i>N</i>	1504	1244

Table 5: Correlation Coefficients (robustness checks for endogeneity)

(N=1571)	Reported Profit	HHI (Competition)
Reported Profit	1.0000	
HHI (Competition)	-0.0350	1.0000
(N=1814)	Experienced Profit	HHI (Competition)
Experienced Profit	1.0000	
HHI (Competition)	-0.0250	1.0000
(N=2540)	Inpatient Service	Inpatient Cost
Inpatient Service	1.0000	
Inpatient Cost	-0.1430	1.0000
(N=2540)	Outpatient Service	Outpatient Cost
Outpatient Service	1.0000	
Outpatient Cost	-0.0939	1.0000
(N=2540)	Other Services	Other Costs
Other Services	1.0000	
Other Costs	-0.0389	1.0000
(N=2900)	Poverty Rate	Household Income
Poverty Rate	1.0000	
Household Income	-0.8218	1.0000