



Essays in Managed Competition in the Affordable Care Act's Marketplaces

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Essays in Managed Competition in the Affordable Care Act's Marketplaces

A dissertation presented

by

Ellen Janine Montz

to

The Committee on Higher Degrees in Health Policy

in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

in the subject of

Health Policy (Economics)

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Essays in Managed Competition in the Affordable Care Act's Marketplaces

Abstract

This dissertation examines different economic principles as they relate to the outcomes of managed competition in insurance markets with a specific focus on the Affordable Care Act's Marketplaces. Now in their fifth year of operation, the Affordable Care Act's (ACA) Marketplaces exhibit wide variation in their level of competition. Across markets, premium growth trends and participation rates for eligible consumers also vary widely, sparking renewed debate over how policies can work to improve market competition and whether such competition can drive greater value in the market. Chapter one examines one policy in the ACA designed to create competition, the subsidization of market entry for newly-created Consumer Operated and Oriented Plans (COOPs), which led to the establishment of twenty-four new insurers. Using difference-in-differences variation created by the subsequent exogenous exit of COOPs from most federal Marketplaces, I find that for the average market with COOP competition loss, the second lowest cost silver plan premium growth was 3.8% higher in 2016 and 8% higher in 2017. Additional analysis finds both a direct, mechanical effect as well as an indirect, competitive effect of the removal of COOP competition on premiums, with the mechanical effect of the removal of COOP plans from the market accounting for the full premium effect in 2016. In an exploration of how selection may contribute to or be driven by premium increases, I show that selection across insurers within a market cannot explain the premium increases and that an increase in the average per capita cost of enrollees as consequence of premium increases in the market may contribute to future premium increases but the magnitude of the point estimates do not explain the estimated premium effects. Finally, I show how premium increases may drive the

exit of unsubsidized enrollees from and entry of subsidized enrollees to the Marketplaces, implicating long term selection effects.

Chapter two (with Tim Layton, Keith Ericson and Adam Sacarny) examines consumer choice behavior in the Colorado Marketplace, Connect 4 Health Colorado (C4). Under the rules set up for the regulated individual market under the Affordable Care Act (ACA), active consumer health plan choice should drive competition among health insurers, causing them to offer products at prices close to the underlying cost to the insurer of providing the products. We investigate consumer price sensitivity, inertia, and churn using longitudinal, individual-level enrollment and plan data from C4, spanning plan year 2014 to plan year 2016. We find that, on average, consumers are highly price sensitive, with price elasticities that range from -2.75 for all enrollees to -0.87 for continuing enrollees and -6.82 for new enrollees. We find that price semi-elasticities are almost twice as large for new enrollees vs. continuing enrollees, though continuing enrollees in this market are still relatively more price sensitive than continuing enrollees have been estimated to be in other health insurance markets. Younger consumers exhibit much higher levels of price sensitivity than older consumers. Finally, while we find no difference in price sensitivity between subsidized and unsubsidized consumers when focusing on consumer choices across plans within C4, we do find suggestive evidence that the exit of low premium plans has important effects on the probability that unsubsidized consumers remain in the market.

Chapter 3 (with Tim Layton, Alisa B. Busch, Randall P. Ellis, Sherri Rose, and Thomas G. McGuire) examines health plan incentives to limit covered services for mental health and substance use disorders under the risk-adjustment system used in the health insurance Marketplaces. Under the Affordable Care Act, the risk-adjustment program is designed to

compensate health plans for enrolling people with poorer health status so that plans compete on cost and quality rather than the avoidance of high-cost individuals. Through a simulation of the program on a population constructed to reflect Marketplace enrollees, we analyzed the cost consequences for plans enrolling people with mental health and substance use disorders. Our assessment points to systematic underpayment to plans for people with these diagnoses. We document how Marketplace risk adjustment does not remove incentives for plans to limit coverage for services associated with mental health and substance use disorders. Adding mental health and substance use diagnoses used in Medicare Part D risk adjustment is one potential policy step toward addressing this problem in the Marketplaces.

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Chapter 1: Can Promoting Competition by Subsidizing Market Entry Generate Consumer Gains?

1.1 Introduction

The Affordable Care Act (ACA) dramatically reformed the individual insurance market through the imposition of modified community rating rules, benefit and cost-sharing standards and risk-sharing programs. To drive value in the newly-regulated market, policymakers established Health Insurance Exchanges (Marketplaces), where consumers can compare their options for health insurance plans and receive tax credits to help pay for premiums. Now in their fifth year of operation, there is wide variation across markets in premium growth trends, competition among health insurers, and consumer participation as a percentage of the eligible population, prompting widespread discussion over the role of competition and risk selection in driving differential outcomes and how policies can work to improve the markets for consumers.

Research conducted on other health insurance markets point to competition among health insurers as a key driver of lower premiums in the ACA's Marketplaces. In this paper, I study the role of subsidized competition in health insurance markets, leveraging a natural experiment in the Marketplaces. The decision to enter a market by an insurer depends on several factors, including the fixed market entry costs, the consumer demand characteristics, costs of providers in the market, and expectations of competitor participation. The ACA encouraged competition in the Marketplaces by creating the Consumer Operated and Oriented Plan (COOP) program, which was specifically designed to increase competition in the Marketplaces by directly decreasing one barrier to market entry. The law provided newly-formed, nonprofit health insurers with federal loans for planning, start-up, and reserve funding at favorable interest rates, thereby making the creation of a new health insurer and entry into any given market more attractive.

The COOP program proved successful in drawing new health insurer competition to the Marketplaces-- twenty-four states had new COOP insurers in their Marketplaces beginning in 2014. However, COOPs were particularly disadvantaged when Congress passed a law that made the ACA's risk corridor program budget neutral, forcing more than half of the COOPs to exit the Marketplaces before the 2016 plan year began.¹ COOPs were more vulnerable to changes for three reasons—1) COOPs did not have access to ample reserves or the ability to cross-market subsidize through other lines of business; 2) COOPs were limited by the terms of their federal loans and could not quickly increase reserves through private capital; and 3) the COOP loan program funding had been cut by Congress and therefore additional government sources of capital were limited.

I examine the effect of this COOP exit, which represents a change in competition, on the Marketplaces. When an insurer exits the Marketplace, the choice set of plans change for consumers. It changes both through the absence of the exiting plans as well the response of remaining insurers in how they design and price their future plans. Such a choice set change can affect who signs up for coverage, thereby affecting the risk profile, among other characteristics of the market. The exiting COOPs provide a unique shock to Marketplace competition through which I can study how competition drives outcomes in the new Marketplaces. While COOPs represent one particular type of health insurer and therefore a distinct type of competitor in a market, the effect of COOP competition represents arguably the most policy-relevant type of competition to study in the Marketplaces because COOPs are a direct result of legislative policy. And, while COOPs are now, for the most part, gone from the competitive landscape as a result of a different federal policy, their competitive effect in the Marketplaces is of specific interest as

¹ Congress also cut the initial program funding from six billion dollars to three billion dollars in 2011.

policy debate continues over how to increase Marketplace competition and efficiency in insurance markets.

In theory, the effect of competition on premiums is ambiguous. Increases in market concentration may allow health insurers to raise their mark-ups, leading to higher premiums (or lower benefits). However, increases in market concentration may strengthen insurers' leverage over providers, leading to reduced negotiated prices and lower premiums.² Alternatively, there are other efficiency gains through increased economies of scale in IT investment and disease management that may lead to lower premiums and/or higher quality. Competition has by-and-large been found to have a downward effect on premiums in the employer group market (Dafny, Duggan, Ramanarayanan, 2012; Guardado et al., 2013; Feldman, et al., 1996)³ and the Medicare Advantage market (Dugan, Starc, and Vabson, 2014; Feldman, Wholey, and Christianson, 1996; Song, Landrum, Chernew, 2012; Cabral, Geruso, Mahoney, 2017). Limited evidence suggests the same is true in the Marketplaces (Dafny, Gruber, and Ody, 2015; Dickstein et al., 2015; Jacobs et al., 2015; Scheffler et al., 2016).⁴ Research with respect to the effect of competition on benefit generosity in the Medicare Advantage market has produced different conclusions (Town and Liu, 2013; Pizer and Frakt, 2002; Pelech, 2016; Cabral, Geruso and Mahoney, 2017; Duggan, Starc, and Vabson, 2014).⁵ In the Marketplaces, Swartz et al. (2015) and Taylor et al.

² It should be noted that insurers would only then reduce premiums if they are required by regulations or driven by competition.

³ Feldman, et. al. (1996) finds that HMO mergers only increase premiums in the most competitive markets and that mergers' effects dissipate quickly. The dissipation of merger effects is also noted in Dafny, Duggan, and Ramanarayanan (2012) as consumers respond and market shares change.

⁴ Dafny, Gurber, and Ody (2015) is the one and only analysis that seeks to casually identify the relationship between competition and premiums. Also of note is that Scheffler et al. (2016) finds opposing associations between competition and premiums in New York (lower premiums) and California (higher premiums), two State-based Marketplaces, which they suggest may be related to Marketplace management strategies.

⁵ Town and Liu (2003), Pizer and Frakt (2002), and Pelech (2016) find that reducing competition in Medicare Advantage decreases benefits.⁵ Cabral, Geruso and Mahoney (2017) find greater benefit increases in more

(2015) examine how non-premium margins of competition (e.g., plan network generosity and deductible amounts) may operate and find wide variation across markets.⁶ Finally, competition-driven selection has been found to contribute to premium changes, but such findings are largely dependent on market characteristics, subsidies and regulations (Cabral, Geruso, and Mahoney, 2017).

The analysis provided by this paper can be separated into three parts. In the first, I explore how competition in the Marketplaces affects market premiums and benefit generosity. Because COOPs had different market import as a competitor pre-exit, the exit of the COOPs represents a differential change in competition across Marketplaces. After establishing that treatment and control markets are not significantly different in the pre period, I use a difference-in-differences empirical analysis to find that premium increases were higher in markets where the exiting COOP represented a larger enrollment share of the market. For the average market with COOP competition loss, premiums were 3.8% higher in 2016 and 8% higher in 2017 for the key premium measure in the Marketplaces, the premium for the second lowest cost silver plan. Allowing COOP market share to flexibly vary by year shows no impact in pre-exit years, providing evidence in support of the parallel trends identifying assumption necessary for a

competitive markets when subsidies are raised. And, while Part D is likely not comparable market, Chorniy, et. al. (2013) find that consolidation in Part D leads to better benefits (more generous formularies). And, Duggan, Starc, and Vabson (2014) find that greater competition in Medicare Advantage has no effect on beneficiary out-of-pocket costs.

⁶ Swartz et al. (2015) examine how insurers compete in Marketplaces through cost-sharing and composition of provider networks and find that when insurers are not allowed to compete by risk-selecting they shift to compete with differential patient cost-sharing requirements and composition of provider networks, which seem to depend on the type of market in which they compete. This paper provides initial evidence into the fact that insurers are likely to compete on other margins than premiums, even with the greater benefit regulation under the ACA than in the pre-ACA markets because of their inability to compete on risk. Related, Taylor et al. (2015) show that the availability of more plans in a rating area was associated with lower premiums but higher deductibles for the second lowest cost silver plan.

difference-in-differences analysis. The evidence for the COOP exit effect on other plan characteristics, specifically plan benefit generosity as measured by a plan's actuarial value and deductible, is generally inconclusive due to a lack of meaningful variation in the measurements across markets and an inability to support the parallel trends identifying assumption in most cases. However, one analysis indicates smaller deductible increases where the exiting COOP represented a larger share of the market.

In the second analysis part, I examine the extent to which premium increases can be explained by the mechanical effect of COOP exit. That is, what are the consequences for premium change distinctly attributable to having the COOP plan offerings leave the market? This question is particularly important given that a COOP insurance plan was the lowest cost plan in 40 percent of the markets in which they participated. To determine the mechanical effect, I repeat the main specification on the insurer rather than market-level and find that the mechanical removal of COOP plans accounts for the full premium effect in 2016. I also find evidence of an indirect competitive effect (i.e., the strategic pricing response of competitors remaining in the market) of COOP exit on premiums in 2017, consistent with the hypothesis that COOP competitors found out about COOP exit too late in 2015 to allow exits to affect the competitors' premiums, but did respond to exit when setting 2017 premiums. Similar results are obtained using the main specification model but with the omission all pre-exit COOP observations.

In the third analysis part, I examine how the change to the competitive landscape in COOP exit markets may have affected consumer participation in the Marketplaces as a consequence of premium increases, and potential driver of subsequent increased premiums. I first establish that a pure redistribution of risk within the market as a result of COOP exit would

only serve to decrease premiums, if affect them at all because of budget neutral risk adjustment. I then examine possible selection in and out of the market by individuals by using the main difference-in-differences analysis to test whether COOP exit affects underlying state and insurer-level enrollment risk scores and per capita costs. Results using state-level risk scores indicate insignificant changes in underlying consumer risk following COOP market exit. Results also indicate increased per capita costs in the full individual market, but may also suggest a lower increase in per capita costs in the Marketplace. Results on the insurer-level are not precise enough to interpret but seem to follow the same pattern as the state-level results. Overall, these results indicated that selection is unlikely to play a large role in the premium changes estimated. Finally, in an examination of the differential enrollment consequences of COOP exit on unsubsidized and subsidized individuals, I find COOP exit markets experience increases in the percent of subsidized enrollment, driven by a decrease in participation by unsubsidized individuals and a smaller increase in enrollment by subsidized individuals. Taken together, such results may indicate that premium increases drive healthy unsubsidized enrollees out of and away from the market as a whole but may also drive healthier, subsidized individuals into the Marketplace through increased subsidies.

This paper adds to the literature in four ways. First, Marketplaces are a new and unique setting to study the effect of competition in health insurance markets. While conclusions regarding the effect of insurer competition from the employer and Medicare Advantage market provide insight into how competition may drive Marketplace outcomes, the rules of competition in the Marketplaces are significantly different. Additionally, consumers in the Marketplaces are, on average, different in demographics, socio-economic measures, and experience with insurance than in previously-studied markets. Second, while some papers provide causal evidence (Dafny,

Gruber, and Ody, 2015), this study leverages a novel exogenous change to competition to examine how such a shock affects changes in Marketplaces outcomes across years. Third, this study seeks to determine how a change in competition affects enrollee characteristics, including health risk and enrollee type, in the underlying market. Such examination is particularly important in the Marketplace context where only subsidized consumers are insulated from large premium increases and the option of going uninsured is prevalent. Finally, this is the first paper to rigorously study the effect of a unique type of subsidized competition—market entry subsidization through low interest loans.

This paper is structured as follows. Section 1.2 summarizes the policy background. Section 1.3 argues for and presents the empirical approach. Section 1.4 presents the results, Section 1.5 discusses limitations, and Section 1.6 concludes.

1.2 Policy Background

Marketplaces. The ACA created Marketplaces in the individual and small group health insurance markets as part of a package of health system reforms, and also as a way on its own to increase access and affordability of health insurance coverage. Eligible individuals, typically those without access to employer-sponsored coverage, can purchase private plans approved by regulators on the Marketplaces.

Plans are offered in four metal levels of increasing generosity of insurer payment for health costs: bronze, silver, gold, and platinum. Insurers also have to offer plans with at least a minimum set of benefits, called the Essential Health Benefits, and are only allowed to rate premiums based on an enrollee's age, geographic region of residence, and smoking status (within regulated limits).

Insurers must follow these described community-rating rules and price their different products based on a single risk pool within a state. Insurers must also participate in risk mitigation programs such as risk adjustment, which function to mitigate adverse selection.⁷

The Marketplace functions as a common platform where all competing plans are offered to consumers. Each state has its own Marketplace and plans are offered in state-defined rating areas (markets). Thirty-four states' Marketplaces are administered by the federal government (Federal Marketplace) and 16 are run by the state (State Marketplaces). The focus of this paper is on the Federal Marketplaces, which have 395 markets.

On the federal Marketplaces, and in most state Marketplaces, insurers meeting the minimum requirements for offering plans on the Marketplace can offer as many plans as they like. Moreover, despite federal minimum requirements, these plans vary sizably by cost-sharing structure (within metal level), generosity of specific benefits covered, provider network, management type, and other unobservable or difficult-to-observe measures of quality and generosity. Health plans offered on the Marketplaces, called Qualified Health Plans (QHPs) must also be offered off-Marketplace in the broader individual market.

In Marketplaces, subject to fulfillment of participation constraints, health insurers choose whether to offer coverage meeting the minimum requirements and then customers choose among the resultant options. In theory, when coupled with risk adjustment, the Marketplaces set-up creates market conditions that reward insurers for high quality and low cost as opposed to risk selection because customer demand drives competing insurers to offer efficient combinations of premium and benefits.

⁷ Premium tax credits along with the individual mandate also seek to mitigate adverse selection under the rating rules of the ACA.

The Marketplaces are now in their fifth year of operation, with total enrollment around 13 million⁸ and wide variation across markets with respect to participation rates and tenure of eligible enrollees.⁹ Insurer participation by market also varies widely across markets and over time in each of the 51 Marketplaces, with participation ranging from 1 to 15 competitors.¹⁰ Following a minor increase in the average number of insurers offering plans by states in 2015, the number of plans offering coverage on the Marketplaces slightly decreased in 2016 and continued to decrease in 2017 and 2018 with several pull-outs from large insurers, causing growing concern over the viability of Marketplace markets.¹¹

Plan Offerings and Pricing Background. Under the new market regulations, insurers in the individual market set their own premiums. For each plan (e.g., Silver 4500 HMO), insurers begin with one index rate (premium) for the state and metal level. That rate can then vary for each of the markets across the state (markets) and it can further vary by a customer's family composition, tobacco use (1.5:1 limit), and age (3:1 limit) within the market where a customer lives.

In order to offer coverage on a Marketplace, insurers are required to submit each of their proposed plans to the state and federal government, including benefit, cost-sharing, and network design, along with the rates for these offerings by the Summer before the upcoming plan year.¹²

⁸ As of February 1st 2017, Marketplace enrollment, excluding Basic Health Plan Enrollees was 12.7 million. <https://aspe.hhs.gov/sites/default/files/pdf/187866/Finalenrollment2016.pdf>

⁹ For example, see: Kaiser Family Foundation. Marketplace Plan Selection. <http://kff.org/health-reform/state-indicator/marketplace-plan-selections-as-a-share-of-the-potential-marketplace-population/>

¹⁰ Author's analysis of the healthcare.gov data

¹¹ For example, see: Kaiser Family Foundation. Number of Insurers by Individual Market. <http://kff.org/other/state-indicator/number-of-issuers-participating-in-the-individual-health-insurance-marketplace>

¹² Dates vary by state and year of operation

Insurers do not know the plan offerings and prices of other insurers before they submit their own offerings, but they do generally know who their competitors will be in the market for the upcoming year. Moreover, for the years after 2014, insurers know the plan premiums and offerings of their competitors for the previous year.

After plan and pricing submission, state and/or federal regulators review the plans and proposed rates; and often changes, generally minor but on occasion major, are made through interactions between regulators and insurers. On August 1st, final plan offerings for the upcoming plan year begin to be made public by the states and federal government. Consumers can begin to sign up for these plans during the subsequent open enrollment period, which varies depending on the year in this study, but generally begins on November 1st.

In each of the first years of Marketplace operation, insurers had very different sets of information about the market and likely chose different strategies to compete. In the first year, the Marketplace market was new to all insurers. In addition to not knowing the pricing and plan offerings of the other insurers in the market, insurers had to make assumptions about the risk profile of the consumers in the new market and how the ACA's risk mitigation programs would work (i.e., risk adjustment, reinsurance, and risk corridors). In the second year, existing plans had more information about their competitors, their enrollees, and the market, but such information was largely incomplete. Importantly, information related to the premium stabilization programs was non-existent for insurers prior to the June 1st deadline for submitting their proposed plans and rates for the second year. In the third and future years, insurers had at least one year of full information.

In addition to the different degrees of information held by insurers in any given year, insurers also faced different competitive pressures in any given year. In the first year an insurer

offers insurance on the Marketplace, insurers compete for new customers, but in the following years, insurers compete not only for new customers, but also to keep their existing customers.

Premium Tax Credit Background. While the same plans available on the Marketplace are available off the Marketplace, there are differences in what people eligible for income-based subsidies (premium tax credits) face in terms of net premiums and cost-sharing connected to the plans. Individuals with incomes below 400%FPL have access to premium tax credits through purchase of a health plan on the Marketplace and those with incomes under 250%FPL have access to cost-sharing reductions when they purchase a silver plan on a Marketplace.

Premium tax credits work through the setting of a maximum amount an individual at a certain income will have to pay for the second lowest cost silver plan in their market. The cap is based on a sliding scale, with lower income individuals paying less as a percent of their income than higher income individuals. If the cost of the second lowest cost silver plan in the market exceeds the percentage of income cap, the federal government gives the individual a credit valued at the difference. The individual can then use the credit to purchase any plan on the Marketplace they would like, paying the difference between the credit amount and the plan's premium out-of-pocket. It is important to note for this paper is that because premiums for lower income enrollees are limited to a capped amount, their premiums will not materially change across years, even if market premiums increase (provided they stay at the same income). This is not true for enrollees who are unsubsidized.

COOP Background. The ACA created the COOP loan program. Under the program, private, newly-formed, nonprofit health insurance insurers could apply for planning, start-up, and reserve funding loans from the Federal government at favorable interest rates. Start-up loans offer funding to assist with the start-up activities associated with developing a new insurance

company, like market research, business strategy analysis, and provider network development. Solvency loans offer funding to assist with state reserve requirements. Start-up loans are to be repaid in five years and solvency loans are to be repaid in 15 years. The goal of the program is to encourage competition in the new Marketplaces by helping new insurers overcome one barrier to market entry—seed and reserve funding required to gain licensure in a state.

COOPs can operate locally,¹³ state-wide, or in multiple States. COOPs are required to be licensed as an insurer in each State in which they operated and are subject to State laws and regulations that apply to all individual market insurers.

All COOPs receiving loans were selected by CMS on a competitive basis based on external independent review by an appointed committee. Applicants and recipients of the COOP loan awards represented a range of stakeholders in states across the country. Loan recipients represented coalitions of small businesses, physician and hospital providers and associations, union organizations, and community-based sponsors. COOP plans were available in twenty-four Marketplaces (including eleven federal Marketplaces) starting in 2014.

While the ACA initially made a \$6 billion appropriation for COOPs, congress cut this funding in half in 2011, and eventually rescinded all but \$1.1 of the original funding through several pieces of legislation. This funding cut to available reserve loan money contributed to the acute vulnerability of the COOP insurers to the changes in the risk corridor program, as discussed in the following subsections.

Risk Corridor Program. The risk corridor program is one of the ACA’s two temporary premium stabilization programs. The stated policy goal of the program was to attract insurers

¹³ While most COOPs offered state-wide, COOPs offering locally within a state were required to have a plan to offer state-wide in subsequent years.

to participate in the new Marketplaces because, despite being regulated, the markets were new and the expected enrollee population's average health risk was unknown. The program was designed to operate for the first three years of the Marketplace and was set up to compensate insurers for losses over a reasonable margin and recapture profit from insurers over a reasonable margin in a given plan year. In addition to encouraging market entry, risk corridors also mitigate the need to price loss risk into premiums as a result of uncertainty in medical costs of new enrollees and, given well-documented experience in the Medicare Part D program, allow insurers to be more aggressive in their pricing, depending on their market strategy.

Nothing in the statutory provision creating the ACA program required the program to be revenue neutral and health insurers priced their 2014 plans assuming full compensation for their losses falling outside the risk corridor loss boundary and full collection of profits falling outside the corridor profit boundary. Near the end of 2014, however, Congress included in its 2015 appropriations bill a provision that the risk corridor program had to be revenue neutral, meaning that the Department of Health and Human Services (HHS) could not pay out to insurers with losses more than it collected from insurers with gains. At the time of the policy change, insurers had already priced, submitted, and received approved for their 2015 Marketplace plans. HHS assured insurers that if payments owed exceeded collections, payments could still be made later in the program, retroactively.

While insurers expressed great resistance to the law change and knew of their own potential 2014 plan year losses, the extent to which such a provision would affect total payments was still unknown and by June 2015, the deadline for plan submission for the 2016 plan year, HHS had yet to announce risk corridor payments for 2014.

In August of 2015, after insurers had submitted plans for the 2016 plan year, HHS announced a delay in the formal release of the risk corridor numbers, but insurers and state regulators were aware that there would be a large shortfall in payments, even beyond what they expected. Finally, in October of 2015, HHS formally announced the projected payment for 2014. For 2014, Marketplace insurers incurred \$2.87 billion in losses over the risk corridor limit and only \$362 million in profit gains over the risk corridor limit. This meant that HHS could pay only \$0.126 for every dollar owed to insurers.

Risk Corridors and COOP Exit. The effect of the change to budget neutrality rules in the risk corridor program had a particularly acute effect on COOPs for three reasons. First, COOPs were unlike the majority of their competitors in that they did not have access to ample reserves or have a market presence in other, more profitable, business lines like the large group, Medicaid managed care, and Medicare Advantage markets to ride out the shortfalls. Second, COOPs were limited by the terms of their federal loans and could not quickly increase reserves. For example, the terms of COOP loans prohibited them from raising private capital. Third, COOP loan program funding had been cut by Congress and therefore additional government sources of capital were not available.

Because of these differences, the risk corridor shortfall placed nearly all COOPs in immediate solvency danger, meaning state regulators needed to determine the state COOP's ability to meet regulatory requirements for offering insurance in the state. The legislative change making risk corridors budget neutral, well documented as a political move by Senator

Marco Rubio, was cited by all of the COOPs in their shuttering announcements¹⁴ as well as in their legal filings against the Obama Administration in implementing neutrality.

As noted, the final shortfalls for risk corridor compensation were announced by HHS in October 2015 – after plan bid submission for 2016 but before the start of open enrollment for the 2016 plan year. In the weeks after HHS’s announcement, over half of the COOP insurers (13 in total, including 8 in the Federal Marketplaces) were required by state regulators to pull out of all the markets where they operated. Important for this study, due to the timing of COOP exit in 2015, competitors in COOP markets submitted their plan bids assuming COOPs would compete for plan year 2016, albeit at a precarious market position. In contrast, insurers submitted their plan bids for the 2017 plan year with full knowledge that COOPs would not participate. While some anticipatory knowledge from competing insurers could have occurred for the 2016 plan year, plan year 2017 would be the first year insurers in previous competition with the COOPs would bid with certain knowledge of COOP exit. Figure 2.1 and Figure 2.2 present a timeline of risk corridor program changes and COOP exit.

¹⁴ For example, see: New York Times. <https://www.nytimes.com/2015/12/10/us/politics/marco-rubio-obamacare-affordable-care-act.html>

Figure 2.1. Risk Corridor Program Changes and COOP Exit Timeline

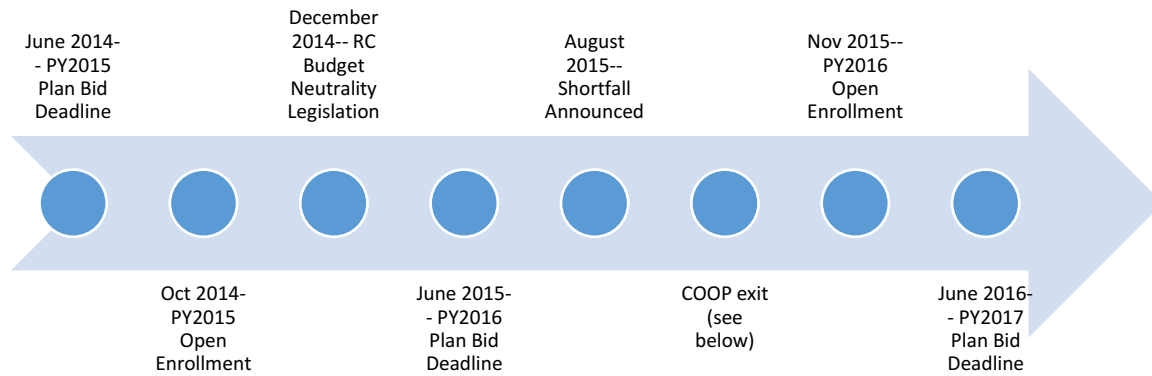


Figure 2.2. COOP Exit Timeline

State	Exit Announcement
Iowa/Nebraska*	3/30/2015
Louisiana	7/27/2015
Nevada	8/27/2015
New York*	9/25/2015
Kentucky*	10/9/2015
Tennessee	10/14/2015
Colorado*	10/16/2015
Oregon*	10/16/2015
South Carolina	10/22/2015
Utah	10/27/2015
Arizona	10/30/2015
Michigan	11/3/2015
Maine*	12/10/2015
Ohio	5/26/2016

*Not used in analysis. COOPs in Oregon, New York, Colorado and Kentucky are in State based Exchanges. The COOP in Iowa and Nebraska, COOpportunity Health, moved its members off its books and shut down shortly after open enrollment for the 2015 plan year. Maine paused accepting new members in 2016.

1.3 Empirical Approach

The key challenge to estimating the effect of competition in a market is that insurers were not randomly distributed at the beginning of Marketplace operation in 2014. An additional challenge is that insurers do not randomly enter and exit markets thereafter. That is, competitive and uncompetitive markets likely differ from one another in unobservable ways—a problem of endogeneity. Thus, the key to isolating the direct effect of competition is finding plausible exogenous variation in competition.

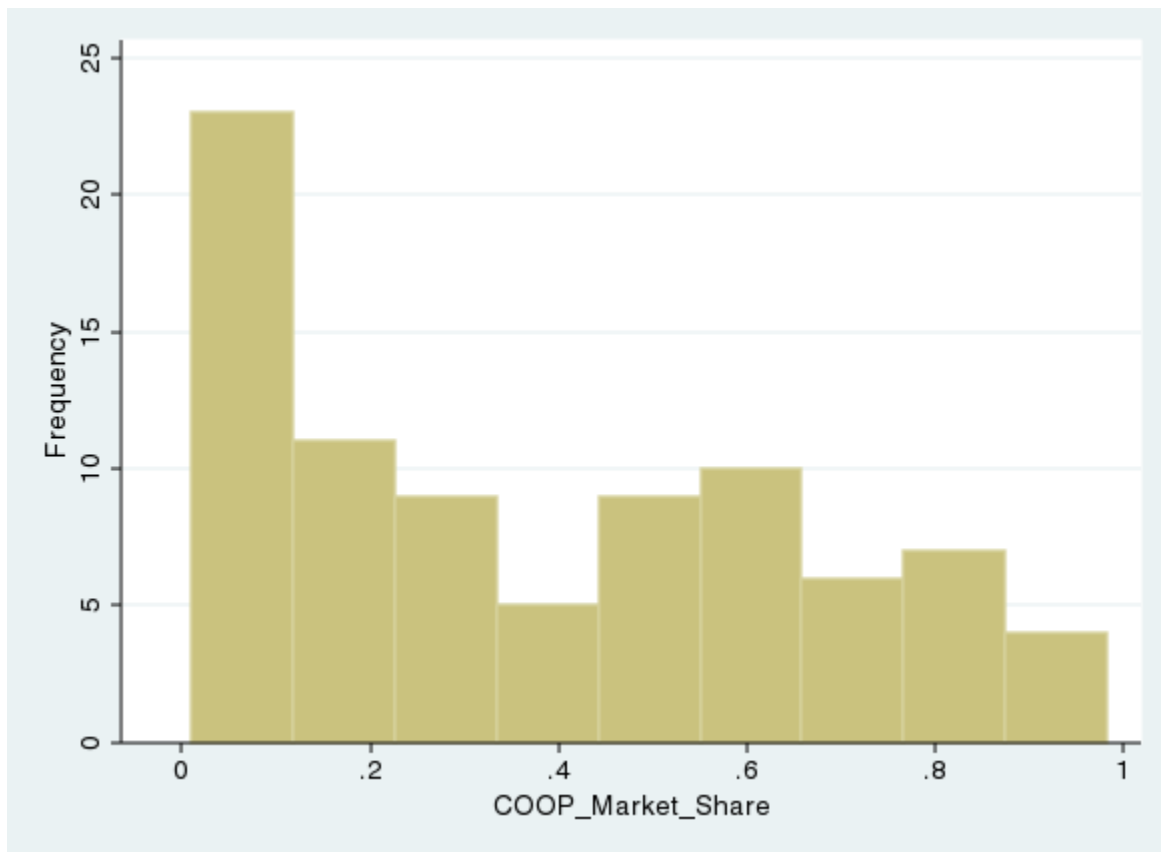
In this study, the COOP exit provides the source of exogenous variation. I exploit the differential variation in baseline market power held by the exiting COOPs to identify the effects

of competition. Because the exit of COOP insurers was not a choice and was not made on a market by market basis within a state, the variation in competition across markets is plausibly unrelated to unobserved confounding variables, like changes in profitability in local markets

To estimate the effect of COOP exit on the Marketplaces, I use a difference-in-differences model with the exiting COOP's pre-exit market shares as the continuous treatment variable.

Identifying Assumption and Variation. The COOP exits had different effects on the competitive landscape across markets. The market shares of the exiting COOPs in 2014 and 2015 varied across the seven Federal Marketplace states where COOPs exited. COOP market shares averaged 32 and 33 percent across all exit states in 2014 and 2015, respectively, and varied from 1 percent in a market in Arizona to roughly 90 percent in a market in South Carolina in 2015 (Figure 1.3). There was also within state variation across rating areas, although within state variation was lower, with an average within state variance of 0.02 across markets with respect to market concentration of COOPs.

Figure 1.3. Exiting COOP Market Share by Market, 2015



Note: Frequency is the number of markets. COOP_Market_Share is the share of enrollment in a given market that is enrolled in the COOP plan.

The variation created with COOP exit indicates that each COOP's exit from its Marketplace differentially affect the competitive landscape of each market. The identifying assumption for this analysis is that variation in competition across markets created by exit is exogenous to underlying conditions of the local market.

Estimating Equation. The main specification for the difference-in-differences approach is:

$$(1) \quad Y_{mt} = \beta_1 + \beta_2 YR15 * COOPShare_m + \beta_3 YR16 * COOPShare_m + \beta_4 YR17 * COOPShare_m + \beta_5 X_{mt} + \beta_6 M_{mt} + \tau_t + \delta_m + \varepsilon_{mt},$$

where Y_{mt} measures the outcome variable of interest in market m at time t . $COOPShare_m$ is the market share of the exiting COOP in the rating area (market) in year 2015. $YR15$, $YR16$, and $YR17$ are indicator variables for years 2015, 2016, and 2017, respectively. Separate coefficients are estimated for each calendar year with $YR14 * COOPShare_m$ normalized to equal zero so that coefficients can be interpreted as a change relative to 2014. Year fixed effects (τ_t) control for changes in premium and benefit generosity common over all markets, and market fixed effects (δ_m) control for baseline differences across markets. Finally, M_{mt} is a set of time-varying market characteristics to control for local economic conditions¹⁵ and X_{mt} indicates plan type (e.g. PPO, HMO). Standard errors are clustered at the market level.

¹⁵ Note that these variables are unlikely to provide much explanatory power in the regressions due to the presence of market and year fixed effects.

Data. This paper uses data from four years of operation in the Federal Marketplaces (2014-2017). Calendar year data from 2014 and 2015 provide data on the Marketplace before COOP exit and calendar years 2016 and 2017 provide data for the years after COOP exit.

Data on plan offerings by market in the Federal Marketplaces are taken directly from the publicly-available Health Insurance Marketplace Public Use Files (Marketplace PUF).¹⁶ The Marketplace PUF includes health plan and insurer-level information for qualified health plans (QHPs) offered to individuals on the Marketplaces by market. The data provided can be used to construct data on the plan-market-year level and include health insurer, product, and plan identifiers along with information on plan premium, metal level, benefits and cost-sharing rules for each plan by Marketplace market. The Marketplace PUF does not contain enrollment or claims data.

Enrollment shares and a market's Herfindahl-Hirschman Index (HHI) are constructed from HHS-released public use files detailing insurer enrollment by county for plan years 2014 and 2015.¹⁷ Insurer enrollment by market is constructed using files relating county Federal Information Processing Standards (FIPS) codes to market area.

¹⁶ The data sets are updated regularly to reflect the plan data that consumers will see when shopping for a Marketplace Qualified Health Plan (QHP). Data for the 2016 Marketplace PUF were imported to CMS systems on July 29, 2016. The 2015 Marketplace PUF data were imported to CMS systems on July 24, 2015, and the 2014 Marketplace PUF data were imported on July 30, 2014. Data for the 2017 Marketplace PUF were imported to CMS systems on Nov 1, 2016.

¹⁷ See <https://www.cms.gov/CCIIO/Resources/Data-Resources/issuer-level-enrollment-data.html>. Note that issuer-level enrollment data by market is not yet available for years 2016 and 2017.

HHS-released annual reports on risk adjustment and reinsurance for all insurers in the individual and small group market are the source for data on state average individual market risk scores and insurer-level risk adjustment payments by state.¹⁸

To measure average cost per enrollee at the state and insurer-state level, data from the HHS-released Medical Loss Ratio (MLR) reporting files, which report the total claims costs and number of enrollees in an insurer's offerings of QHPs and in all of an insurer's offerings of non-grandfathered plans in the individual market.¹⁹

Finally, data on the percent of enrollees who receive Advanced Premium Tax Credits (APTCs) and Cost-Sharing Reductions (CSRs) by market are constructed from HHS-released public data published in annual open enrollment reports at the county level for years 2015-2017.²⁰ Again, market-level measures are constructed using files relating county FIPS codes to market.

Sample Construction. The sample is limited to the 34 Federal Marketplaces (395 markets) because consistent data are available across all four years through HHS. Additionally, state Marketplaces tend to be more active in their regulatory and contracting negotiations, which means they have additional rules and regulations not present in Federal Marketplaces that could drive the outcomes of interest in this study.

To construct the full analysis sample, I exclude Alaska, Nebraska, and Idaho because consistent data are not available on the geographic level necessary for analysis. Next, an

¹⁸See <https://www.cms.gov/CCIIO/Programs-and-Initiatives/Premium-Stabilization-Programs/>

¹⁹ See <https://www.cms.gov/CCIIO/Resources/Data-Resources/mlr.html>

²⁰ See https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Marketplace-Products/Plan_Selection_ZIP.html Note, data unavailable for 2014.

examination of the distribution of market concentration in 2015 (as measured by the market HHI) in COOP exiting markets versus Non-COOP exiting markets shows that the latter group (the control group) has a large group of markets with HHIs above 8,000 that is not present in the treatment group (see Appendix Figure 1.A1 and Figure 1.A2). A further examination to determine if the parallel trends assumption necessary for difference-in-differences estimation is met when the control group is defined without omitting markets with HHIs above 8,000 confirms that the assumption is violated without the sample restriction (see Appendix Table 1.A1 and discussion in Validity section). As a result, markets with an HHI above 8,000 are excluded from the analysis. Table 1.1 displays summary statistics for the study sample by market by year.

Table 1.1 Summary Statistics

	Plan Year			
	2014	2015	2016	2017
Monthly Premium (40yrs)	313.17 38.26	325.77 39.63	346.87 44.04	427.15 740.4
Deductible	2984.47 825.49	3118.7 690.48	3521.47 836.16	3788.78 892.76
Actuarial Value	69.5 0.63	69.38 0.5	69.65 0.57	69.76 0.61
Second Lowest Cost Silver Premium	261.82 42.3	271.89 40.05	295.3 48.45	373.92 59.9
Second Lowest Cost Silver Deductible	3837.25 1396.4	3742.91 1303.25	4527.52 1618.26	5049.15 1670.15
Second Lowest Cost Silver Actuarial Value	69.15 0.98	68.91 0.98	68.91 1.18	68.76 1.01
Insurer Per Market	3.43 2.02	4.82 2.44	3.97 2.33	2.47 1.66
Fraction HMO	0.4 0.3	0.32 0.26	0.39 0.28	0.38 0.36
Fraction PPO	0.3 0.31	0.32 0.31	0.24 0.28	0.26 0.36
Fraction EPO	0.24 0.31	0.19 0.3	0.26 0.34	0.3 0.4
Fraction POS	0.06 0.13	0.07 0.15	0.07 0.13	0.05 0.14
Markets	395	395	395	395

Note: Table shows market-level mean and standard deviation summary statistics by year. The sample includes all silver plans in all 395 ratings areas in the Federal Marketplaces, weighted equally.

In addition to running my analysis on the full sample, I also run the primary analysis with sample observations limited to states with Federal Marketplaces where COOPs exit (LA, TN, SC, NV, UT, AZ, MI, and OH) in order to mitigate any additional endogeneity concerns. This analysis relies on the variation in concentration across markets where COOPs exited.

In all analyses, I restrict the observations to Silver plans offered during open enrollment (plans with a start date of January 1 for the year of observation).²¹ The limitation to silver plans has three rationales. First, the vast majority of Marketplace enrollment during the analysis years is in silver plans.²² Second, evidence from Dickenson (2015) suggests that plan offerings, including premiums, are consistent within insurers across silver and bronze levels. And finally, silver plans serve as the benchmark for premium tax credits for individuals under 400 percent of the Federal Poverty Level (FPL) and cost-sharing reductions for individuals under 250 percent of the FPL can only be taken advantage of upon enrollment in a silver plan.

Key Dependent and Independent Variables

Independent Variable: The key independent variable for this study is the pre-exit market share of the exiting COOP in a given market. Such a variable measures the importance of the competitor in the market. It also tends to be highly correlated with the cost position of the insurer in a given market due to the large flow of individuals into and out of the market from year to year.

²¹ Such an approach is consistent with research to date on Marketplaces, including the approach taken by Dafny, Gruber, and Ody, 2015.

²² See https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Marketplace-Products/Plan_Selection_ZIP.html

Dependent Variables:

Premiums. The natural log of the second lowest cost silver premium and the mean silver premium in a given market for a 40-year-old are both used to measure the premiums faced by consumers. The premium of the second lowest cost silver plan is important for two reasons. First, it is the benchmark plan in each market and as such is the basis for determining the value of the premium tax credit. Second, the vast majority of enrollment in the Marketplaces is concentrated in the lowest cost plans. The mean premium represents an alternative summary measure, which is likely of lower consequence for consumers as enrollment is clustered in lower premium plans.

Benefit Generosity. Two measures of benefit generosity are used in this paper.

Actuarial Value (AV). As with premiums, a measure for the AV of the second lowest cost silver plan and the mean AV is used in the analysis.

For each plan an insurer offers, the insurer is required to report the AV for the plan. The AV is a measure that represents the percentage of covered health care costs an individual with average spending can expect a plan to pay in a given year. It is determined using the same (or meaningfully similar) AV algorithm provided by HHS. Within each metal level, the AV is allowed to vary by a *de minimus* amount of 2 points above and below the metal level standard value. For silver plans, this means that the AV can be between 68 and 72. This means, for example, that an individual with \$5,000 in annual medical costs would pay between \$1,600 and \$1,400, respectively, in the lowest and highest silver AV plan. It is important to note that the AV is not only a noisy measure, but it is also a measure that may be easily gamed by insurers,

particularly when insurers have an idea of the medical claims patterns of their enrollees.²³ For example, the AV calculator is based on medical spending and medical use of employees in large firms. Health insurers with experience in the Marketplace may be able to construct plan designs that may meet legal AV requirements but may not actually provide the financial coverage, on average, given their expected enrollment population.

Deductible. The deductibles of the second lowest cost silver plan and the mean premium silver plan are included as a measure of each plan's generosity in order to capture what is generally thought of as the second most salient characteristic of a health insurance plan, behind premiums.

It is important to note that while AV captures overall plan generosity for an average population (as constructed by HHS), deductibles may and do have a different effect on premiums than other cost-sharing structures. Notably, the tradeoff in the actuarial value calculator is more than likely different from the pricing calculation used by actuaries when constructing premiums. Additionally, deductibles are a noisy measure and may not be the best measure for overall generosity. For example, a plan could have a very low deductible, but high co-insurance after the deductible.

Enrollee Risk. Several different measures of enrollee characteristics are used to assess how enrollee selection may be affected by premium increases resulting from competition changes.

Cost Per Enrollee. The ratio of annual total claims, after risk adjustment payments, to annual enrollment by state and by insurer is used as a measure of underlying spending.

²³ While there is not empirical evidence of such gaming, anecdotal evidence from conversations with industry actuaries suggests the AV calculator is gamed to ensure AV standards are met.

Risk Adjustment Transfers. Under the ACA's deficit neutral risk adjustment program, insurers either pay to or receive money from their competitors within the state as a result of a calculation of their relative average enrollment risk. An insurer's payment into the risk adjustment program is used as a measure to track relative within-market risk changes for an insurer across time.

Subsidized and Unsubsidized Enrollment. Premium increases that may decrease demand in the market for the product are only experienced fully by enrollees who are not subsidized by premium tax credits. In recognition of this fact, the study measures the proportion of the market with subsidized enrollment across time to measure enrollee demand response.

Validity of the Empirical Approach. This subsection examines and responds to two main threats to the validity of my empirical approach—1) the assumption of the exogeneity of the COOP exit and 2) the appropriateness of the treatment and control groups.

Exogeneity of COOP Exit The difficulty with measuring the effect of competition on Marketplaces is the endogeneity of market participation and market shares in a given year and across time. Specific to this study, the endogeneity concern is that exit from a market is driven by expectations of premiums or benefit designs that would affect profitability. For example, during the time period of this study, Aetna enters and exits and enters again in different markets within and across states. The same can be said of several other national and regional carriers and of Blue Cross Blue Shield within states, as insurers pick and choose markets in which to participate.

The shuttering of COOPs within the federal Marketplaces is an exception to this endogeneity concern. First, COOPs tended to offer their products state-wide and where COOPs did exit they exited in all markets across the state. Second, COOPs did not exit the

market by choice. Rather, they were forced to close as a result of a federal policy change, which applied to all Marketplace insurers across states but hit COOPs particularly hard. It is important to note that prior to forced closure, COOPs filed rates for the upcoming plan year. And third, while the risk corridor policy uniquely affected COOPs, non-COOP insurers in COOP markets were not differentially affected when compared to non-COOP markets. The following analysis examines these claims empirically.

To provide evidence for the exogeneity of COOP exit, I first show that COOPs were differentially affected by the risk corridor funding shortfall. To do so, I construct a risk corridor shortfall ratio by dividing the dollar amount of a given insurer's risk corridor funding shortfall by the insurer's total individual market revenue. The risk corridor shortfall ratio measure is meant to capture the extent to which the risk corridor policy change is meaningful in the context of the insurer's total individual market business. For example, two insurers, one large, like Blue Cross Blue Shield and one small, like a COOP or a physician network plan, with the same shortfall dollars would have very different shortfall ratios. Table 1.2 reports the mean risk corridor shortfalls ratio for insurers that remain in the market (Remain), non-COOP insurers exiting the market (Non-COOP), and COOPs (Exit COOPs) in 2016.

Table 1.2. Risk Corridor Shortfall Ratios by Insurer's 2016 Participation Status

	Exit (COOP)	Exit (Non COOP)	Remain
Shortfall Ratio	0.38 (0.21)	0.14 (0.15)	0.07 (0.09)

Note: Sample includes all insurers in the sample markets with risk corridor data in 2014 and/or 2015. A risk corridor shortfall ratio is constructed by dividing the dollar amount of a given insurer's risk corridor funding shortfall divided by the insurer's total individual market revenue.

The results in Table 1.2 show the expected association between shortfall ratio and market exit (exiting firms have significantly larger shortfall ratios on average). Additionally, importantly, the mean shortfall ratios document that the average shortfall ratio of COOPs is significantly greater than it is for the other exiting insurers (0.38 versus 0.14). These differential average shortfall ratios provide supporting evidence that COOPs were particularly affected by the risk corridor change because of their limited revenue base (COOPs generally have low shares of off-Marketplace individual market enrollment) and that using all exiting insurers to examine the effect of competition in 2016 would likely introduce the endogeneity discussed above.

Second, even if the COOPs are unique in the acute effect that the risk corridor policy change had on them, there is still a concern that markets where COOPs operated were, on average, simply more adversely affected by the risk corridor policy change overall. That is, it may be the case that even absent the COOPs, market exits and premium increases as a result of the risk corridor policy change would be greater in COOP markets. To explore this possibility, I take COOP observations out of the sample of risk corridor ratios and report the risk corridor shortfall ratio in markets with and without COOPs (Table 1.3 Panel A). Panel A shows that absent COOPs, the average number of exiting insurers in 2016 (1.4 versus 1.4) and the average market risk corridor shortfall ratio (0.080 versus 0.084) are not statistically different in non-COOP versus COOP exiting markets.

Additionally, in recognition that the identifying variation is largely driven by the differences in pre-exit market share of COOPs, Table 1.3 Panel B reports the risk corridor shortfall ratio in markets with high and low COOP pre-exit shares. Panel B shows that within COOP markets, the average number of exiting insurers in 2016 (1.3 versus 1.5) and the

average market risk corridor shortfall ratio (0.07 versus 0.08) are not statistically different in markets with high and low COOP pre-exit shares.

Table 1.3. Risk Corridor Shortfall and Market Exit Comparisons, 2016

Panel A. Comparison of Markets Excluding COOPs		
	Non COOP Exit Market	COOP Exit Market
2016 Insurer Exits	1.4 (1.2)	1.4 (1.1)
Risk Corridor Shortfall	.080 (.1)	.084 (.08)
Num Markets	212	103
Panel B. Comparison of High and Low Pre-Exit COOP Shares		
	Low COOP Pre Shares	High COOP Pre Shares
2016 Insurer Exits	1.5 (1.6)	1.3 (.71)
Risk Corridor Shortfall	.08 (.08)	.07 (.10)
Num Markets	57	56

Notes: A risk corridor shortfall ratio is constructed by dividing the dollar amount of a given insurer's risk corridor funding shortfall divided by the insurer's total individual market revenue.

Panel A includes all insurers that are not an exiting COOP.

Panel B includes all markets that are COOP markets.

Finally, a regression of the average non-COOP insurer shortfall in a market on the COOP exiting share does not produce a statistically significant relationship.

Treatment and Control Groups. Under the main empirical specification of this paper, most federal Marketplaces are used in the analysis (as noted in the description of the sample construction). In this approach, markets with COOP exit are the treatment group with the exiting COOP's share as the continuous treatment variable. Marketplaces without COOP exit serve as the control group.

To examine the appropriateness of using markets in which COOP exit did not occur as a control group, Table 1.4 compares market-level measures across variables that may have a

differential effect on premium growth across markets. It can be seen that the markets in the treatment and control groups are, on average, statistically similar, although COOP markets have, on average, one additional insurer (the expected response).

In an alternate specification, the analysis limits the sample to only those markets where COOPs exit and relies on the variation in market importance of the COOP for variation. Table 1.5 compares COOP plans to Non-COOP plans within these markets and again finds statistically similar distributions.

Finally, the identifying assumption for this paper's difference-in-differences approach is the assumption that in the absence of COOP exit, outcomes for Marketplaces would have evolved in parallel. In order to assess the validity of this parallel trends assumption, separate coefficients are estimated for each calendar year. If the coefficient associated with 2015 is not significant, this provides evidence to support the assumption. A discussion of this assumption is included throughout in the results section.

Table 1.4. COOP Exit and Non-COOP Exit Markets, 2015

	COOP Exit Market	Non COOP Exit Market
Mean Silver Premium (ln)	5.75 0.1	5.78 0.13
SLCS Premium (ln)	5.56 0.13	5.6 0.15
Mean Silver Deductible (ln)	7.9 0.21	8 0.2
Mean Silver AV	69.4 0.27	69.2 0.49
2015 HHI	0.34 0.11	0.4 0.13
Insurers	6.1 2.6	5 2
Urban (%)	0.62 0.24	0.63 0.24
Uninsured (%)	0.12 0.04	0.14 0.05
ln Hospital Price Index	6.56 0.11	6.56 0.13
Average Enrollment	19,997 34,055	26,615 54,216
Markets	103	212

Notes: Sample includes all markets in the full analysis sample. Observation on the market level for 2015. All rating areas are equally weighted.

Table 1.5. COOP and Non-COOP Plan Characteristics by Insurer (2015)

	COOP	Non-COOP
Low Premium (\$)	296.4 (51.2)	293.0 (45.8)
Low Deductible (\$)	3470.9 (764.5)	3359.1 (1618.4)
Low AV	68.44 (.69)	68.77 (1.0)
Mean Premium	313.04 (54.16)	307.0 (45.47)
Mean Deductible	2395.7 (375.3)	2645.1 (695.89)
Mean AV	69.5 (.8)	69.5 (.9)
Risk Corridor Ratio	.38 (.26)	.14 (.25)
Market Share	.27 (.31)	.20(.22)

Note: Observations are on the insurer-market level for the 103 COOP exit markets.

1.4 Results

In this section, I start by presenting the effects of COOP exit on market premiums and plan characteristics. I then examine how COOP exit separately affects these Marketplace outcomes directly (i.e., the mechanical result of removing COOP plans from the market) and indirectly (i.e., the strategic pricing response of competitors remaining in the market). Finally, I explore whether there is evidence that premium growth differences can be attributed to selection effects associated with COOP exit, by examining how COOP exit could affect within market and extensive margin (into and out of) market selection.

COOP Exit and Premium and Plan Characteristic Effects. Table 1.6 presents the results of regressing the log of the second lowest cost silver plan premium (SLCSprem) and mean silver plan premium (meanprem) on the 2015 market share of the exiting COOP as described in section 3. Exiting COOP 2015 market share is interacted with indicator variables for years 2014, 2015, 2016 and 2017 to create the variables coop14 (base category), coop15, coop16, and coop17, respectively. Year and market fixed effects are included in the regression. Importantly, the effect

of COOP share in 2015 (coop15) on premiums establishes that differences in changes in premiums between 2014 and 2015 between treatment and control markets are not significant, providing supporting evidence for the parallel trends assumption.

The positive and significant coefficients on coop16 and coop17 suggest that for the average market where a COOP exited (COOP share of 33% percent), premium increases for the second lowest cost silver plan were 3.8% higher in 2016 and 8% higher in 2017 (column 1). For the mean market silver plan premium, results suggest that for the average COOP exiting market, premium increases were less than 1% higher in 2016 and 3.8% higher in 2017 (column 2).

Table 1.6, column 3 shows the results from a regression that repeats the main empirical specification but with the sample limited to markets where COOPs exited (sample as described in section 2.4). Column 3 shows the results of regressing the log of the second lowest cost silver premium (SLCSprem) on the 2015 market share of the exiting COOP. Results are similar to those using the larger sample with a 6.1% and 10.5% greater premium increase for the second lowest cost silver plan in the average market in 2016 and 2017, respectively.

Table 1.6. Relationship between Exiting COOP Share and Market Premiums

	(1) SLCSprem	(2) meanprem	(3) SLCSprem
coop2015	-0.0308	-0.0333	-0.0194
	-0.0209	-0.018	-0.0191
coop2016	0.114***	0.0235	0.186***
	-0.0285	-0.0275	-0.027
coop2017	0.246***	0.113***	0.324***
	-0.0445	-0.0377	-0.0595
2015 fe	0.0344***	0.0347***	0.0212*
	-0.00608	-0.00557	-0.011
2016 fe	0.0917***	0.0856***	0.0483***
	-0.00844	-0.00763	-0.0149
2017 fe	0.295***	0.267***	0.232***
	-0.0156	-0.0118	-0.0332
Market FE	yes	yes	yes
Sample	Full	Full	COOP only
Observations	1,260	1,260	412
R-squared	0.76	0.781	0.864

Notes: Observations are at the market-year level. SLCSprem= Second lowest cost silver plan in the market. Meanprem= mean premium in the market. COOP2015, COOP2016, and COOP2017 is the share of the exiting COOP in the market interacted with the year indicator variable. 2014 is the base year. All regressions include market and year fixed effects. Other control variables are omitted for clarity. Robust standard errors clustered at the market level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table 1.A1 shows the results of regressing the log of the second lowest cost silver plan premium and mean deductible, and second lowest cost plan actuarial value and mean actuarial value, on the 2015 market share of the exiting COOP as described in section 1.3. Such regressions indicate significant differences in the pre-period and can therefore not be used to establish the effect of COOP exit on deductibles and actuarial value in the markets. Appendix Table 1.A1, column 3 repeats the regression but with the COOP-only sample and focuses on the results of the characteristics of the market's second lowest cost silver plan. Column 5 shows that

the effect of exit on the second lowest cost silver plan deductible in the market (SLCSded) can be examined in this specification because pre-trend indicates a small in magnitude and non-significant difference across COOP markets in the changes in deductibles between 2014 and 2015. Results indicate that in the average market, COOP exit relates to a 23% lower deductible in 2016 and a 22% lower deductible in 2017. However, because deductibles are a noisy measure of plan generosity, it is difficult to draw strong conclusions from this result. This difficulty is highlighted by the fact that the pre trends are significantly different in 2015 for the other generosity measure, actuarial value, leaving interpretation of the effect of exit on the actuarial value in the market difficult (Column 8).

Separating Direct and Indirect Effects of COOP Market Exit on Premiums

Decomposition. Results above indicate that premiums grew faster in 2016 and 2017 in markets with larger market shares of exiting COOPs. These premium increase estimates, however, only indicate the result of COOP exit and not the mechanism for such increases. To further understand the mechanism, it is important to separate the indirect effect from the direct effect of COOP market exit on premiums. When an insurer leaves the market remaining insurers respond to the potential for additional market power. For example, if an insurer newly-acquires an additional market share as the result of competitor exit, they might respond by changing their premiums to reflect these changes in market leverage (indirect/competitive response). Additionally, when an insurer leaves the market, market premiums are affected simply by the removal of those plans from the choice set (direct/mechanical effect). For example, if the lowest cost insurer leaves a market, even if remaining competitors do not change their premium setting and strategic behavior in response to the change in competition, the premium for the second lowest cost silver

plan would rise, mechanically. To illustrate how premium increases can be divided into direct and indirect components, suppose the following:

- \bar{p} is enrollment-weighted average premium in market m
- $ShareCOOP$ is the percent of the market represented by COOP plan enrollment.
- $Share\sim COOP$ is the percent of the market represented by non-COOP plan enrollment
- $\overline{premCOOP}$ is the COOP-specific cost for an individual for a given year multiplied by a coop-specific markup term in a given year.
- $\overline{prem\sim COOP}$ is the Non-COOP-specific cost for an individual for a given year multiplied by the non-coop-specific markup term in a given year.

The enrollment-weighted average premium in year t and market m is given by:

$$\bar{p}_t = [(ShareCOOP)_{mt} * (\overline{premCOOP})_{(mt)}] + [(Share\sim COOP)_{mt} * (\overline{prem\sim COOP})_{(mt)}]$$

And, for now making the simplifying assumption that there is no selection across plans or out of the market, the change in average premium between year t and t+1 is given by:

$$\Delta \bar{p} = \bar{p}_{t+1} - \bar{p}_t$$

$$= \left[\overbrace{[(ShareCOOP)_{m(t+1)} * (\overline{premCOOP})_{m(t+1)}]}^{=zero} - [(ShareCOOP)_{mt} * (\overline{premCOOP})_{(mt)}] \right] + \left[\overbrace{[(Share\sim COOP)_{m(t+1)} * (\overline{prem\sim COOP})_{m(t+1)}]}^{=1} - [(Share\sim COOP)_{mt} * (\overline{prem\sim COOP})_{(mt)}] \right]$$

$$\begin{aligned}
& \text{Competitive response} \\
& = \overbrace{(Share \sim COOP)_{m(t+1)} * [(pre \sim COOP)_{m(t+1)} - (pre \sim COOP)_{mt}]} \\
& - \underbrace{[(Share COOP)_{mt} (pre \sim COOP)_{mt} + [(Share \sim COOP)_{mt} - (Share \sim COOP)_{m(t+1)}] (pre \sim COOP)_{mt}]}_{\text{Mechanical effect}}
\end{aligned}$$

Empirical Results. Separating the direct effect from the indirect effect of COOP market exit on premiums is of interest for two main reasons. First, COOP insurers were the low cost insurer in 40 percent of the markets where they exited meaning that one might expect a mechanical result from market exit. Second, as detailed in section 2, COOPs exited after rates had been filed for 2016. So, unless there were anticipatory effects acted on by other insurers in the market, rates filed by competitors in 2016 would reflect a belief that COOPs would remain a market competitor. Such a situation is rarely found in an empirical setting and may give us a clearer look at the direct versus indirect competitive effects. To separate the effects, I employ two different strategies.

First, I exclude all exiting COOP plans from the plan sample and rerun the main empirical regression using the main outcome of interest, the log of the second lowest cost silver plan premium.²⁴ Column 1 of Table 1.7 presents the results of the regression using the full analysis sample (with COOP observations excluded) and Column 2 of Table 1.7 presents the results using the COOP market only sample (with COOP observations excluded). In both regressions, results for 2016 show premium increases for the average COOP exit market were less than one percent and were not significant. Results for 2017 indicate a positive and significant indirect competitive effect on premiums. Specifically, results using the full sample indicate that premiums are 3.4% higher in the average COOP exit market, on average. Point

²⁴ Note, COOP plans are also excluded from the calculation of the second lowest cost silver plan.

estimates for 2017 are roughly 58% lower than estimates when COOP observations are excluded, which reflects the elimination of the direct effect from 2016. Nevertheless, the 2017 competitive effect remains, indicating that the competitive effect of COOPs as a low cost competitor go beyond the mechanical result of removal.

Second, as expressed in Equation 2 below, I run an insurer-level regression (COOP observations included) of the log of an insurer's lowest cost silver plan premium (LCSprem) on the 2015 market share of the exiting COOP. I use the log of the lowest cost premium by insurer to closely approximate the market-level measure of the second lowest cost silver plan premium. Here again, COOP market share is interacted with year indicators to separate out effects in 2016 and 2017, but unlike the previous regressions, observations are on the insurer-market-year level and regressions include insurer fixed effects.

$$(2) \quad \ln(LCP)_{imt} = \beta_1 + \beta_2 YR15 * COOPShare_m + \beta_3 YR16 * COOPShare_m + \beta_4 YR17 * COOPShare_m + \beta_5 X_{imt} + \beta_6 M_{mt} + \tau_t + \delta_m + \gamma_i + \varepsilon_{imt} ,$$

Columns 3 and 4 of Table 1.7 show the results of this regression using the full and COOP market only sample. Similar to the results using the market-level observations, results suggest that the market response to COOP exit in 2016 is largely mechanical but there remains an indirect and significant effect of COOP exit on premium increases in 2017 of 5.8 percent.

Table 1.7. Indirect Relationship between Exiting COOP Share and Market Premiums

VARIABLES	(1) SLCSprem	(2) SLCSprem	(3) LCSprem	(4) LCSprem
coop2016	-0.0288 (0.0253)	-0.0297 (0.0269)	-0.00524 -0.0279	-0.0133 -0.0304
coop2017	0.104** (0.0462)	0.108 (0.0658)	0.135*** -0.0469	0.176** -0.0729
2015 fe	0.0256*** (0.00544)	-0.0127 (0.00782)	0.0180*** -0.00503	-0.0164** -0.00685
2016 fe	0.0896*** (0.00825)	0.0542*** (0.0139)	0.0892*** -0.00663	0.0585*** -0.0142
2017 fe	0.293*** (0.0156)	0.238*** (0.0341)	0.253*** -0.0122	0.189*** -0.038
Market Fixed Effects	yes	yes	yes	yes
Insurer Fixed Effects	--	--	yes	yes
Sample	Full	COOP only	Full	COOP only
Includes COOP Plans	no	no	yes	yes
Observations	1,260	336	4,968	1,228
R-squared	0.753	0.837	0.696	0.749

Notes: Observations are at the market-year level for columns 1 and 2 and at the insurer-market-year level for columns 3 and 4. SLCSprem= Second lowest cost silver plan in the market. LCSprem= Lowest cost premium for an insurer. COOP2016, and COOP2017 is the share of the exiting COOP in the market interacted with the year indicator variable. 2014 is the base year. All regressions include market and year fixed effects. Columns 3 and 4 include insurer fixed effects. Other control variables are omitted for clarity. Robust standard errors clustered at the market level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Role of Selection. The results above indicate that markets where exiting COOPs represented a greater market share experienced higher premium increases in subsequent years. Further, the results suggest that these premium increases were both the result of the direct elimination of the COOP plans from the markets and a response by the remaining competitors. This section explores how selection may affect or be affected by premium increases caused by changes in market competition.

Within Market Selection-- COOP Enrollment Risk Redistribution. One possible explanation for an increase in premiums by competitors in 2017 is that enrollees in the exiting COOP plans were, on average, less healthy than individuals in competitor plans. One might expect that premiums should not respond to a pure redistribution of risk if insurers are pricing to the average market risk (as may be the case with perfect risk adjustment). But it is plausible that insurers might engage in different pricing behavior and strategies to attract consumers into the market and their products, and/or that risk adjustment does not mitigate all adverse selection.

To determine whether or not a redistribution of risk into the remaining insurers could explain premium increases, I examine the risk adjustment payments made by the exiting COOPs in 2015. Under the deficit neutral risk adjustment program, insurers that enroll a lower than average risk population pay into the program whereas insurers that enroll a higher than average risk population receive payments from the program. With one exception, the COOPs all paid into the program in 2015, meaning they enrolled relatively healthy individuals when compared to the state-wide average. Therefore, any redistribution of COOP enrollment into competing plans would likely be from a relatively healthy pool of people.²⁵

This evidence suggests that the premium increase estimates in 3.1 and 3.2 could be conservative with respect to the estimates of the indirect effect of competition since the distributional selection consequences of the COOP exit should either be negligible (with perfect risk adjustment) or negative, on average, on the remaining insurers because COOPs had lower average risk. However, the conclusion that the estimates may be conservative must also factor in

²⁵ It should be noted that selection on residual (net of risk adjustment) risk and selection on measured risk (risk scores) could go in different directions. Such residual selection is not measured.

the fact that the non-COOP insurers receive smaller risk adjustment payments and any unmeasured net of risk adjustment selection.

Into/Out of Marketplace Selection-- Marketplace Enrollee Risk and Cost Changes. While I find that COOPs had, on average, healthier enrollees (as measured by risk transfers) and a redistribution of its enrollees would bring, on average, healthier enrollees to the remaining insurers, such a finding does not rule out the possibility that COOP markets as a whole became relatively less healthy with the exit of COOPs, particularly because risk adjustment is budget neutral. Another possible explanation for an increase in premiums could be that COOP exit markets experienced adverse selection in response to premium increases. That is, because premiums increased, healthier individuals left the market disproportionately in COOP markets. Because the risk adjustment transfer program pools at least some portion of risk across all insurers in the market, this would raise costs for the remaining insurers even if all exiting consumers were previously enrolled in the COOPs.

To determine if there is evidence for greater adverse selection in the market after COOP exit, I examine two sources— the state average risk score and the average claims costs per enrollee by state and insurer. The state average risk score is published annually in the Risk Adjustment and Reinsurance Annual Program Report by HHS. To construct the average claims cost per enrollee, I use data from the Medical Loss Ratio public reporting files. In this data, all insurers in the Marketplace are required to report both the number of individuals they enroll by state and the claims costs for these enrollees. The available data on both risk and costs are at the state level (and state-insurer level in the case of costs) and cannot be constructed at the market level and in the case of risk scores, at the insurer-level.

State Average Risk Scores. To determine if state average risk scores change in response to COOP exit, I regress the state average risk score on the 2015 market share of the exiting COOP using year and state fixed effects (Equation 3).

$$(3) \quad \text{RiskScore}_{st} = \beta_1 + \beta_2 \text{YR15} * \text{COOPShare}_s + \beta_3 \text{YR16} * \text{COOPShare}_s + \beta_4 S_{st} + \tau_t + \delta_s + \varepsilon_{st} ,$$

Table 1.8 columns 1 and 2 present the results of this regression. Column 1 uses an indicator variable to denote COOP states while the regression results reported in Column 2 use state average weighted COOP exit market share to measure the dependent variable. Results are not statistically significant and I cannot rule out effects that state average risk scores decreased 0.06 points in 2016 and 2017 in COOP states. These results seem to indicate that very limited if any differential changes in average risk across years in response to COOP exit.

Average Claims Costs per Enrollee. Results using state average risk scores do not produce conclusive results, but this may be because state average risk scores are not sensitive enough to pick up smaller relative market changes in risk as one may expect to find under the COOP exit. Additionally, risk scores are calculated for the full individual market in a state and are not separately calculated for the Marketplace and off-Marketplace population. To examine changes in risk on a more granular measurement level, I examine whether state and insurer-level claims costs per enrollee are affected by the exit of the COOP competitor.

I regress the average claims cost per enrollee, either on the state or insurer-state level, on the 2015 market share of the exiting COOP (Equation 4).

$$(4) \quad \ln(\text{AverageCost})_{st[i]} = \beta_1 + \beta_2 \text{YR15} * \text{COOPShare}_m + \beta_3 \text{YR16} * \text{COOPShare}_m + \beta_4 M_{st} + \tau_t + \delta_s [+ \gamma_i] + \varepsilon_{st[i]},$$

where $\ln(\text{AverageCost})_{st[i]}$ measures the natural log of the average enrollee cost in state s , at time t , [for insurer i]. Claims costs are calculated net of budget-neutral risk adjustment transfers made meaning that, for this particular measure, the cost per enrollee for a given insurer reflects the average cost for the average risk in the plan. When the entire state is considered for the measure, risk adjustment transfers do not matter because transfers are budget neutral within the state. $\text{COOPShare}_{2015_m}$ is the average market share of the exiting COOP in the state in 2015. YR15 and YR16 are indicator variables for years 2015, 2016, respectively. Year fixed effects (τ_t) control for changes in average costs common over all markets, and state fixed effects (δ_m) control for baseline differences across states. Finally, M_{mt} is a set of time-varying state characteristics to control from local economic conditions, like whether the state expanded Medicaid. Standard errors are clustered at the state level. Because insurers report claims and enrollment by state for both their full individual market enrollment and also for their QHP enrollment²⁶, I am able to run the analysis on both samples.

Table 1.8 columns 3-6 present the results. Columns 3 and 4 show the results for the state-level regression (COOP observations included), which indicate that, compared to 2014, the average claims costs for enrollees in states with exiting COOPs are larger in 2016 when the whole individual market is considered and smaller (but not statistically significant) in 2016 when

²⁶ While QHP are offered both inside and outside of the Marketplace, QHP enrollment and spending experience is a close approximation of Marketplace experience.

only the Marketplace plans are considered. Interpreting the point estimate for the average COOP exit market translates to the conclusion that per enrollee cost growth was 2.6 percent greater in the average state with COOP exit than in states without COOP exit in the state's full individual market and .25 percent lower in the state's Marketplace. Columns 5 and 6 present the results for the insurer-level regression (COOP observations included). With state and year fixed effects, an insurer-level regression uncovers how per capita costs differentially changed for the remaining insurers in the market following COOP exit. Similar patterns can be seen when insurer-level regressions are run, with evidence suggesting greater cost increases experienced for continuing insurers when the entire individual market in a state is considered but lower cost increases were experienced when only QHPs are considered. It should be noted that in both cases, standard errors are large, indicating the inability to draw definitive conclusions from the data.

Table 1.8. Relationship between Exiting COOP State Share and Enrollee Risk and Cost

Variable	(1) state-level riskscore	(2) state-level riskscore	(3) state-level ln(per capita cost)	(4) state-level ln(per capita cost)	(5) insurer-level ln(per capita cost)	(6) insurer-level ln(per capita cost)
COOP15	-0.0581 (0.0412)	-0.035 (0.0621)	-0.0280 (0.0519)	-0.0333 (0.0540)	0.0216 (0.0635)	-0.0117 (0.0572)
COOP16	-0.0657 (0.057)	-0.049 (0.105)	0.0857* (0.0493)	-0.00815 (0.0937)	0.0888 (0.107)	-0.0453 (0.0850)
State FE	yes	yes	Yes	yes	yes	yes
Year FE	yes	yes	Yes	yes	yes	yes
Insurer FE	no	no	No	no	yes	yes
Sample	Individual Market	Individual Market	Individual Market	Marketplace	Individual Market	Marketplace
Observati on	90	90	90	90	446	446
R- squared	0.864	0.859	0.9	0.82	0.823	0.849

Notes: Observations are at the state-year level and insurer-state-year level. Samples either include all individual market plans or all Marketplace plans (here, all QHPs), for a given insurer. StateCOOP15 and StateCOOP16 is the average market share of the exiting COOP by state interacted with the year indicator variable. 2014 is the base year. Riskscore= state average risk score for the individual market for the given year. Ln(per capita cost) is the insurer's claims costs, after risk adjustment payment, divided by the number of life years. COOP15 and COOP16 is the share of the exiting COOP in the state interacted with the year indicator variable for column 1 and is an indicator variable for COOP state in column 2. All regressions include state and year fixed effects. Other control variables, including whether or not the state is a Medicaid expansion state, are omitted for clarity. Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

One potential conclusion that can be drawn from these results is that because at both the state- and insurer-level, per capita costs grew faster for COOP exit states in the entire individual market and slower (though not statistically significant) for Marketplace plans, we might conclude that the individual market as a whole experienced adverse selection through the exit of relatively healthy individuals but that increased subsidies (the result of an increase of the second lowest cost silver plan) may have attracted and help retain healthier enrollees in the Marketplace. However, it is important to note that Marketplace-specific conclusions should be considered with an abundance of caution given the high level of noise in the point estimates and the incentives for insurers to “game” medical loss ratio data. All told, the magnitude of the point estimates do not explain the premiums effects estimated above and likely the only conclusion to be drawn here is that selection is unlikely to have a large effect on premium changes. One additional item to note here is that these results show that the marginal enrollees of the non-COOPs after COOP exit are more expensive in the individual market as a whole and potentially less expensive in the Marketplace than the average non-COOP enrollee but the results cannot conclude anything regarding the differential costs for a given person in a COOP versus a different insurer (e.g., COOP provider rates or network breadths are different). This relative cost story cannot be explored because risk scores are not published at the insurer-level, I am unable to determine if there is evidence that an individual enrolled in a COOP plan would cost more or less than the same individual enrolled in the average non-COOP plan. To further understand enrollee response to premium changes, I next examine enrollment.

Unsubsidized Enrollment. The examination of risk scores and average claims costs seem to provide suggestive evidence of overall risk pool degradation where COOPs exited, but analysis specific to the Marketplace is inconclusive and I cannot rule out the possibility that non-COOP

plans were simply less expensive for health care services for a person at a given risk. One reason we might find limited evidence of a change in enrollee risk in the Marketplace is because premium tax credits rise commensurately with premium increases in the second lowest cost silver plan. Such an apparatus shields individuals who receive premium tax credits, a group that accounts for 85% of Marketplace enrollment, from annual premium increases. Because the vast majority of the Marketplace is held harmless in premium increases, we may only expect to see a demand response as a result of the COOP exit induced premium increases in the population that is not eligible for premium tax credits. Conversely, we may even expect to find an increase in enrollment from subsidy-eligible individuals as premium tax credits increase along with the benchmark. While I am unable to separate the risk of those who are and are not eligible for tax credits, I can use data from HHS on Marketplace enrollment that separately reports the number of enrollees who are and are not covered by premium tax credits by market in a given year to determine how COOP exit affects market enrollment of the different populations.

Table 1.9 presents the results of the following regression:

$$(5) \quad Y_{mt} = \beta_1 + \beta_2 YR16 * COOPShare_m + \beta_3 YR17 * COOPShare_m + \beta_4 M_{mt} + \tau_t + \delta_m + \varepsilon_{sm},$$

where Y_{mt} measures the enrollment characteristics of market enrollees (e.g., the total population, the population of subsidized or the population unsubsidized enrollees) in market m at time t . $COOPShare_m$ is the market share of the exiting COOP in 2015. $YR16$ and $YR17$ are indicator variables for years 2016 and 2017, respectively, with 2015 as the base year. Year fixed effects (τ_t) control for changes in the outcome variable common over all markets and market fixed effects (δ_m) control for baseline differences across markets. Finally, M_{mt} is a set of time-

varying market characteristics to control from local economic conditions. Standard errors are clustered at the market level.

Table 1.9. Relationship between Exiting COOP Share and Enrollment Population (2015-2017)

	(1)	(2)	(3)	(4)
VARIABLES	share aptc	aptc # lives	ln(aptc)	enroll # lives
COOP16	0.0434*** (0.0134)	1,059 (912.7)	0.0816*** (0.0280)	145.4 (1,218)
COOP17	0.0446*** (0.0150)	3,401*** (1,272)	0.161*** (0.0477)	2,681 (1,633)
Year FE	yes	yes	yes	yes
Market FE	yes	yes	yes	yes
Observations	945	945	945	945
R-squared	0.648	0.997	0.997	0.997

	(5)	(6)	(7)
VARIABLES	ln(enrollment)	unsubsidized # lives	ln(unsubsidized)
COOP16	0.0121 (0.0270)	-913.1* (478.3)	-0.497*** (0.0722)
COOP17	0.0880* (0.0455)	-719.9 (584.4)	-0.348*** (0.0863)
Year FE	yes	yes	yes
Market FE	yes	yes	yes
Observations	945	945	945
R-squared	0.997	0.982	0.988

Notes: Observations are at the market-year level. Shareaptc= share of the market represented by individual receiving tax credits in a given year. Unsubsidized= number of unsubsidized enrollment per market in a given year. COOP16 and COOP17 is the share of the exiting COOP in the market interacted with the year indicator variable. 2015 is the base year. All regressions include market and year fixed effects. Other control variables are omitted for clarity. Robust standard errors clustered at the market level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Column 1 relates exiting COOP market share to the share of market enrollment that receives a premium tax credit. Results indicate greater increases in market share of individuals with premium tax credits in markets where the exiting market share of the exiting COOP is larger. To determine whether such a change in share is driven by greater enrollment from subsidy eligible individuals, lower enrollment from non-subsidy individuals, or both, additional regressions are run relating exiting COOP market share to the raw and log number of lives receiving a premium tax credit (columns 2 and 3), raw and log number of lives not receiving a premium tax credit (columns 6 and 7), and raw and log total enrollment (column 4 and 5). Results suggest that the increase in the share of premium tax credit enrollees per market is driven by both an increase in the number of subsidized enrollees and a decrease in the number of unsubsidized enrollees. Such a result is consistent with unsubsidized consumers leaving the Marketplace as a result of increasing premiums and subsidized consumers joining the Marketplace in response to higher premium tax credits. Results for enrollment overall in the Marketplace suggest a small increase in Marketplace enrollment in COOP exit market, potentially giving evidence to the hypothesis that the Marketplace and off-Marketplace plans experience different demand responses to increasing premiums. I am not able to determine whether individuals who leave the Marketplace drop out of the market altogether or simply move to an off-Marketplace plan given that the data used for this particular analysis is not available for the individual market as a whole. To interpret this result as clear evidence of a demand response to the change in markets is limited by the lack of 2014 data as without data from 2014, it is not possible to establish parallel pre-trends.

1.5 Limitations

There are several limitations to this study. First, plan enrollment-level data is not available for years 2016 and 2017. Such a limitation makes market-level and insurer-level data analysis necessary. However, given the fact that the majority of market enrollees choose to enrollee in the lowest cost plans and the fact that premium tax credits are based off of the second lowest cost silver plan in the market, market and insurer level measures are likely a good proxy.

Second, claims data is not available to assist in the determination of whether or not selection plays a role in premium changes due to COOP exit. Available data does allow for more summary analysis, which suggests that selection may be an important consideration for the consequences of premium changes.

Third, a measure or measures of plan generosity are difficult to construct using this data. For example, while actuarial value may be the best summary measure, the variation in actuarial value within metal level in the latter years of Marketplace operation limits inquisition. Additionally, salient measures like deductible or co-pays are not standardized across plans and are therefore hard to measure without error. Finally, other meaningful measurers such as network breadth are not available for the years of study.

1.6 Discussion and Conclusion

The Affordable Care Act's Marketplaces serve as the only option for millions of Americans to purchase health insurance. Current laws and regulations were constructed in hopes that consumer demand and competition across health insurance companies would lead to efficient outcomes, yet the success of these policies vary across the nation. Debate over how to regulate individual market coverage and promote stable, competitive markets remain at the

forefront of the health care policy debate in federal and state governments. Understanding how policies aimed at increasing competition through the subsidization of market entry have contributed to differential affordability across the Marketplaces is therefore essential to future policy making in the Marketplaces, other managed competition health care markets, and even in industries like renewable energy or broadband, where government may seek to improve outcomes where little current competition exists.

This study examines the change in competition across markets created by the ACA policy to create new health insurers (COOPs) and the subsequent law passed that acutely disadvantaged COOPs and lead to their ultimate dissolution. Using difference-in-differences analysis, I examine several aspects of how this change in the competitive landscape affects Marketplace outcomes. First, I explore how competition in the Marketplaces affects premiums and benefit generosity and find that premium increases are higher in markets where the exiting COOP represented a larger share of the market. For the mean market with COOP competition loss, premiums were 3.8% higher in 2016 and 8% higher in 2017 for the second lowest cost silver plan in the market. The evidence for the effect on other plan characteristics, specifically plan benefit generosity as measured by a plan's actuarial value and deductible is generally inconclusive. Because insurers have latitude, albeit constrained, to vary plan design in ways that may not be readily apparent to consumers, further research on how competition drives plan design is important to pursue.

Second, I analyze the extent to which the differential premium increases can be explained by the mechanical effect of COOP exit and find that premium increases in 2016 can fully be explained by the removal of the COOP plan offering from the Marketplace. Although COOP competitors knew of the solvency problems facing the COOPs, the result that premium increases were purely mechanical in 2016 is expected because the COOPs studied in this paper filed plan

offerings for the 2016 year and did not exit the market until after all plan offerings had been submitted for open enrollment. In contrast, regressions show that 2017 premium increases are a strategic pricing response of competitors remaining in the market and not just a residual mechanical effect. Such a result indicates that the value of a low premium competitor is not simply in providing lower premium plans, but also in driving competing insurers to lower their premiums.

Third, I analyze whether the premium increases can be attributed to shifts of enrollees among insurers (within-market risk movement) as well as to shifts of people into and out of markets (extensive margin risk movement) following the loss of COOP competition. I find that, prior to exit, COOPs had a healthier-than-average risk profile than their competitors, indicating that even if risk adjustment does not perfectly mitigate selection incentives, that the effect of pure redistribution of COOP risk into competitor plans would be negative, rather than positive on premiums. Because risk adjustment is budget neutral, the finding that COOPs had healthier enrollees does not rule out the possibility that COOP markets as a whole became relatively less healthy (higher risk and cost) with the exit of COOPs and therefore drove premium increases. Regressions examining risk scores and average per capita costs changes explore this possibility of extensive margin market changes. State-level risk score changes in response to COOP exit cannot be determined as a result of the limited variation across states and time. When per capita costs are examined on a state-level, I find that, compared to 2014, the average claims costs for enrollees in states with exiting COOPs are larger in 2016 in the individual market and smaller (but not statistically significant) in 2016 in the Marketplace. Interpreting the point estimate for the average COOP exit market translates to the conclusion that per enrollee cost growth was 2.6 percent greater in states with COOP exit than in states without in the state's full individual

market. When analyzed at the insurer-level, similar results are seen, but point estimates are not precise, with high standard errors. One potential conclusion is that the individual market as a whole experienced adverse selection through the exit of relatively healthy individuals but that increased subsidies (the result of an increase of the second lowest cost silver plan) may have attracted and help retain healthier enrollees in the Marketplace. Such a conclusion would attribute Marketplace premium increases on insurer strategic pricing and not from overall market risk changes. However, it is important to note that Marketplace-specific conclusions should be considered with an abundance of caution given the high level of noise in the point estimates and the incentives for insurers to “game” medical loss ratio data. All told, the magnitude of the point estimates do not explain the premiums effects estimated above and likely the only conclusion to be drawn here is that selection is unlikely to have a large effect on premium changes. This is an important area for future research, particularly regarding the dynamic between on and off-market selection experience.

Finally, in recognition that the structure of premium tax credits shields subsidized enrollees from premium increases, I examine enrollment behavior differences between subsidized and unsubsidized of individuals across Marketplace markets in response to COOP exit. Results indicate an increase in the market share of subsidized enrollees, driven by both an increase in the number of subsidized enrollees and a decrease in the number of unsubsidized enrollees in COOP exit markets. Such a result is consistent with unsubsidized consumers leaving the market as a result of increasing premiums but an additional counter-balancing response of subsidized consumers entering, or remaining in the market as a result of higher premium tax credits.

Overall, results of this paper suggest that promoting market competition through subsidized entry can be valuable to consumers. My results show that competition, particularly from low premium insurers, in the ACA federal Marketplaces can both restrain premium growth and attract and retain unsubsidized consumers in the market. Policies to limit the need for active choice could mitigate such effects. Further research into both the non-premium responses of insurers to changes in competition and participant response to available insurance plans and premiums would be beneficial. The tradeoffs between the subsidization of market entry and consumer gains through competition should also be explored.

Chapter 2: Consumer Choice in Health Insurance Marketplaces

2.1 Introduction

The Affordable Care Act (ACA) dramatically reformed the individual health insurance market in the United States, largely relying on the principles of “managed competition.” Under the rules set up for this newly-regulated individual market, active consumer health plan choice should drive competition among health insurers, causing insurers to offer products at prices that are close to the underlying cost to the insurer of providing the products. However, if consumers do not make informed active choices, competitive outcomes may not result. While evidence from other health insurance markets such as Medicare and employer markets suggests that consumers often make choices that are hard to rationalize, there is little evidence on the extent of such consumer choice frictions and switching costs in the newly reformed individual market.

This paper examines consumer choice behavior in the Colorado Marketplace, Connect 4 Health Colorado (C4), focusing specifically on consumer price sensitivity, evidence of inertia, and switching behavior. As debate over reform of the individual market (e.g., individual mandate, public plan options, subsidies, and benefit and rating flexibility) continues to take center stage in the policy and political arena, results from this study are particularly relevant to policy reform in the individual market by states and the federal government.

Evidence from consumers in the employer and Medicare Advantage (MA) markets suggest consumers are price sensitive when making active choices. (Abraham, Vogt, & Gaynor, 2006; Bundorf, Levin, & Mahoney, 2012; Curto, Einav, Levin, & Bhattacharya, 2015; Cutler & Reber, 1998). However, evidence also suggests when consumers are not required to make active choices, inattention or inertia in health plan choices can lead consumers to stay in their default

plan instead of switching to lower cost plans when they become available.²⁷ This inattention provides insurers with an incentive to raise prices over time.²⁸ Indeed, a body of evidence from the employer (Handel, 2011, Kling et al., 2012) and Medicare Advantage and Part D markets (Abaluck and Gruber, 2011; Heiss, McFadden, and Winter, 2007; Ketcham et al., 2012; Ericson, 2014) document such an effect in these health insurance markets.

However, the “Marketplaces” created by the ACA as part of the reform of the individual-market are likely to differ from the employer and MA settings. The Marketplace enrollment pool includes a higher proportion of consumers with lower average incomes than is typically the case with employer groups and Marketplace consumers are younger than Medicare enrollees. Moreover, a high proportion of the Marketplace consumers were uninsured before 2014. And, for many, Marketplace enrollment is also temporary.²⁹ Finally, while many receive subsidies for enrolling in Marketplace coverage, the subsidy is constant across plans, implying that consumers pay the full incremental cost of choosing one plan vs. another, a key difference from much of the employer and MA markets.

Early evidence from the Marketplaces confirms that average price sensitivity is high (Burke, Misra, and Sheingold, 2014; Gabel et al., 2017; ASPE, 2016). However, it remains unknown whether that average is driven by higher price sensitivity across all consumers or by higher levels

²⁷ Handel BR. Adverse selection and inertia in health insurance markets: when nudging hurts. *Am Econ Rev.* 2013;103(7):2643–82.

Sinaiko AD, Afendulis CC, Frank RG. Enrollment in Medicare Advantage plans in Miami-Dade County: evidence of status quo bias? *Inquiry.* 2013;50(3):202–15.

²⁸ Ericson KMM. Consumer inertia and firm pricing in the Medicare Part D prescription drug insurance exchange. *Am Econ J Econ Policy.* 2014;6(1):38–64.

²⁹ Data from the Department of Health and Human Services shows that over one-third of customers who enrolled during 2015 year had disenrolled by the end of the year (Apostle 2016).

of churn generating a larger portion of new enrollees making active choices relative to incumbent enrollees who may still exhibit substantial inertia. Indeed, data from the Department of Health and Human Services (HHS) shows that in 2015, fifty-three percent of enrollees were new enrollees during open enrollment and over one-third of customers who enrolled during the year had disenrolled by the end of the year (Apostle, 2016), indicating that churn rates are high in the Marketplaces.

We investigate price sensitivity, consumer frictions and switching costs, and churn using individual-level data from C4 spanning plan year 2014 to plan year 2016. We use longitudinal, individual-level administrative enrollment and plan data from C4 to examine how consumers respond to price changes, providing evidence on the levels of price sensitivity among new and incumbent enrollees as well as the relative sizes of these groups. The setting also allows us to test for switching costs/inertia. In this paper we refer to inertia or switching costs interchangeably as we are unable to separate out the specific frictions that lead to inertia. And, notably, while we attempt to isolate inertia from brand preference, we often refer to inertia/switching costs evidence when we have not fully accounted for brand or provider preference. This study is the first to explore enrollment decision making and enrollment across plan years in the Marketplace on an individual level.

We find that, on average, consumers in C4 are highly price sensitive, with average price elasticities for all enrollees of -2.75 with a range of -6.82 for new enrollees to -0.866 for continuing enrollees. We find that price elasticities are much larger for new enrollees vs. continuing enrollees, though continuing enrollees are still relatively more price sensitive than continuing enrollees have been estimated to be in other health insurance markets. Thirty percent of continuing enrollees who had the option to stay in their current plan opted to switch,

consistent with rates reported by HHS for the Marketplace population although higher than is typically reported in the employer market or the Medicare private market. We also find that price elasticities for incumbent enrollees who are forced to switch due to their plans being cancelled are almost as high as those we estimate for new enrollees.

We find evidence of preference heterogeneity, with younger consumers exhibiting much higher levels of price sensitivity than older consumers, consistent with previous work from Massachusetts by Ericson and Starc (2012). Switchers are more likely to be tax credit receivers, more likely to be in silver plans than bronze, more likely to face higher potential savings to switching, and more likely to have their plans become relatively more expensive. We find no difference in price sensitivity between subsidized and unsubsidized consumers when focusing on consumer choices across plans within the Marketplace. However, we find suggestive evidence that the exit of low premium plans has important effects on the probability that unsubsidized consumers remain in the market but no effect on subsidized consumers. The price of coverage for the subsidized consumers, of course, is fixed due to the presence of price-linked subsidies that increase when low-premium options exit.

This paper proceeds as follows: section 2.2 provides a background on the health plan choice environment and rules in the Marketplaces as well as in C4. Section 2.3 describes the data and sample construction. Section 2.4 includes the descriptive analysis of the research questions. Section 2.5 presents the enrollee demand model and examines price sensitivity and evidence for inertia using a conditional logit model. Section 2.6 concludes.

2.2 Background

Plan Choice in the Marketplaces. The ACA created Marketplaces in the individual and small group health insurance markets as part of a package of health system reforms; the Marketplaces and regulations accompanying them were intended to increase access and affordability of health insurance coverage. Eligible individuals, typically those without access to employer-sponsored coverage or public health insurance programs such as Medicare and Medicaid, can purchase health plans that are approved by regulators and offered by private insurers on the Marketplaces.

Insurers can offer plans in four metal levels of increasing generosity of insurer payment for health costs: bronze, silver, gold, and platinum. All such plans must cover at least a minimum set of benefits, called the Essential Health Benefits, and insurers are only allowed to rate premiums based on an enrollee's age, geographic region of residence, and smoking status (within regulated limits). Individuals with incomes below 400%FPL have access to premium tax credits through purchase of a health plan on the Marketplace and those with incomes under 250%FPL also have access to cost-sharing reductions when they purchase a silver plan on a Marketplace.

The Marketplace functions as a common platform where all competing plans are offered to consumers. Each state has its own Marketplace (C4 in the case of Colorado) but it is important to note that consumers' choices of plans depend on where they live within a state. Under the ACA, states are permitted to determine how many premium rating areas (markets) there are in the state. With a few exceptions in states with more restrictive regulations and more active Marketplace regulators, insurers meeting the minimum requirements for offering plans on the Marketplace can offer as many plans as they like and choose which markets they want to offer such plans. As a result, plans within metal levels vary by cost-sharing structure, generosity

of specific benefits covered, provider network, management type, and other unobservable or difficult-to-observe measures of quality and generosity—both within and across states.³⁰

New and continuing consumers can sign up for a plan during the annual open enrollment period, the timing of which varies depending on the year in this study, but generally begins on November 1st. In 2014, all enrollees were new and had to actively select a plan. But in years following 2014, currently enrolled individuals receive a notice from the Marketplace and their health insurance plan informing them of their enrollment and what actions will take place if they do not actively disenroll or reenroll in a plan during open enrollment. Under the Marketplace rules, a currently enrolled individual will be automatically enrolled in the same or similar plan (as selected by the issuer if it discontinues the plan in which the individual is enrolled) if they take no affirmative action. Such automatic reenrollment will not take place if (1) individuals who received tax credits in the year before did not give permission to the state Marketplace to request an eligibility renewal for tax credits, (2) the plan in which the individual is currently enrolled is discontinued and the insurer does not identify a new plan for automatic enrollment, or (3) the individual actively disenrolls or enrolls in a different plan during open enrollment. Such defaults allow for consumer inattention that could potentially contribute to suboptimal choices in the Marketplace but they are also designed to promote market stability across years.

When purchasing insurance for the first time on the Marketplaces (or when reenrolling with eligibility changes), potential enrollees must first determine their eligibility for a premium tax credit and/or cost-sharing reduction subsidies before selecting a plan. To determine eligibility to purchase, consumers must enter demographic and income information. After eligibility

³⁰ Katherine Swartz et al. How Insurers Competed in the Affordable Care Act's First Year, The Commonwealth Fund, June 2015.

determinations are made, consumers are offered the choice set of plans available to them in their market at the price they can expect to pay (i.e., net of premium tax credits). Plans are displayed in increasing order of price but consumers can select different ways of viewing plans online.³¹

Colorado Marketplace. C4 is the fifth-largest of the thirteen state-based Marketplaces.³² In comparison to the federal Marketplaces, the Colorado Marketplace offers a greater average number of plan choices by market. Depending on where they reside in the state, many Colorado Marketplace enrollees could choose in 2015 from more than sixty different silver plans from ten carriers, including a large staff-model health maintenance organization (HMO), other HMOs, and preferred provider organizations (PPOs). By contrast, on average, consumers in the thirty-eight states served by the federally facilitated Marketplace could choose among forty-six silver health plans.³³

In 2016, only 22% of Colorado residents who were eligible for Marketplace coverage chose to enroll, lower than the national take-up rate of 40%.³⁴ The age distribution of Colorado Marketplace enrollees was similar to the age distribution of Marketplace enrollees nationally. However, enrollees in Colorado are more likely to choose a plan in the bronze tier (45 percent in

³¹ Consumers may see plans differently if they view plan using a third-party vendor's site or if they are working with an agent, broker, or Navigator.

³² Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. Health Insurance Marketplaces 2015 open enrollment period: March enrollment report [Internet]. Washington (DC): ASPE; 2015 Mar 10 [cited 2016 Dec 8]. (ASPE Issue Brief). Available from: <https://aspe.hhs.gov/sites/default/files/pdf/83>

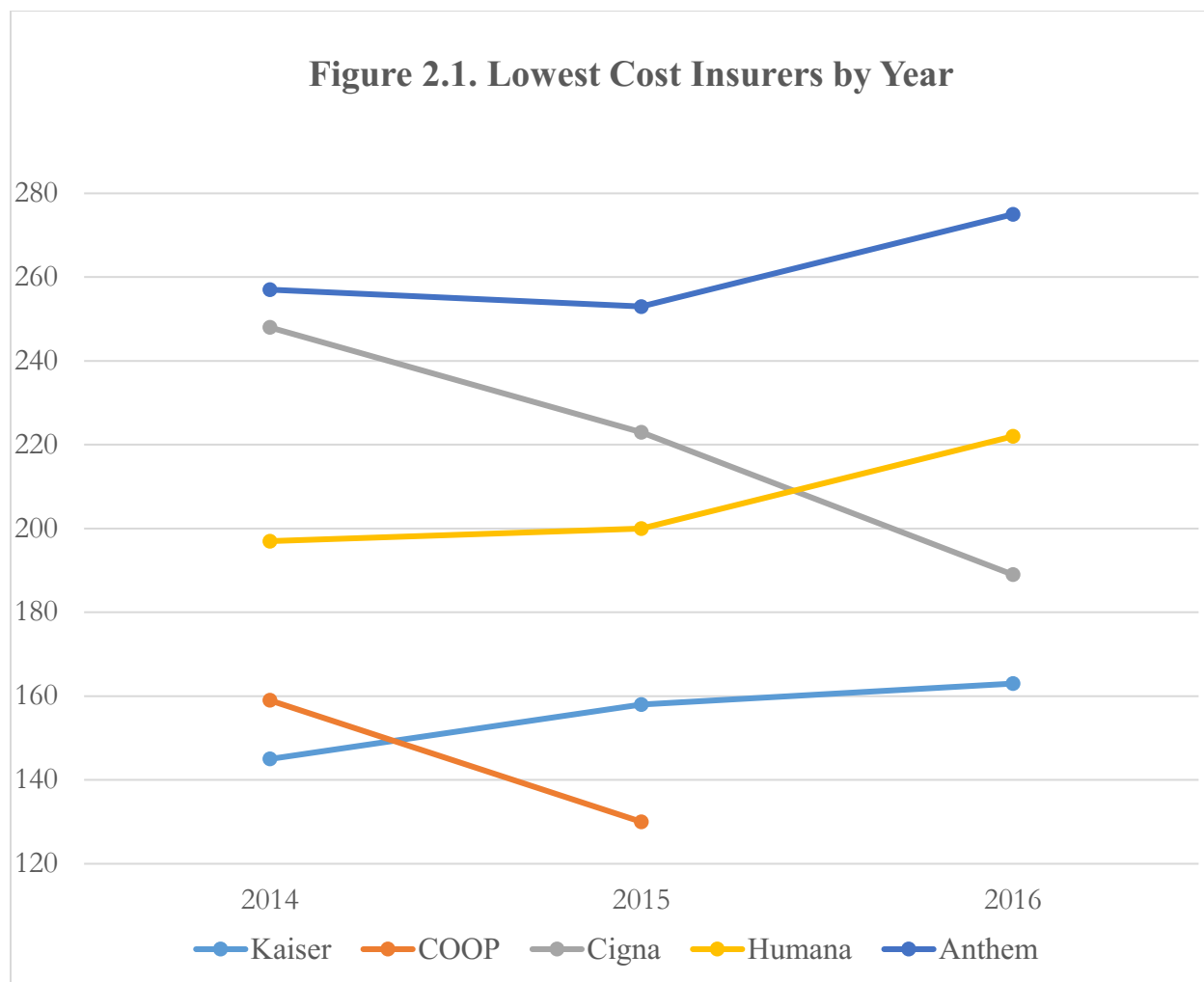
³³ Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. Health Insurance Marketplace premiums after shopping, switching, and premium tax credits, 2015– 2016 [Internet]. Washington (DC): ASPE; 2016 Apr 12 [cited 2016 Dec 8]. (ASPE Issue Brief). Available from: <https://aspe.hhs.gov/sites/default/files/pdf/198636/MarketplaceRate.pdf>

³⁴ Kaiser Family Foundation. <https://www.kff.org/health-reform/state-indicator/marketplace-enrollment-as-a-share-of-the-potential-marketplace-population-2015/>

Colorado and 23 percent nationally), which is likely a consequence of the fact that enrollees in Colorado are less likely to receive subsidies in the form of tax credits or cost-sharing reductions (61 percent in Colorado and 84 percent nationally).³⁵

Insurer participation and pricing strategies were highly variable over the first three years (Figure 2.1). In the first plan year, Kaiser Health Plan was the lowest cost insurer over most of the counties in Colorado. In its second year, the COOP plan undercut Kaiser's pricing, becoming the lowest cost insurer in the majority of counties. Finally, in 2016, the COOP exited all markets and Kaiser once again became the lowest cost insurer in the majority of counties.

³⁵ Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. Health Insurance Marketplace premiums after shopping, switching, and premium tax credits, 2015– 2016 [Internet]. Washington (DC): ASPE; 2016 Apr 12 [cited 2016 Dec 8]. (ASPE Issue Brief). Available from: https://aspe.hhs.gov/sites/default/files/pdf/198636/Market_placeRate.pdf



Note: Vertical axis represents monthly cost on the insurer's lowest cost silver premium in Adams County for a 21-year-old. Premiums are not representative of all counties. Premiums reported not reflect price or relative price rank in all rating areas because insurers are allowed to price premiums differently by rating area and are also allowed to choose whether or not to offer plans in a given rating area.

2.3 Data and Sample

Data. We obtained administrative enrollment and health insurance plan data from C4 for plan years 2014-2016. The data includes each household's plan selection, their tax credit value, their county and zip code of residence, and demographics of household members (age, sex, and income as proxied by tax credit amount and receipt of cost-sharing reductions). We also obtained administrative plan data from Wakely Consulting Group (Wakely) which includes details for

each plan on gross premium by age, rating area and smoking status, service area, cost-sharing rules, and plan type (HMO, PPO, etc.). A crosswalk of plans, also provided by Wakely is used to track default enrollment plans across years. Counties are used in this analysis as the “market” because there are cases where an insurer (Kaiser) only offers plans in some counties within a rating area.

Sample. We constructed a panel dataset describing plan enrollment for all enrollees in the Marketplace for 2014-16. Individuals whose enrollment and disenrollment date is the same in a given year of enrollment are dropped from our sample. Such individuals either signed up and never paid a premium or selected a plan but never enrolled in the plan. Plan details and crosswalk information across years are added using the Wakely plan data. For much of the paper’s analysis, enrollees are separated into three categories: *New Enrollees*, who are assigned to a year based on the first year in which their unique member identification is enrolled in a health insurance plan; *Continuing Enrollees*, who are identified as enrollees who have both a plan selection in the current and previous year and were given the option to default into their same plan if they chose not to act during open enrollment; and *Forced Active Enrollees*, who are identified as enrollees whose enrollment continues across plan years but who were in a plan that was cancelled and no crosswalked plan was provided for the following year during open enrollment.

Table 2.1 presents a summary of Colorado Marketplace enrollees by year (2014-2016) and enrollment type.

Table 2.1. Descriptive Statistics

Sample Demographics	All Enrollees	New Enrollees	Forced-Active	Continuing Enrollees
2014				
N- Subscriber	84,237	84,237	--	--
N- All Members	123,356	123,356	--	--
Age	44	44	--	--
Sex (male)	47.4	47.4	--	--
Tax Credit(%)	60.6	60.6	--	--
CSR (%)	30.50%	30.50%	--	--
Mean Premium (21yo)	215	215	--	--
Silver (%)	48.6	48.6	--	--
Bronze (%)	38.2	38.2	--	--
2015				
N- Subscriber	119,879	47,853	1,107	70,919
N- All Members	173,020	69,300	1,705	102,015
Age	45	42.2	51	46
Sex (male)	49%	49%	49%	48%
Tax Credit (%)	55	47.5	60.5	60.1
CSR (%)	19	22.30%	30%	32
Mean Premium (21yo)	210	196	241	219.71
Silver (%)	48	43.5	46	51.8
Bronze (%)	38	41	44.1	36.3
2016				
N- Subscriber	111,706	44,894	27,971	38,841
N- All Members	163,285	67,058	40,317	55,910
Age	42	40.4	45.5	42.8
Sex (male)	49%	49%	50%	49%
Tax Credit (%)	60	60.0	62.1	59.1
CSR (%)	25.7	23.0	26.5	28.4
Mean Premium (21yo)	237.4	235.7	241.0	236.7
Silver (%)	44.5	40.5	44.6	49.1
Bronze (%)	45.1	48.8	47.0	39.4

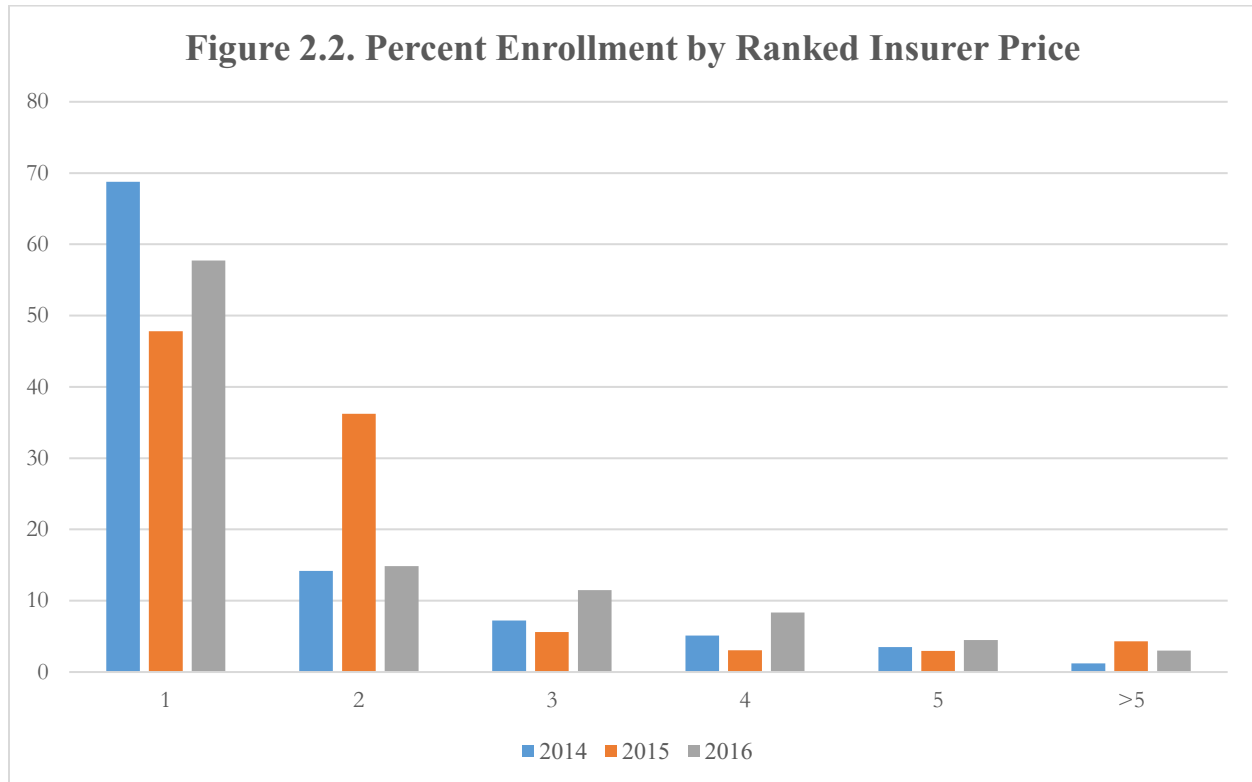
Note: Table shows individual-level mean and standard deviation summary statistics by year by enrollment type. The sample includes all individuals enrolled in the C4 Marketplace in a given year. Tax Credit= the percent of enrollees with at least \$1 in premium tax credit. CSR= the percent of enrollees enrolled in a silver plan with cost-sharing reductions

2.4 Descriptive Analysis

We start by providing reduced form, descriptive results that provide insights into consumer price sensitivity, switching behavior, and inattention across years in C4.

First, in Figure 2.2 we illustrate price sensitivity by plotting the portion of enrollees enrolled with each insurer, with the insurers ranked according to the price of their lowest price plan in a given metal tier. The bars for insurer “1” indicate the portion of consumers choosing a plan offered by the insurer with the lowest price plan in a given tier. The bars for insurer “2” indicate the portion of consumers choosing a plan offered by the insurer with the lowest price plan in a given tier after removing the plans offered by insurer “1”, and so on. Results look similar when this plot is at the level of the plan rather than the insurer (see Appendix Figure 2.1A), but patterns are easier to see at the insurer level.

From Figure 2.2, a number of choice dynamics are apparent. First, in the initial year of the C4 Marketplace (2014), consumers seem to be highly price sensitive, with almost 70% of consumers choosing a plan offered by the lowest-price insurer. Second, in the second year of the C4 Marketplace (2015), when the pool of Marketplace enrollees was split between new enrollees and continuing enrollees, average price sensitivity seems to have declined, with less than 50% of consumers choosing a plan from the lowest-price insurer and almost 40% choosing a plan from the second-lowest price insurer. Third, in the third year of the C4 Marketplace (2016), we see a rebound in average price sensitivity with almost 60% of consumers choosing a plan from the lowest-price insurer.



Note: Vertical axis represents the percent enrollment by year. Horizontal axis is ranked insurer price. Rank insurer price is constructed by ranking the lowest cost premium offered by each insurer within a county and metal level. Sample includes all enrollees.

To understand these dynamics, it is useful to describe the pricing dynamics in the market during this period. As shown in Figure 2.1, Kaiser was originally the lowest-price insurer.³⁶ In 2015, the COOP became the lowest-price insurer and Kaiser moved to be the second lowest-price insurer. In 2016, the COOP exited the market, forcing all former COOP enrollees to actively choose a different plan, and Kaiser once again became the lowest-price insurer. Given these pricing dynamics, the choice patterns we observe could be explained by either of two features of the market. First, consumers could have a strong brand preference for Kaiser. This

³⁶ Here and throughout the paper, “lowest-price insurer” broadly refers to the lowest-price insurer in the majority of markets, unless such a measure is performed at the market level.

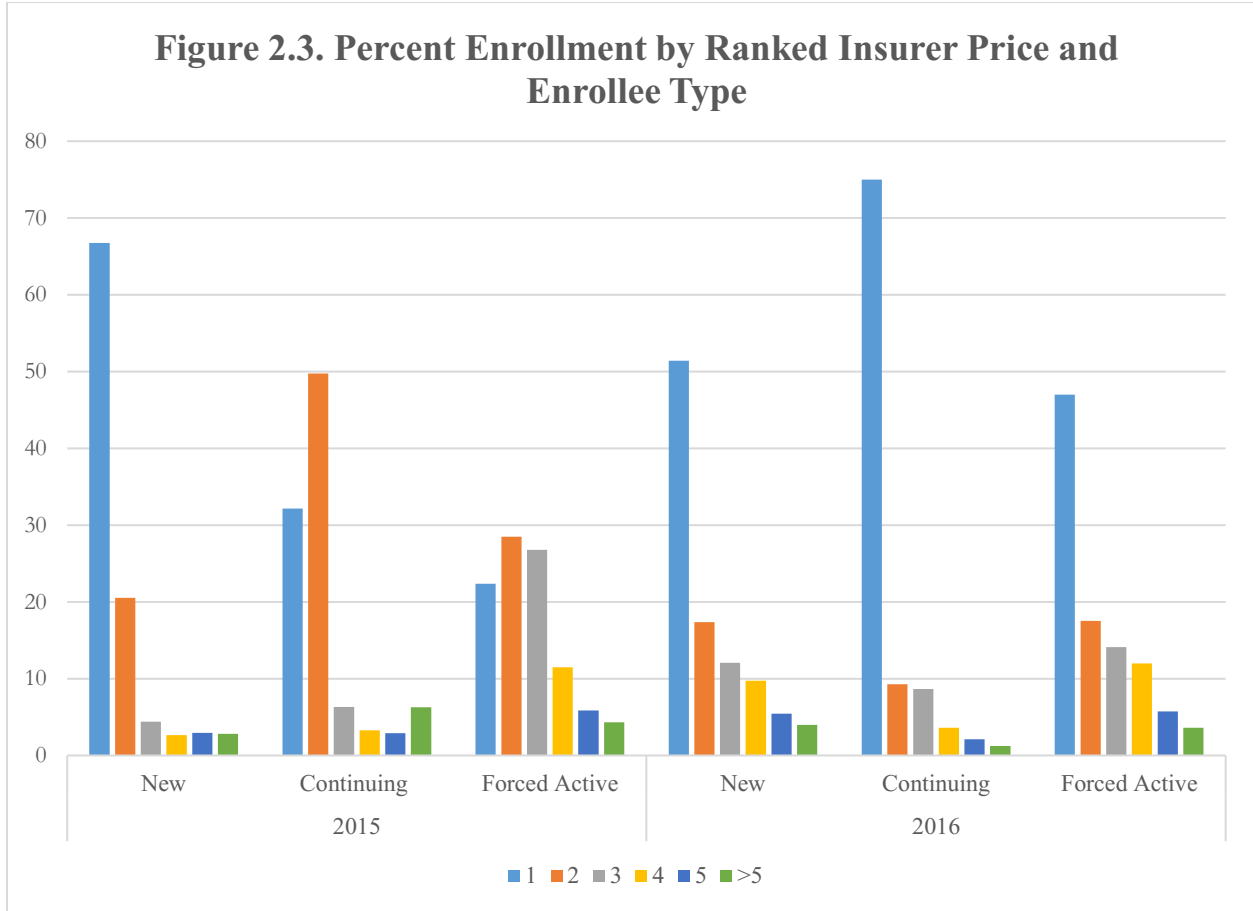
could explain why when Kaiser becomes the second lowest-price plan (in 2015), there is not a great deal of switching from Kaiser to the lower-price COOP. An alternative explanation is inertia. In 2014, all consumers are new and are making active choices, so highly price sensitive consumers choose the lowest-price plan in 2014, Kaiser. In 2015, when a lower-price option (COOP) becomes available, continuing enrollees get “stuck” in Kaiser due to switching costs or inertia. In 2016, Kaiser becomes the lowest-price option again and potentially inertial consumers just slide back into the lowest-price slot.

A limitation of previous research on Marketplace enrollment is that with aggregate data, these two explanations were difficult to disentangle. For years after 2014 when all enrollees were not, by default, active choosers, summary plan enrollment data masks differences in choice behavior of passive and active enrollees.

Our individual-level data allows us to separate the choices for new, continuing, and forced active enrollees for plan years 2015 and 2016 (all 2014 plan enrollees are new by definition) to attempt to disentangle the two explanations for the choice patterns observed in Figure 2.2 (inertia and strong brand preference for Kaiser). Figure 2.3 displays the percent of enrollment by ranked insurer price within a metal level for enrollees by consumer type (i.e., new, continuing, and forced active). Here, we can see how price sensitivity differs across groups. In 2015, it is clear that the “new” enrollees were every bit as price sensitive as the new enrollees in 2014 (i.e., all enrollees), with nearly 70% of them choosing a plan from the lowest-price insurer. This is true even though the lowest-price insurer in 2015 was the COOP, not Kaiser. In 2015, the “continuing” enrollees, however, are much less price sensitive, with only 30% in a plan offered by the lowest-price insurer while around 50% are with the higher-priced Kaiser. In 2015 the group of “forced active” enrollees also exhibit low levels of price sensitivity, though this group

was small in this year and most of these consumers initially chose higher price options in 2014, suggesting they are a much less price sensitive group (see Table 2.1). Comparing the choice patterns of new and inertial enrollees, which Table 2.1 shows are two groups with similar demographics, reveals that the aggregate choice dynamics are much more likely to be explained by inertia than by a brand preference for Kaiser: If consumers had a strong brand preference for Kaiser, we would expect the choice patterns for the new enrollees in 2015 to mimic the choice patterns for the inertial enrollees. We do not see this in practice. It should be noted that new and continuing enrollees may be different in unobservable ways, including risk profiles, which may drive a brand preference. However, such a case is unlikely given the steady-state turnover in the market and the dramatically different choice patterns.

In 2016, Kaiser again became the lowest-price insurer. Figure 2.3 shows that for this year, we see high levels of enrollment in the lowest-price option (Kaiser) among the “new” and “continuing” groups. We also see high levels of enrollment in the lowest-cost option among the “forced out” group. Recall that this group is largely made up of former COOP enrollees in 2016 because the COOP was forced to exit the market in that year. It is not surprising that this group of (highly price sensitive) former COOP enrollees again opted to enroll in the lowest-price plan when forced to make an active choice. All of these 2016 results are consistent with both the “strong brand preference for Kaiser” and “inertia” explanations. However, when combined with the 2015 results, which strongly favor the “inertia” explanation, the bulk of the evidence points toward inertia among continuing enrollees and high levels of price sensitivity among enrollees making active choices as the reason for the choice dynamics observed in Figure 2.3. Appendix Figure 2.2A shows choices for the group of consumers who are continuously enrolled from 2014 through 2016. This Figure again provides strong evidence of inertia among this group.



Note: Vertical axis represents the percent enrollment. Horizontal axis presents ranked insurer price enrollment by year and type of enrollee. Rank insurer price is constructed by ranking the lowest cost premium offered by each insurer within a county and metal level. Sample includes all enrollees divided into three different groups for analysis. *New Enrollees*, who are new to the Marketplace in that year; *Continuing Enrollees*, who those enrollees who have both a plan selection in the current and previous year and were given the option to default into their same plan if they chose not to act during open enrollment; and *Forced Active*, who are identified as those enrollees whose enrollment continues across plan years but who were in a plan that was cancelled and no crosswalked plan was provided for the following year during open enrollment.

In an attempt to account for preference heterogeneity and estimate price sensitivity more directly, we employ a fixed-effect linear regression model. We use within plan premium variation to identify how changes in price affect enrollment. We estimate the following regression equation relating plan share to price:

$$(1) \quad \Delta \log(s_{jm}) = \beta_1 \Delta P_{jm} + \beta_2 \Delta X_{jm} + \Delta \varepsilon_{jm},$$

where s_{jmt} is enrollment in plan j in market m ³⁷ at time t as a share of overall market enrollment at time t . Product characteristics including metal level, deductible level, and insurer-market and insurer-metal level fixed effects are represented by X_{jmt} . ε_{jmt} represents unobserved quality, including network quality, which admittedly could be correlated with the change in price. Insurer fixed effects attempt to mitigate such a correlation. Estimates of β_1 should represent premium sensitivity.

Table 2.2 presents the results from estimating equation 1 with increasing levels of fixed effects using three different sample populations (all enrollees, continuing enrollees only, and new enrollees only) for 2014-2015. We chose 2014-2015 because plan choice sets are generally stable across the two years and there is a change in the lowest cost insurer across the years. Columns 1, 2 and 3 have market fixed effects, columns 4, 5 and 6 have market-by-metal level fixed effects and columns 7, 8 and 9 have market-by-insurer fixed effects. In the preferred specification (market-by-metal fixed effects), we estimate price elasticities of -2.75 for all enrollees, -0.866 for continuing enrollees, and -6.821 for new enrollees. Such results indicate that continuing enrollees are 70 percent less price sensitive when premiums increase across years. Previous work using similar methods but only state-insurer level Marketplace enrollment data finds that a one percent premium increase reduced plan-specific enrollment by 1.7 percent (Abraham et al., 2017). Our results show that this average masks the different price sensitivities of the new and continuing enrollees.

³⁷ Note that counties are used as the market measure in this paper due to the fact that Kaiser is allowed to offer in select counties within a market due to provider constraints.

Table 2.2. Demand for Marketplace Plans (2014-2015) by Enrollee Type

	(1)	(2)	(3)	(4)	(5)
VARIABLES	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$
$\Delta \log(\text{prem})$	-2.627*** -0.204	-0.760*** -0.251	-6.888*** (0.282)	-2.751*** -0.219	-0.866*** -0.26
County FE	X	X	X		
Countyxmetal FE				X	X
Sample	All Enrollees	Cont	New	All Enrollees	Cont
Observations	1,875	1,733	1,345	1,841	1,697
R-squared	0.19	0.066	0.456	0.242	0.118

	(6)	(7)	(8)	(9)
VARIABLES	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$	$\Delta \log(\text{enroll})$
$\Delta \log(\text{prem})$	-6.821*** (0.312)	-9.564*** -0.629	-6.574*** -0.6	-12.48*** (0.763)
Countyxmetal FE	X			
Countyxinsurer FE		X	X	X
Sample	New	All Enrollees	Cont	New
Observations	1,298	1,853	1,709	1,318
R-squared	0.493	0.41	0.342	0.573

Note: Observations are on the plan level and include only plans with enrollment greater than 10 individuals across 2014 and 2015. $\Delta \log(\text{enrollment})$ is the log change in enrollment share between 2014 and 2015. $\Delta \log(\text{prem})$ is the log change in plan premium between 2014 and 2015. Columns 1, 3, and 5 include consider all enrollment and columns 2, 4, and 6 only consider enrollment for continuing enrollees (those not enrolled in 2014). Robust standard errors in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

To provide additional evidence for inertia in this market, we use enrollment data aggregated to the market-year level to test whether past prices are correlated with current enrollment by estimating the following regression:

$$(2) \quad \ln(s_{jmt}) = \beta_1 P_{jmt} + \beta_2 X_{jmt} + \alpha_1 P_{jmt-1} + \alpha_2 X_{jmt-1} + m_{mt} + \varepsilon_{jmt} ,$$

where $\ln(s_{jmt})$ is plan j 's log market share in market m at time t , P_{jmt} is the plan's premium, and X_{jmt} contains its observed characteristics, like metal level. $\ln(s_{jmt-1})$ is plan j 's log market share in market m in the previous year, P_{jmt-1} is the plan's premium in the previous year, and X_{jmt-1} contains the plan's observed characteristics in the previous year. Market fixed effects (m_{mt}) capture variables that are fixed over time in each market and that may vary across markets. Standard errors are clustered at the market-level.

We estimate the regression expressed in equation 2 on three different groups of enrollees—1) all enrollees; 2) continuing enrollees across a given plan year and; 3) those who are continuously enrolled across all three years. All samples are limited to plans with enrollment greater than ten across year thresholds. Table 2.4 presents the results of the regressions relating enrollment to current and past prices for plans offered across plan year thresholds. Regressions are run across each of the year thresholds (2014-2015 and 2015-2016) and across all three years with and without the lagged plan premium and plan characteristics. Table 2.4a presents results for all enrollees and indicates that premiums in 2014 are not a significant predictor of enrollment share in 2015, suggesting a limited role for inertia in plan selection. However, results in Tables 2.4b, which presents results of the estimating equation on only continuing enrollees, indicate that

premiums in the previous year strongly predict plan share in both 2015 and 2016. Results indicate that a plan's premium in the previous year has an almost equal association with plan enrollment in the current year as the plan's current year premium.

Table 2.4c estimates the same regressions with the sample limited to those enrollees who are continuously enrolled across all three years. Columns 11-14 show strikingly similar results to those in Table 2.4b. When the association between 2016 enrollment and plan premiums from 2014, 2015, and 2016 is estimated we find that premiums in 2014, 2015, and 2016 are all significantly associated with plan enrollment in 2016. Interestingly, the coefficient on 2015 suggests a positive association between premium and enrollment, which is consistent with enrollment trends reflected in Figure 2.5. These results provide strong evidence for high levels of frictions in the continuously enrolled population but admittedly, one cannot rule out choice persistence for a doctor, for example, rather than a plan.

Table 2.4a: Response of Enrollment to Current and Past Prices (All Enrollees)					
	(1)	(2)	(3)	(4)	(5)
VARIABLES	Share2015	Share2015	Share2016	Share2016	Share2016
prem14	-0.00219 (0.00362)				-0.00655* (0.00358)
prem15	-0.0267*** (0.00386)	-0.0299*** (0.00304)	-0.0166*** (0.00331)		-0.00904 (0.00650)
prem16			-0.0162*** (0.00149)	-0.0256*** (0.00149)	-0.0167*** (0.00227)
Observations	454	607	611	611	466
R-squared	0.702	0.713	0.705	0.683	0.742

Table 2.4b: Response of Enrollment to Current and Past Prices (Continuing Enrollees)

	(6)	(7)	(8)	(9)	(10)
VARIABLES	Share2015	Share2015	Share2016	Share2016	Share2016
prem14	-0.0124*** (0.00357)				-0.00663 (0.00850)
prem15	-0.0149*** (0.00264)	-0.0303*** (0.00299)	-0.0187*** (0.00474)		-0.0137 (0.0171)
prem16			-0.0120*** (0.00298)	-0.0221*** (0.00245)	0.00407 (0.00660)
Observations	379	464	336	336	264
R-squared	0.697	0.709	0.649	0.620	0.755

Table 2.4c: Response of Enrollment to Current and Past Prices (Continuously Enrolled (2014-2016))

	(11)	(12)	(13)	(14)	(15)
VARIABLES	Share2015	Share2015	Share2016	Share2016	Share2016
prem14	-0.0189*** (0.00382)				-0.0349*** (0.00754)
prem15	-0.00829** (0.00320)	-0.0304*** (0.00295)	-0.0187*** (0.00474)		0.0322*** (0.0107)
prem16			-0.0120*** (0.00298)	-0.0221*** (0.00245)	-0.0200*** (0.00366)
Observations	291	369	336	336	265
R-squared	0.706	0.701	0.649	0.620	0.717

Note: Observations are on the plan-county level and include only plans with enrollment greater than 10 individuals. Share20XX is the enrollment share by county in the given year. PremXX is the log gross premium faced by an enrollee for the plan. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

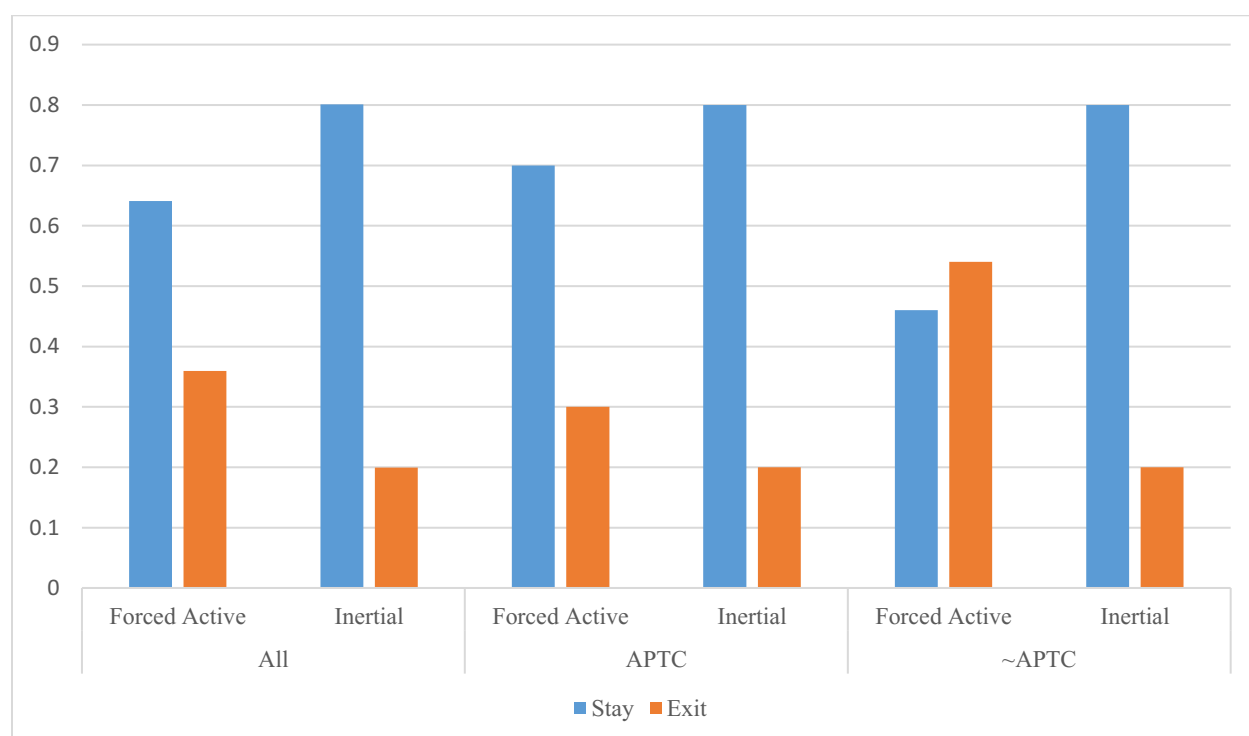
In addition to general choice patterns, we also perform reduced form analyses of switching behavior in this market. These results can be found in Appendix Table 2.2A and Figures 2.3A and 2.4A. Overall, roughly 30 percent of enrollees given the choice to switch opted to switch, consistent with rates reported by HHS for the Marketplace population although higher than is typically reported in the employer market or the Medicare private market. Switchers are more likely to be tax credit receivers (70 percent of switchers were tax-credit receivers compared to 60 percent of enrollees who defaulted into their crosswalked plan), more likely to be in silver plans than bronze, and more likely to face higher potential savings to switching. Additionally, we find that when a plan falls in rank across years (i.e. when a plan moves to a relatively cheaper rank in the choice year than in the base year), the switching rate is lower than when a plan stays the same rank and when a plan increases in rank over the year.

Finally, to better understand the demand response, we use the differential change in the second lowest cost silver plan benchmark across counties as a source of variation to examine the enrollment response of individuals who were and were not previously enrolled in the COOP insurer. Under enrollment rules, individuals who were in COOP plans in 2015 were forced to actively choose a new plan for 2016 but individuals who were not enrolled in COOP plans in 2015 had a default reenrollment plan and were therefore not actively required to reenroll for 2016.

Figure 2.4 charts the percentage of individuals who exited C4's market by whether or not they were forced to actively choose a new plan and whether or not they were eligible for a premium tax credit. While there is not a significant difference between the percentage of individuals leaving the market in the subsidized and unsubsidized population, conditional on having a default reenrollment plan, there is a significant difference in the exiting percentage in

the subsidized and unsubsidized population, conditional on having to actively choose a new plan in order to continue enrollment (i.e., no default plan available). Individuals not eligible for premium tax credits and required to switch to a new plan exited at a rate of 55% where as those covered by premium tax credits exited at a rate of 30%.

Figure 2.4. Market Exit Patterns (2015-2016)



Note: Forced Active Enrollees are enrollees in 2015 that were in a plan in that was cancelled and no crosswalked plan was provided to the following year during open enrollment. Inertial Enrollees are identified if they were given the option to default into their same plan if they chose not to act during open enrollment. APTC= subsidized enrollee. ~APTC= unsubsidized enrollee.

To further explore these results, we estimate the regression expressed in equation 3 relating the natural log of the change in the premium of the Second Lowest Cost Silver Plan from 2015 to 2016 ($\Delta SLCS_{premium}$) to whether or not an individual exits the market between plan years 2015 and 2016 ($exit_i$). $\Delta SLCS_{premium}_m * APTC_i$ is a variable that interacts the natural

log of the change in the premium of the Second Lowest Cost Silver Plan from 2015 to 2016 with an indicator for whether or not the individual is subsidized. $agecategory_i$ is an indicator variable for an individual over the age of 40 and sex_i is an indicator that the individual is male. M_m is a categorical variable for metal level of the individual's 2015 plan enrollment.

$$(3) \quad exit_i = \beta_1 + \beta_2 \ln(\Delta SLCSpremium_m) + \beta_3 (\ln(\Delta SLCSpremium_m) * APTC_i) \\ + \beta_4 M_m + \beta_5 agecategory_i + \beta_6 sex_i + \varepsilon_{im} ,$$

The regression represented in equation 3 is estimated with the two populations—those with default reenrollment plans and those forced to actively select a new plan (Table 2.5 columns 1 and 2, respectively). Results in column 1 suggest similar results to those visually represented in Figure 2.4. When individuals have a default reenrollment plan, exit rates for the subsidized and unsubsidized population are not significantly different and individuals seem to be unresponsive to premium changes. Results in column 2 show that not only is market exit more likely as the change in the premium for the second lowest cost silver plan increases, but that those without premium tax credits are more likely than those with credits to exit the market. Such results indicate a demand response of market exit to increased premiums, but seemingly only among the unsubsidized.

Table 2.5. Relationship between Enrollee Exit from Market and Second Lowest Cost Silver Premium Increase (2015-2016)

VARIABLES	(1) market exit	(2) market exit
$\Delta\text{slc silver premium}$	-0.000468** (0.000196)	0.00180*** (0.000226)
$\Delta\text{slc silver x APTC}$	2.83e-05 (0.000110)	-0.00254*** (0.000168)
age	-0.0554*** (0.00554)	-0.0826*** (0.00891)
sex	-0.00470 (0.00480)	-0.00237 (0.00748)
metal FE	yes	yes
Observations	27,853	16,036
R-squared	0.006	0.029

Notes: Observations are at the individual level. $\Delta\text{slc silver premium}$ is the natural log of the change in premium between 2015 and 2016 of the second lowest cost silver plan by market. $\Delta\text{slc silver x APTC}$ is the natural log of the change in premium of the second lowest cost silver plan by market interacted with an indicator variable for whether or not an individual has a subsidized premium. The sample population for column 1 are individuals with a default enrollment plan for 2017. The sample population for column 2 are individuals without a default enrollment plan for 2017. Age is an indicator for individuals over the age of 40. Sex is an indicator for male. Metal fixed effects are included in both regressions. Robust standard errors clustered at the county level in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

2.5 Estimating Enrollee Demand

Empirical Approach. We estimate enrollee demand using a discrete choice logit model. We

assume that consumer i 's utility of plan j in market m is given by: $u_{ijmt} = \pi_{jm} + \rho_{ijmt} +$

ε_{ijmt} ,

where π_{jm} is the mean utility of a plan in market m , ρ_{ijmt} represents the plan's utility that varies

based on observed individual characteristics (e.g. age and sex), and ε_{ijmt} is an error term that is

independently and identically distributed (i.i.d.) extreme value. Mean utility can be expressed in

terms of price and plan features: $\pi_{jm} = \alpha p_{jm} + \beta X_{jm} + \varepsilon_{jm}$,

where p_{jm} is the price of plan j in market m , X_{jm} is a vector plan characteristics like metal level and insurer brand, and ε_{jm} is unobserved plan characteristics.

We model a consumer's choice of insurance plan using a conditional logit model of the following form:

$$(4) \quad u_{ij} = \alpha_1 p_{ij} + \alpha_2 (p_{ij} * \gamma_i) + \beta X_j + \varepsilon_{ij},$$

where u_{ij} is an indicator variable for the plan selected by consumer i , p_{ij} is the net price of plan j in consumer i 's choice set, $p_{ij} * \gamma_i$ is the net price of plan j in consumer i 's choice set interacted with a consumer characteristic, such as eligibility for tax credit or age. Here, α_1 can be interpreted as the semi-elasticity for price and α_2 describes how individuals with characteristic γ_i different in price sensitivity from the average.

To model inertia in consumer demand, we use the same conditional logit model but with an indicator for past plan enrollment (similar in approach to Handel and Kolstad, 2015). We use a conditional logit model of the following form:

$$(5) \quad u_{ij} = \alpha p_{ijm} + \partial (\text{planlastyear}_{ij}) + \beta X_{jm} + \varepsilon_{ijmt}$$

Where $\partial(\text{planlastyear}_{ij})$ is an indicator for whether plan j is the plan in which enrollee i was enrolled in the previous year. We model inertia, represented by ∂ , as an implied monetary cost, the incremental cost paid conditional on switching plans. This framework implies that, on

average, for a family or individual to switch at t they must prefer an alternative option by $\$ \delta$ more than their default. To perform this analysis, we limit the sample to silver plans of the two lowest cost insurers.

Results. The results of regressions using equation 4 are presented in Table 2.6. Panel A presents results for new enrollees only and Panel B presents results for all enrollees. Columns 1, 2, and 3 of Panel A present results of the simple model with different levels of fixed effects. For example, column 2, with metal level fixed effects, implies that a \$10 change in premium would lead to a 11.8% decrease in enrollment. Column 4 allows price sensitivity to vary discretely by tax credit status and the results indicate that tax credit receipt does not have a significant effect on price sensitivity. Column 5 allows price sensitivity to vary discretely by age and the results indicate that individuals over 40 are significantly less price sensitive than younger enrollees. This may indicate that older individuals are more likely to have health conditions and therefore prefer to remain with a health plan if changing health plans would require them to find new providers.

Table 2.6, Panel B estimates the model allowing price sensitivity to vary discretely by the enrollee type. Panel B column 1 and 2 show that continuing enrollees are 50 percent less price sensitive than new enrollees in 2015 but not significantly different in price sensitivity in 2016. Such a result can be explained by the fact that the COOP left the market and its enrollees were forced into active choice and that enrollees who were signed up for Kaiser in 2015 typically found themselves in the lowest cost plan in 2016 without action. Panel B column 3 shows that enrollees who were forced to make an active choice were roughly 20 percent less price sensitive than other enrollees in 2016.

Table 2.6. Price Sensitivity in Conditional Logit Model

Panel A: New Enrollees (Active Choice)					
YEAR	(1)	(2)	(3)	(4)	(5)
VARIABLES	2014	2014	2014	2014	2014
	planchoice	planchoice	planchoice	planchoice	planchoice
netpremfaced	- 0.00782*** (8.99e-05)	-0.0118*** (0.000147)	- 0.00628*** (0.000156)	-0.0116*** (0.000242)	-0.0189*** (0.000361)
prem x aptc				-0.000254 (0.000263)	
prem x agecategory					0.00828*** (0.000360)
Metal Fixed Effects		X		X	X
Insurer Fixed Effects			X		
Observations	1,353,978	1,353,978	1,353,978	1,353,978	1,353,978
Panel B: All Enrollees					
YEAR	(1)	(2)	(3)		
VARIABLES	2015	2016	2016		
	planchoice	planchoice	planchoice		
net premium	-0.0105*** (0.000167)	- 0.00984*** (0.000185)	- 0.00815*** (0.000164)		
net premium*cont	0.00510*** (0.000180)	-0.000304 (0.000217)			
net premium*forced				0.00176*** (0.000200)	
Metal Fixed Effects	yes	yes	yes		

Note: Observations are on the enrollee-level. Planchoice is a variable that equals 1 if an individual enrolls in the plan and zero if an individual does not. Net premium is the net premium faced by the enrollee. Net premium*cont is the net premium interacted with an indicator variable for whether or not the individual is a continuing enrollee and “net premium*forced” is the net premium interacted with an indicator variable for whether or not the individual is enrolled across years but was forced to select a new plan. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 2.7 presents the results of equation 5. Columns 1 and 2 provide estimates for θ using all enrollees and then limiting to individual (family of one) enrollees, respectively. Column 1 shows that on average, for a family to switch they must prefer an alternative option by \$4,555 a year. Column 2 shows that on average, for an individual enrollee to switch they must prefer an alternative option by \$3,065 a year. Considering that C4 has a large share of enrollees without premium tax credits, these estimates reflect real and large incremental costs to those enrollees.

Table 2.7. Identifying Inertia

	(1)	(2)
VARIABLES	planchoice	planchoice
Net Premium	-0.0130*** (0.000114)	-0.0197*** (0.000185)
Plan Last Year	4.935*** (0.0213)	5.033*** (0.0269)
Sample Enrollees	Silver K/C All	Silver K/C Single
Inertia	\$4,555	\$3,065
Observations	923,552	644,769

Note: Observations are on the enrollee-level and the sample is limited to enrollees in Kaiser and COOP silver plans (Silver K/C). Planchoice is a variable that equals 1 if an individual enrolls in the plan and zero if an individual does not. Net premium is the net premium faced by the enrollee. lastyearplan is an indicator variable for whether or not the plan in an individual's choice set is the plan they were enrolled in during the previous year. The sample includes all continuing enrollees. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

2.6 Discussion and Conclusion

This paper investigates price sensitivity, inertia, and churn using individual-level data from the Colorado Health Insurance Marketplace, spanning from 2014 to 2016. It is the first study to

explore enrollment decision making and enrollment across plan years on an individual, longitudinal level in the ACA's Marketplaces.

Consistent with research based on summary enrollment data, we find that consumers in the C4 Marketplace are more price sensitive than what has typically been found in previously-researched health insurance markets. We find that on average, consumers have price elasticities that range from -2.75 for all enrollees to -0.866 for continuing enrollees. Additionally, thirty percent of continuing enrollees opt to switch on average, which is decidedly higher than is typically seen in the employer market. Such findings would seem to suggest that policy concerns that arise in other health insurance markets, like the perverse incentives for firms to increase prices on continuing enrollees or the concern that consumers "leave money on the table" due to inattention, may be of lesser concern in the Marketplaces.

While such a conclusion may be true on average for the Marketplace, we also find, similar to analyses in other health insurance markets, that price sensitivity depends on whether the enrollee must make an active choice (because they are new or are forced to choose a new plan). Using conditional logit choice models, we find that price elasticities are almost twice as large for new enrollees than they are for continuing enrollees with an option for default reenrollment. We also estimate large switching costs. These results are consistent with results from our reduced form analysis and suggest that the impact of policy reforms moving forward will largely depend on the percentage of the enrollment in a Marketplace that is new versus continuing and how it's targeted as well as the share of enrollment that is subsidized. It should be noted that without claims data and other unobserved enrollees characteristics, we are unable to rule out other preferences (e.g., preference for providers or even rational decision-making for particular conditions or expected spending) that might explain some of the switching costs. We also find

significant price sensitivity heterogeneity, with younger consumers presenting choice behavior suggesting much greater price sensitivity. Conditional on enrollment in a given year, we do not find significant price sensitivity heterogeneity between subsidized and unsubsidized enrollees.

To investigate whether and how inertia plays a role in the different price sensitivities of the new and continuing populations, we relate plan enrollment to past plan premiums in a fixed effects regression and we estimate a conditional choice logit model for consumer demand in which demand is related both to current plan price and a plan indicator for past plan enrollment. Results from both analyses indicate that inertia plays a significant role in plan choice.

Finally, we find suggestive evidence that the exit of low premium plans (the COOP in this case) has important effects on the probability that unsubsidized consumers remain in the market. However, the exit has no significant effect on subsidized consumers for whom the price of coverage is fixed due to the presence of price-linked subsidies that increase when low-premium options exit.

As debate over reform of the individual market (e.g., individual mandate, public plan options, and benefit and rating flexibility) continues to dominate health care policy, results from this study are particularly relevant to future policy reform by states and the federal government. These results present four important conclusions that are especially relevant for policymakers moving forward.

The first is that, on average, consumers in the Marketplace are highly price sensitive (although average mask the fact that continuing enrollees are less price sensitive than new enrollees). Such a dynamic, combined with the result that new enrollees constitute roughly 40 percent of enrollment in each of the three years we observe, means that insurers with the lowest

cost plan will likely receive the majority of enrollment in any given year. As a result, these dynamics could drive insurers to compete to occupy the lowest premium slot across different years (a result that could create clustering of low premium plans) and would result in new enrollment that is likely to churn through different insurers, with the enrollment balance equilibrium depending largely on the lowest cost insurer in the year in which an enrollee enters the market. Such a market dynamic is important when thinking about how to design rules for the number and types of plan an insurer can offer and how changes in how the premium tax credit benchmark is set may better promote competition.

Second, because we find evidence that inertia plays a significant role in plan enrollment across years, the federal government and consumers may be missing out on potential savings. Reaching a definitive conclusion on this point is limited by the lack of data on enrollee risk and provider preferences. But, because even continuing enrollees are relatively price sensitive, the concern that auto-reenrollment policies of the Marketplaces greatly exacerbate foregone savings is mitigated, particularly given the role reenrollment as in ensuring market risk stability across years.

Third, given that we find significant price sensitivity heterogeneity between younger and older consumers, increasing Marketplace premiums will, overtime, have a disproportionate effect on younger enrollees. Such disproportionate effect can not only depress enrollment overall, but could degrade market stability overtime.

Fourth, price-linked subsidies seem to have an important role in keeping subsidized individuals in the Marketplace as premiums increase, but unsubsidized individuals may exit the Marketplace altogether as premiums increase. Such a finding is particularly important for Marketplaces where the option to be uninsured is prevalent, unlike other health insurance

markets previously studied. If large premium increases continue, such a trend could have effects on the stability of the risk pool and it will definitely increase federal spending for premium subsidies.

We stress that results from this study are limited to the Colorado Marketplace. While descriptive statistics suggest that the Colorado Marketplace is similar to other Marketplaces across the nation, more research is needed to determine whether consumer behavior described in this paper is representative of behavior across all states' individual markets. Additionally, we are unable to rule out important other explanations for the large inertia evidence we find and unable to separate out the different causes of apparent inertia in plan choice. Finally, unlike other health insurance markets previously-studied, the option to be uninsured remains prevalent as a choice for consumers. Additional research should be conducted to determine how extensive margin decision making by consumers, especially those eligible for tax credit subsidies, affects market outcomes.

Chapter 3: Simulation of Risk Adjustment Suggests Plans May Have Incentives to Distort Coverage for Mental Health or Substance Disorders

3.1 Introduction

Under the Affordable Care Act (ACA), non-grandfathered health insurance plans in the individual and small-group market—including plans offered on the Marketplaces—may rate premiums based only on family size, geography, age, and smoking status (within rating limits). When premiums do not reflect each person’s expected costs, the market becomes vulnerable to adverse selection: the tendency of sicker, higher-cost consumers to choose more generous coverage (Cutler, 2015). When plans are not compensated appropriately for enrolling sicker, higher-cost consumers, adverse selection in a market means that plans can profit by distorting benefits to avoid higher-cost individuals, which undermines the value of competition (Pauly, 2008). It may also mean that plans enrolling these higher-cost individuals are driven to exit the market, which also undermines the value of competition (Culter, 1998).

To mitigate adverse selection, the ACA established a permanent risk-adjustment program, which transfers funds from plans with enrollees who have lower-than-expected health risks to plans with enrollees who have higher-than-expected health risks. This necessary program of the ACA helps ensure that plan premiums reflect differences in scope of benefits and network coverage rather than differences in the health status of enrollees; it also helps mitigate incentives for plans to avoid higher-cost individuals.

Other ACA regulations, such as the requirement for plans to offer “essential health benefits,” which include services for mental health and substance use disorders, also serve to mitigate adverse selection. However, in spite of risk adjustment and other ACA policies, incentives remain for plans to use subtle and difficult-to-regulate “service-level selection”

mechanisms to distort their benefit offerings to attract better risks (Ellis, 2007; Ellis, 2013; Newhouse, 2013). Such selection occurs when insurers design their health care services and provider networks to attract more profitable enrollees. For example, plans can work around regulations to create provider networks and drug formularies favoring or disfavoring certain conditions, or they can impose more or less strict care management across different categories of care. Preventing service-level selection on dimensions like covered services can be monitored through a plan's requirement to provide essential health benefits, but regulating other dimensions of benefits is much more difficult.

Concerns about service-level selection are particularly warranted given two Marketplace features. The first is that narrow-network plans, often labeled “exclusive provider organizations” but also present in other plan designs, have been particularly popular in the Marketplaces and account for a growing portion of plan offerings, with the percentage of EPO and HMO plans increasing 30 percent between 2014 and 2016.³⁸ In narrow networks of providers, it is relatively easy to adjust the availability of certain specialties and services. The second feature is the high variation in prescription drug cost sharing and coverage. People with mental health and substance use disorders are particularly vulnerable to these features because they have higher average health care costs, including for prescription drugs, and they tend to use services specific to their subpopulation (such as specialty mental health providers) (Frank, 2000; McGuire, 2010). In fact, concerns have already been raised about Marketplace plans' compliance with mental health parity laws and the limited networks of mental health care providers within Marketplaces (Berry, 2015; Goodell, 2015; Dorner, 2015).

³⁸ Pearson C, Carpenter E. Fewer PPOs offered in Exchanges in 2016 [Internet]. Washington (DC): Avalere Health; 2015 Nov [cited 2016 Apr 27]. Available for download from: <http://avalere.com/expertise/managed-care/insights/fewer-ppos-offered-on-exchanges-in-2016>.

Several researchers have documented how risk-adjustment systems like those used in the Marketplaces affect selection incentives (Cao, 2003; Eggleston, 2009; Cutler, 1998). Indeed, recent research has found that under a risk-adjustment system very similar to the one now used by Marketplaces, significant incentives remain for insurers to discriminate against people with mental health and substance use disorders (McGuire, 2014). Another study found evidence that the copayments insurers impose are higher for drugs used by groups of enrollees such as those with mental health and substance use disorders which are less profitable under the Medicare Part D risk-adjustment system (Carey, 2014). On the other hand, researchers have simulated the extent to which risk adjustment is likely to ameliorate plan-level selection incentives in Marketplace plans and found limited evidence for service-level selection incentives (Weiner, 2012; Barry, 2012). However, such studies compared average payments and average costs; they did not study subgroups, examine incentives for plans to construct networks or benefit packages designed to avoid subgroups, or use the risk-adjustment program used by Marketplaces. No studies have looked inside the “black box” of this risk-adjustment formula to see what would explain why a system that includes indications for people with mental health and substance use disorders would systematically undercompensate plans that cover them.

This study examined insurers’ incentives, and the source of those incentives, to engage in service-level selection that puts consumers and providers of mental health and substance use disorders at a disadvantage under the Marketplace risk-adjustment system. To do so, we simulated the Marketplace risk-adjustment system in a population of likely Marketplace enrollees.

3.2 Study Data And Methods

Sample. We used data from the 2012–13 Truven Health Analytics MarketScan Commercial Claims and Encounters Database, an updated version of the 2010 MarketScan data used by the Department of Health and Human Services (HHS) to develop the Marketplace risk-adjustment model known as the HHS–Hierarchical Condition Categories (HHS-HCC) model. Following criteria applied by HHS, we kept the 7,072,964 individuals in the MarketScan data that met the inclusion criteria. To create our study sample, we selected a subset of 2,021,800 adults (ages 21–64) using methods from earlier work that used data from the Medical Expenditure Panel Survey to identify people with the characteristics that would make them eligible for the Marketplace (Table 3.1).

Table 3.1 Simulation sample characteristics and spending amounts
Marketplace estimation
sample

	Mean	SD
Age, years	42.4	12.46
Female	49%	— ^a
Census region		
Northeast	14%	— ^a
Central	23	— ^a
South	43	— ^a
West	20	— ^a
Spending		
Total	\$5,080	\$20,236
Inpatient	1,378	13,657
Outpatient	2,781	10,204
Prescription drugs	921	4,189

Notes. Truven Health Analytics MarketScan Commercial Claims and Encounters Database, 2012–13. Estimation sample ($N = 2,006,126$) is a subset of adults ages 21–64 in 2012 who were continuously enrolled for 2012–13 with prescription drug and mental health coverage, selected to approximate the likely Marketplace-eligible population as described in Layton et al. Assessing incentives for adverse selection in health plan payment systems (see Note 20 in text). Also shown are the sample standard deviations (SD). ^aPlease add text to specify if “n.a.” means “not applicable,” “not available,” or something else.

Risk Adjustment. We calculated risk scores for each individual in the sample using publicly available software for the Marketplace (HHS-HCC) model, which is designed by HHS to predict an enrollee’s medical spending in the current year by mapping individual diagnoses (from five-digit *International Classification of Diseases*, Ninth Revision [ICD-9] diagnosis codes) into one of 100 Hierarchical Condition Categories selected by HHS from the full 264 categories in the

diagnostic classification system.³⁹ The HCC indicators become part of a linear regression model predicting cost. The Marketplace model then uses the average risk score for an insurer by state to calculate payment transfers across health plans each year.

The Marketplace model includes nine categories related to mental health and substance use disorders: drug psychosis (81); drug dependence (82); schizophrenia (87); major depressive and bipolar disorders (88); reactive and unspecified psychosis, delusional disorders (89); personality disorders (90); anorexia/bulimia nervosa (94); autistic disorder (102); and pervasive developmental disorders, except autistic disorder (103). Any person who receives at least one diagnosis on a claim from a qualified clinician that maps to one of the Hierarchical Condition Categories will trigger a condition-specific payment to the insurer. A person can have more than one categorical indication.

Individuals with Mental Health and Substance Use Disorders. We defined *individuals with mental health and substance use disorders* as those with any ICD-9 code that maps to any mental health and substance use disorder–related Agency for Healthcare Research and Quality (AHRQ) Clinical Classification Software (CCS) groups.[23] Such diagnoses in the ICD-9 map to fifteen different CCS categories.

Payments, In Total and For Mental Health And Substance Use Disorders. We defined *total payments* for an individual as the sum of insurers’ payments and patients’ out-of-pocket payments for inpatient care, outpatient care, and prescription drugs in the MarketScan data.

Inpatient mental health spending is defined as the payment associated with any service or

³⁹ Centers for Medicare and Medicaid Services, Center for Consumer Information and Insurance Oversight. HHS-developed risk-adjustment model [Internet]. Baltimore (MD): CMS; [cited 2016 Apr 27]. (SAS software). Available for download from: <http://www.cms.gov/CCIIO/Resources/Regulations-and-Guidance/Downloads/SASsoftware.zip> Kautter J, Pope GC, Ingber M, Freeman S, Patterson L, Cohen M, et al. The HHS-HCC risk-adjustment model for individual and small group markets under the Affordable Care Act. Medicare Medicaid Res Rev. 2012;4(3):E1–11.

encounter with either of the following Major Diagnostic Categories formed by grouping related ICD-9 categories: mental diseases and disorders or alcohol/drug use, and alcohol/drug induced organic mental disorders. We defined *outpatient spending* as the payment associated with any service or encounter for which the primary diagnosis in a claim is for one of the mental health and substance use disorder ICD-9 codes or for which the claim originated from a mental health and substance use disorder provider. We defined *drug spending* as the payment associated with any drug included in ten therapeutic classes commonly used for these conditions.

Analysis

To examine the payment consequences for individuals with mental health and substance use disorder diagnoses under the Marketplace model, we first divided all individuals with a relevant diagnosis in the sample into those with at least one diagnosis that falls into one of the nine related categories (“recognized” individuals) and those with no such diagnosis (“unrecognized” individuals). The second group includes people with mental health and substance use disorders who were intentionally excluded from the Marketplace risk-adjustment classification system at the time it was developed, possibly for reasons related to predictive power and potential manipulation; we return to this point below.

Once we distinguished recognized and unrecognized individuals, we analyzed which diagnoses were most prevalent among the unrecognized group by flagging the prevalence and the associated cost of such individuals. We categorized unrecognized individuals with these conditions using the Clinical Classification System, which was developed as a simple way to group diagnoses, rather than Hierarchical Condition Categories, which were developed for use in a payment system. All individuals with mental health and substance use disorders in our sample

fall within a CCS category, but not all such individuals fall within a Hierarchical Condition Category.

Next, to evaluate plan selection incentives (how well the risk-adjustment system compensates plans for various subgroups), we calculated predictive ratios for each subgroup. A predictive ratio is constructed by taking the ratio of average plan liabilities (total plan payment to providers minus [compensated] predicted payments based on the Marketplace model) to average total plan payments for each subgroup of individuals with mental health and substance use disorders in the sample. Predictive ratios less than 1 indicate that plans are undercompensated for treatment. Finally, using publicly available definitions provided by HHS, we simulated and compared recognized/unrecognized assignment for individuals with mental health and substance use disorders under the three different risk-adjustment programs run by HHS (Marketplace, Medicare Advantage, and Medicare Part D).⁴⁰

Limitations. Our work has a number of limitations. The sample employed in this study does not reflect actual Marketplace enrollment; instead, it uses a sample identified from MarketScan data, a data source coming mainly from large employer plans. Concern related to the data source is of limited importance for two reasons. First, our sample was constructed to be representative of the Marketplace population. Second, HHS also uses MarketScan data to calibrate its Marketplace risk-adjustment model.⁴¹

⁴⁰ Department of Health and Human Services. Model software/ICD-9 mappings [Internet]. Washington (DC): HHS; [cited 2016 Apr 27]. Available for download from: <https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors-Items/Risk2006-2011.html>

⁴¹ Department of Health and Human Services. Patient Protection and Affordable Care Act; HHS notice of benefit and payment parameters for 2017. Final rule. Fed Regist. 2016;81(45):12203-352.

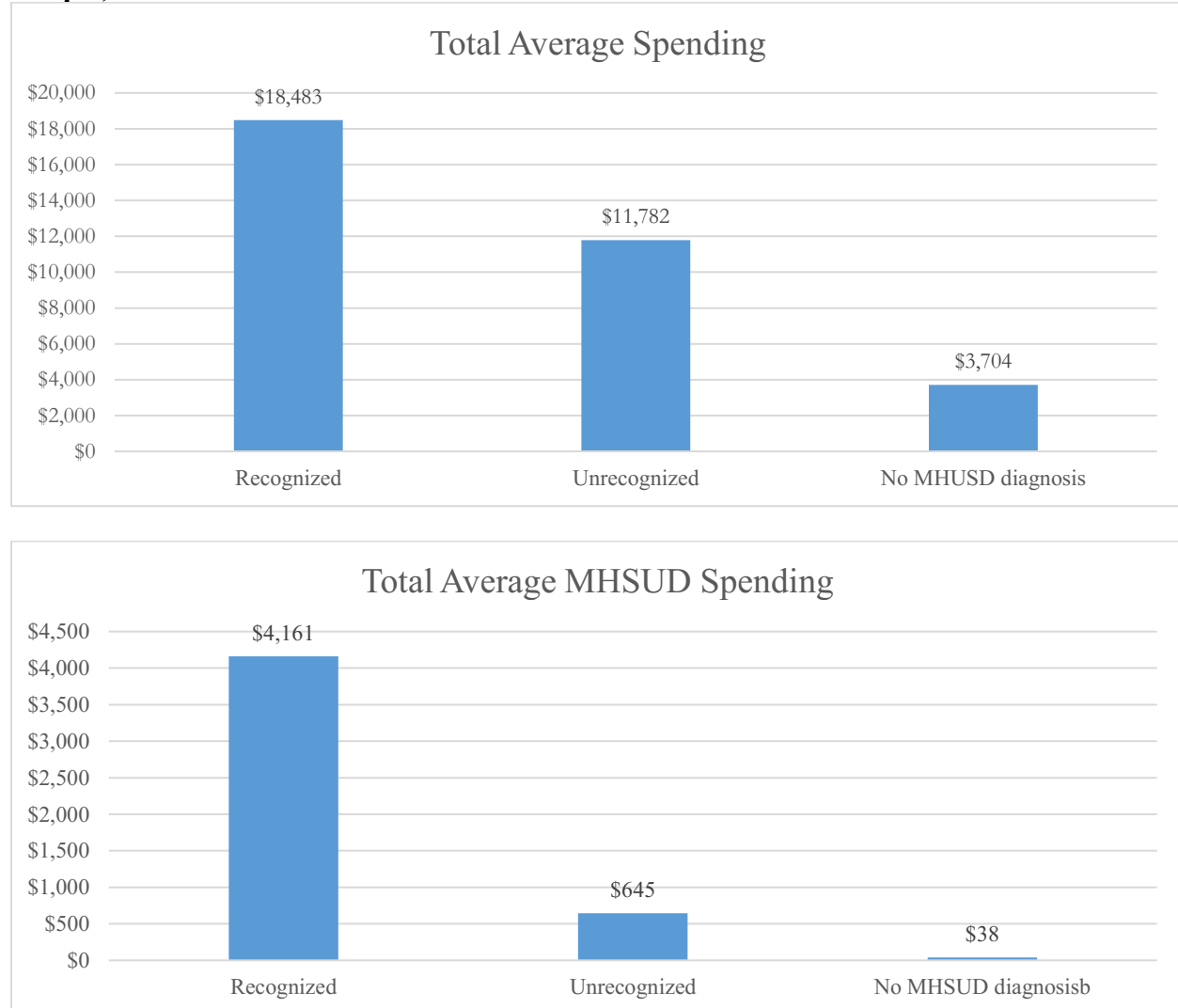
Additionally, this study did not examine the trade-offs associated with our policy recommendation for an expansion of the Marketplace model to include diagnoses used in the Medicare Part D risk-adjustment model. The Medicare Part D model uses diagnoses already screened and selected by HHS, which should alleviate concern here. However, such trade-offs should be examined in a future study, given the unique concerns embedded in a concurrent risk-adjustment system (HHS-HCC model), which uses diagnoses from the current year to risk adjust, as opposed to a prospective risk-adjustment system (Medicare Part D model) where the previous year is used.

3.3 Study Results

All individuals with mental health and substance use disorder diagnoses have higher costs than those without, but recognized individuals have both higher total and mental health and substance use disorder spending (Figure 3.2).

Individuals with mental health and substance use diagnoses were 14.5 percent of our total sample and had spending that was 2.6 times the sample average in 2013 . Among all individuals with those diagnoses, only 20 percent were recognized by the Marketplace risk-adjustment model. Only 30 percent and 58 percent of the total and mental health substance use disorder-specific spending, respectively, was accounted for by the recognized group. See Appendix Table 3.1A for more detail.

Figure 3.2 Average total and mental health and substance abuse spending per person in the sample, 2013

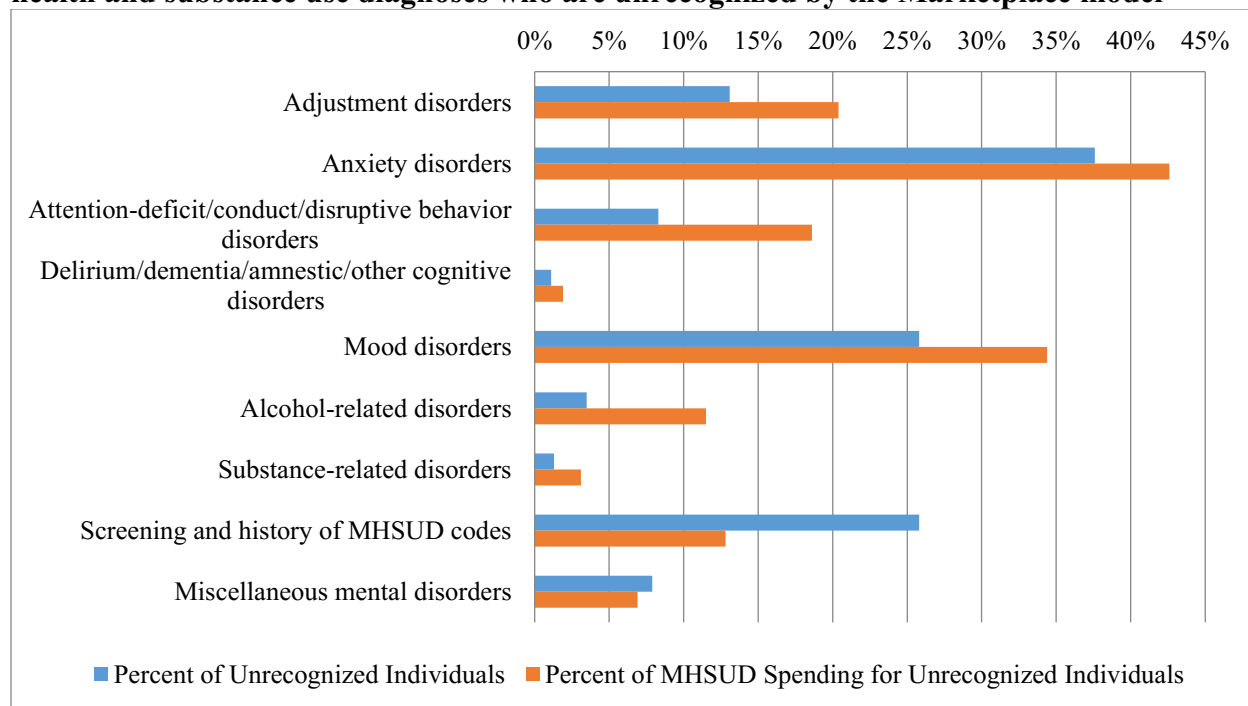


Notes: Authors' analysis of sample data. Recognized and unrecognized categories (described in the text) are mutually exclusive. People without mental health and substance abuse diagnoses have mental health spending because treatments, particularly prescription drugs, are not limited to treating mental health and substance abuse disorders.

Spending for and representation among the unrecognized group is classified by non–mutually exclusive CCS diagnostic categories and presented in Figure 3.2. While the CCS rows are not mutually exclusive, it is clear that anxiety, mood, and adjustment disorders are the most common clinical categories for unrecognized individuals. The same three categories represent the greatest percentage of total and mental health and substance use disorder spending among the

unrecognized group as well. Many individuals with a mood or anxiety disorder are, however, recognized in the risk-adjustment system, which implies that the Marketplace model captures some individuals within a group and misses others.

Figure 3.2 Clinical Classification Software (CCS) categories for individuals with mental health and substance use diagnoses who are unrecognized by the Marketplace model

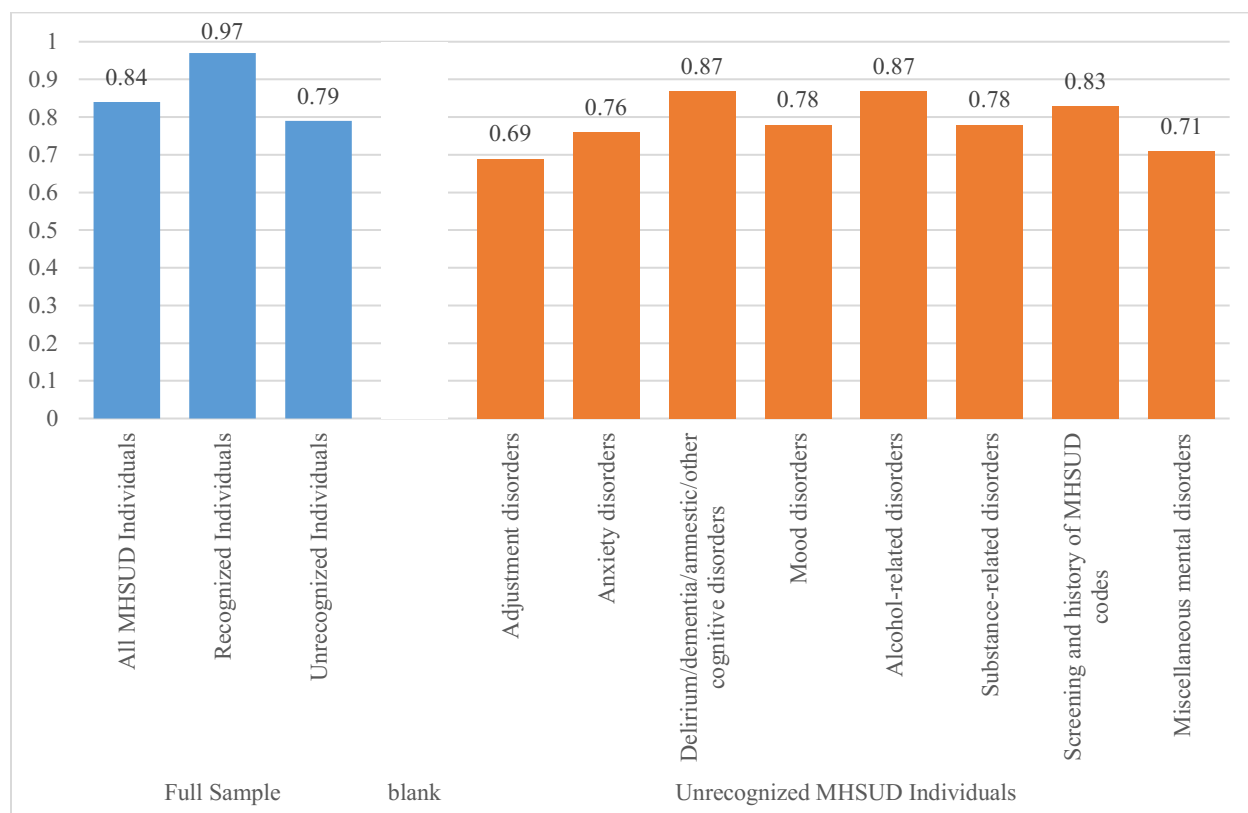


Notes: Authors' analysis of sample data. Percentages of unrecognized individuals and total mental health and substance use disorder spending are not additive, since individuals can have diagnoses associated with more than one CCS category. For example, an individual with diagnosis code for screening and history of mental health and substance use disorder is also likely represented in another category, such as anxiety disorders. The exhibit does not include CCS categories with less than 1 percent of individuals or less than 1 percent of total spending: developmental disorders, disorders usually diagnosed in infancy/childhood/adolescence, impulse control disorders, personality disorders, schizophrenia and other psychotic disorders, and suicide and intentional self-inflicted injury.

Figure 3.3 presents predictive ratios for the full set of all individuals with a mental health and substance use disorder diagnosis and separately for each CCS subgroup among the unrecognized individuals. In total, the Marketplace risk-adjustment model undercompensates plans for individuals with mental health and substance use diagnoses by 16 percent (represented

by a predictive ratio of 0.84), with 3 percent average undercompensation for the recognized group (0.97) and 21 percent average undercompensation for the unrecognized group (0.79). Stated differently, this means that the existing classification for mental health and substance use disorders does a highly imperfect job of detecting and compensating for costs of care among individuals with mental health and substance use disorders. The existing Marketplace risk-adjustment system does a particularly poor job of compensating insurers for unrecognized individuals with adjustment disorders (predictive ratio of 0.69), anxiety disorders (0.76), and mood disorders (0.78) (Figure 3.3).

Figure 3.3 Predictive ratios for individuals with mental health and substance use diagnoses who are recognized and unrecognized by the Marketplace model



Notes: Authors' analysis of sample data. Diagnoses are based on Clinical Classification Software (CCS) categories, as in Exhibit 3. Recognized and unrecognized individuals, described in the text, are mutually exclusive. Predictive ratios measure how well the risk-adjustment system compensates health insurance plans for a subgroup by taking the ratio of average plan liabilities (total plan payments minus [compensated] predicted payments based on the Health and Human Services–Hierarchical Condition Category [HHS-HCC] model to average actual total payments for each subgroup of individuals. The exhibit does not include CCS categories with less than 1 percent of individuals or less than 1 percent of total spending: developmental disorders, disorders usually diagnosed in infancy/childhood/adolescence, impulse control disorders, personality disorders, schizophrenia and other psychotic disorders, and suicide and intentional self-inflicted injury.

Finally, we compared the identification of individuals with mental health and substance use disorders using the Marketplace risk-adjustment model with identification of individuals using alternative risk-adjustment systems currently in use by HHS—that is, a comparison between the HHS-HCC (Marketplace) model, the Medicare Advantage (CMS-HCC) model, the Medicare Part D (CMS-RxHCC) model, and a hybrid model that combines the HCCs used in the CMS-HCC and CMS-RxHCC models, as constructed by the authors. We found that the

Marketplace risk-adjustment model was similar to the Medicare Advantage model in that both recognized roughly 20 percent of individuals with mental health and substance use diagnoses. In contrast, the Medicare Part D model recognized 54 percent, and the combined Marketplace and Medicare Part D model recognized 56 percent (see Appendix Figure 3.1A). In results not presented here, we found that the majority of those captured by the Medicare Part D model but not the Marketplace model had mood or anxiety disorders.

3.4 Discussion

The ACA expanded access to insurance and benefit coverage for a substantial number of people with mental health and substance use disorders. Risk adjustment in plans that provide this expanded access is a necessary tool to use in encouraging competition in the market, making sure that plans are appropriately compensated, and mitigating incentives for plans to distort coverage offerings.

In practice, however, it is difficult to create a risk-adjustment system that completely addresses distortionary incentives. These incentives, with respect to people with mental health and substance use diagnoses, are generated in two ways: when they are accounted for by the Marketplace risk-adjustment system (assigned an HCC) but the payments generated by the risk-adjustment system systematically fall short of actual spending, or when the system completely fails to account for them by not assigning them to an HCC to begin with. Our study found that both failures were present for individuals with mental health and substance use diagnoses in the Marketplaces in 2013. It adds to the evidence that incentives remain for plans to distort coverage offerings for individuals with these diagnoses.

We found that the existing Marketplace risk-adjustment model recognized and made an incremental payment for only 20 percent of individuals with a mental health and substance use disorder diagnosis in 2013. While the Marketplace model does successfully recognize and compensate for enrollment of individuals with the most expensive mental health and substance use diagnoses in a health plan, it still underpredicts spending dramatically for individuals with these diagnoses as a whole, on average.

The remaining 80 percent of individuals with mental health and substance use diagnoses were not recognized by the Marketplace risk-adjustment model. Such a finding could be innocuous with respect to plan incentives if these individuals either had spending levels close to the average level of spending in the population or had a separate non-mental health and substance use disorder related HHS-HCC diagnoses (such as diabetes or cancer) that elevated their risk score to match costs in the Marketplace risk-adjustment model. We found that neither of these scenarios was generally true. First, spending for unrecognized individuals was, on average, 2.3 times higher than total spending for all individuals in the sample. Second, the unrecognized group had an average predictive ratio of 0.79, which indicates that this group was undercompensated by 21 percent, even when we accounted for payments triggered by all of the categories in the Marketplace risk-adjustment model (that is, comorbidities compensated by the risk-adjustment system). Taken together, these findings imply that individuals with mental health and substance use diagnoses are unattractive to plans, thereby providing health plans with incentives to limit their selection into the plan.

There are several potential explanations for why the Marketplace risk-adjustment model failed to recognize so many individuals with mental health and substance use diagnoses. First, there are trade-offs that must be weighed when selecting categories for their use in a risk-

adjustment system.⁴² To determine which HCCs to include in the HHS-HCC model, HHS used four main criteria to narrow down the full diagnostic classification to 100 categories used in the final payment system: the categories represent clinically significant, well-defined, and costly medical conditions; they are not especially vulnerable to discretionary diagnostic coding; they do not primarily represent poor quality of medical care; and they identify chronic, predictable, or other conditions that are subject to insurer risk selection, risk segmentation, or provider network selection, rather than random acute events that represent insurance risk. It may be the case that mental health and substance use disorder diagnoses are disproportionately affected by these subjective criteria; however, available reports describing the current system contain no documentation of these concerns.

Second, how prescription drugs are handled under the Marketplace risk-adjustment system may contribute to undercompensation. Our analysis found that while the Medicare Advantage and Marketplace risk-adjustment models recognize essentially the same individuals with mental health and substance use disorders, the Medicare Part D model assigns substantially more individuals to a mental health and substance use disorder HCC. This result is not surprising given that the base model for Marketplace risk adjustment is the Medicare Advantage model, which was designed to predict medical spending, not drug spending. The Marketplace risk-adjustment model is used to predict total costs, including drug spending. Thus, the Marketplace model's reliance on a model not optimized for predicting drug spending results in its failure to adequately account for conditions such as mood and anxiety disorders that do not typically result in high medical spending but that do result in high prescription drug spending. This result

⁴² Department of Health and Human Services. Patient Protection and Affordable Care Act, HHS notice of benefit and payment parameters for 2014 and amendments to the HHS notice of benefit and payment parameters for 2014; final rule. Fed Regist. 2013;78(47):15410–541.

suggests that the Marketplace model may benefit from the incorporation of certain aspects of the Medicare Part D model with respect to the prediction of spending for individuals with mental health and substance use disorder diagnoses. In its most recent final rule governing risk adjustment, HHS indicated openness to such incorporation, confirming plans to explore including prescription drugs into the model. The results we present here suggest that including prescription drug claims may not be necessary, as the adoption of the Medicare Part D model, which uses diagnosis codes and does not use prescription drug claims, alone would result in a dramatic increase in the portion of recognized individuals with mental health and substance use disorders.

3.5 Conclusion

The ability of risk adjustment to mitigate adverse selection is particularly important for people with mental health and substance use disorders. This study documented how the Marketplace risk-adjustment system generates incentives for plans to engage in service-level selection for services associated with these diagnoses. Our findings add to concerns about health plans' incentives not to comply with their legal obligation under the Mental Health Parity and Addiction Equity Act of 2008 to provide mental health benefits on par with medical and surgical benefits. Modification of the risk-adjustment formula should be considered as a way of addressing systematic underpayment for people with mental health and substance use diagnoses. This study suggests one potential step that could be taken to ameliorate this problem: the incorporation of categorical conditions used in the risk adjuster for Medicare Part D (CMS-RxHCC). Future research should be conducted to examine how the incorporation of prescription drugs in risk adjustment can reduce incentives for service-level selection by health plans.

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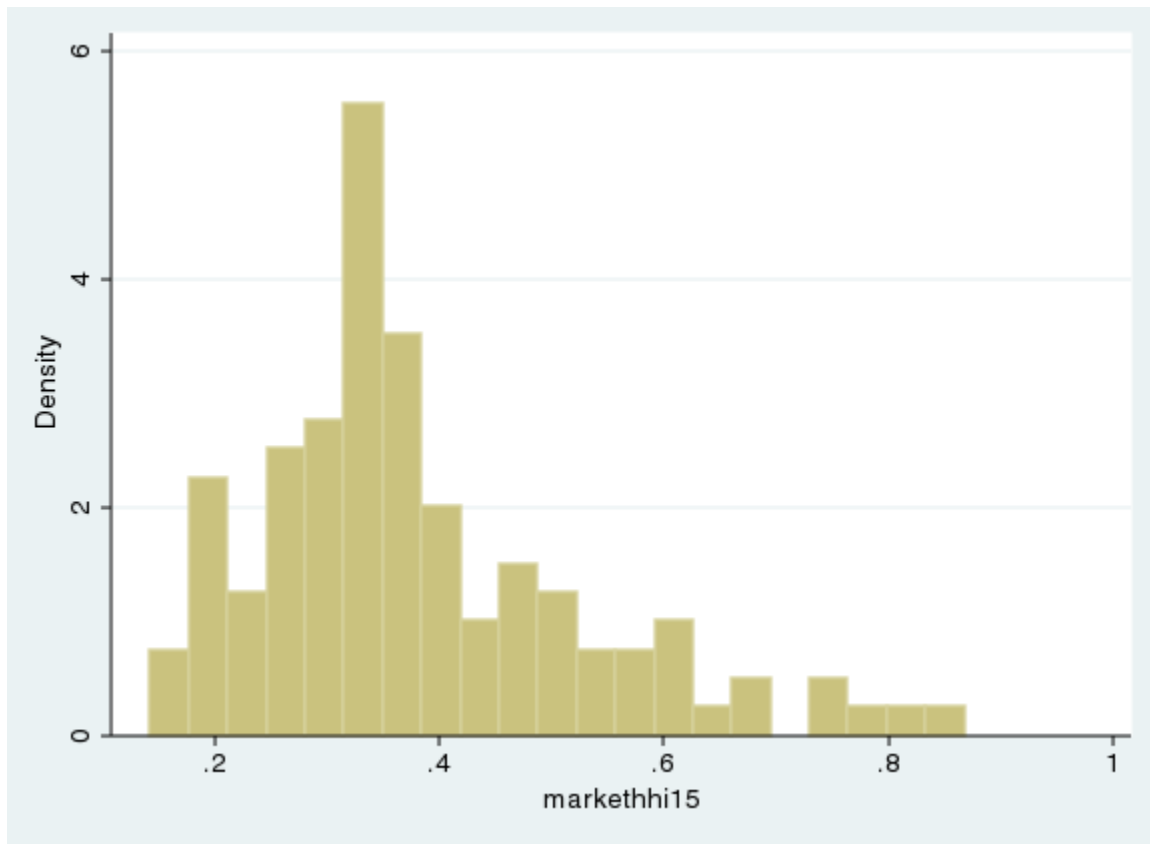
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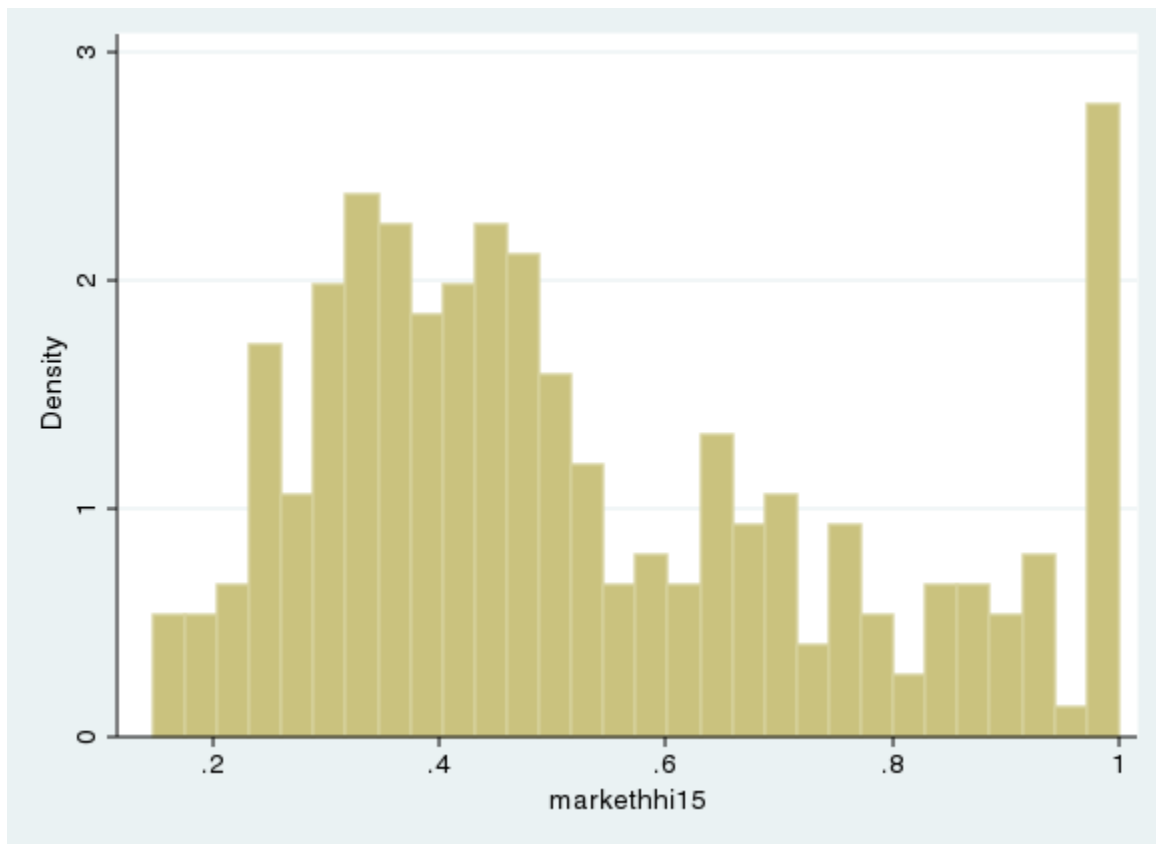
Appendix 1

Figure 1.A1. COOP Market HHI 2015



Note: Frequency is the number of markets. COOP_Market_Share is the share of enrollment in a given market that is enrolled in the COOP plan.

Figure 1.A2. Non COOP Market HHI 2015



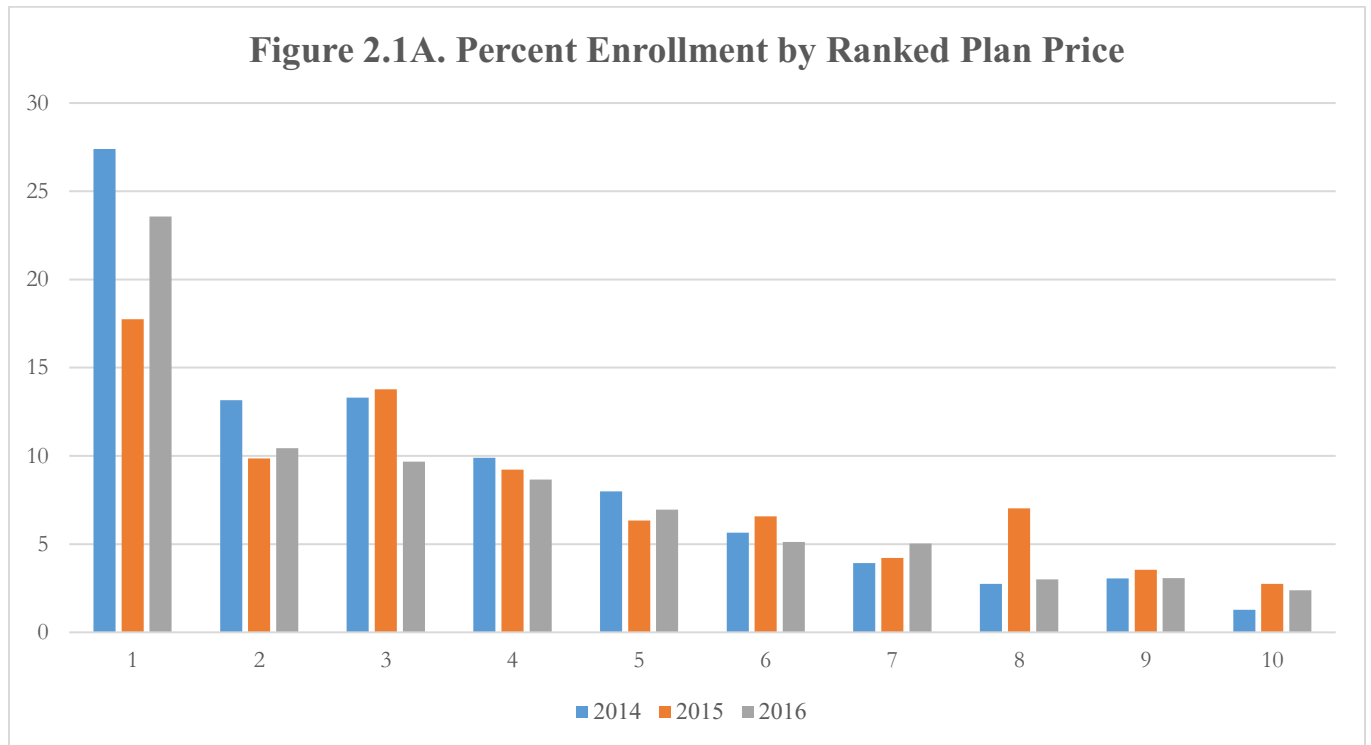
Note: Frequency is the number of markets. COOP_Market_Share is the share of enrollment in a given market that is enrolled in the COOP plan.

Appendix Table 1.A1. Relationship between COOP Exit Share and Market Plan Characteristics

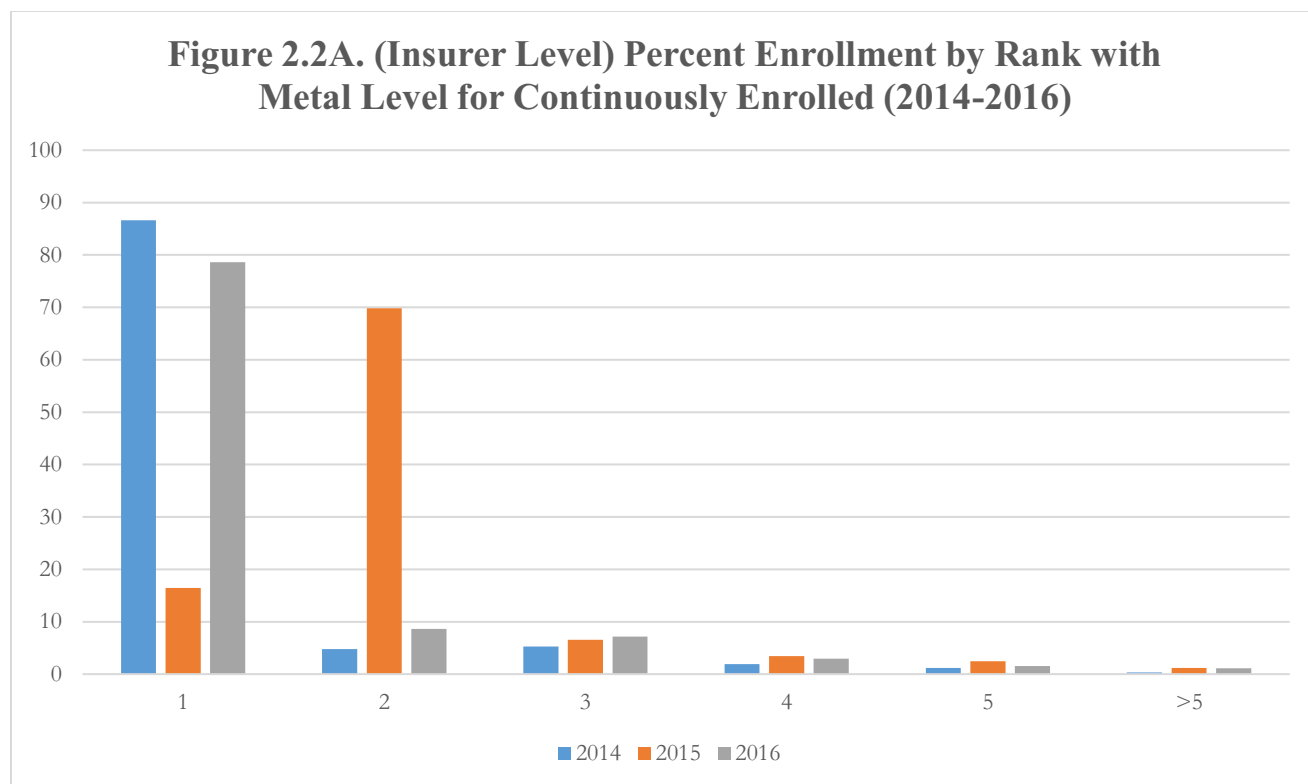
VARIABLES	(1) SLCSded	(2) meanded	(3) SLCSav	(4) meanav	(5) SLCSded	(6) SLCSav
coop15	0.341*** -0.0796	0.324*** -0.0304	0.133*** -0.0474	0.971*** -0.0842	0.0432 -0.0252	0.286*** -0.0723
coop16	-1.050*** -0.124	0.303*** -0.0415	0.310*** -0.0593	1.461*** -0.145	-0.715*** -0.145	0.330*** -0.0928
coop17	-0.890*** -0.104	0.411*** -0.046	0.0177 -0.103	0.462*** -0.148	-0.690*** -0.143	0.0548 -0.18
2015 fe	-0.166*** -0.0366	0.0259*** -0.00842	-0.133*** -0.0218	-0.190*** -0.0274	-0.0224 -0.0139	-0.210*** -0.038
2016 fe	0.0767* -0.0394	0.124*** -0.0125	-0.211*** -0.0241	0.0355 -0.0403	-0.108 -0.0699	-0.225*** -0.0478
2017 fe	0.281*** -0.0252	0.204*** -0.0123	0.00554 -0.0406	0.222*** -0.047	0.132* -0.0709	-0.0141 -0.108
Sample	Main	Main	Main	Main	COOP	COOP
Observations	1,524	1,524	1,524	1,524	412	412
R-squared	0.793	0.823	0.39	0.564	0.947	0.357

Notes: Observations are at the market-year level. Sample is limited to the COOP markets. SLCSded= ln deductible on the second lowest cost silver plan. SLCav= actuarial value of the second lowest cost silver plan. COOP2015, COOP2016, and COOP2017 is the share of the exiting COOP in the market interacted with the year indicator variable. 2014 is the base year. All regressions include market and year fixed effects. Other control variables are omitted for clarity. Robust standard errors clustered at the market level in parentheses.

Appendix 2



Note: Vertical axis represents the percent enrollment by year. Horizontal axis is ranked plan price. Rank plan price is constructed by ranking the price of available plans within a county and metal level. Sample includes all enrollees.



Note: Vertical axis represents the percent enrollment. Horizontal axis presents ranked insurer price by year. Rank insurer price is constructed by ranking the lowest cost premium offered by each insurer within a county and metal level. Sample includes only enrollees continuously enrolled across 2014, 2015, and 2016 who were given the option to default into their same plan if they chose not to act during open enrollment.

Enrollee Plan Switching. It is important to describe the switching behavior of continuing enrollees to better understand the determinants of consumer switching. Table 3 presents summary statistics of the switching behavior of enrollees enrolled across plan years (with no break in coverage across December 31st and January 1) who were given the opportunity to default enrollee into the same or similar plan without action.

Overall, roughly 30 percent of enrollees given the choice to switch opted to switch, consistent with rates reported by HHS for the Marketplace population although higher than is typically reported in the employer market or the Medicare private market. Switchers are more likely to be tax credit receivers (70 percent of switchers were tax-credit receivers compared to 60 percent of enrollees who defaulted into their crosswalked plan), more likely to be in silver plans than bronze, and more likely to face higher potential savings to switching.

Table 2.1A. Continuing Enrollees Enrollment Choices (2014-2016)

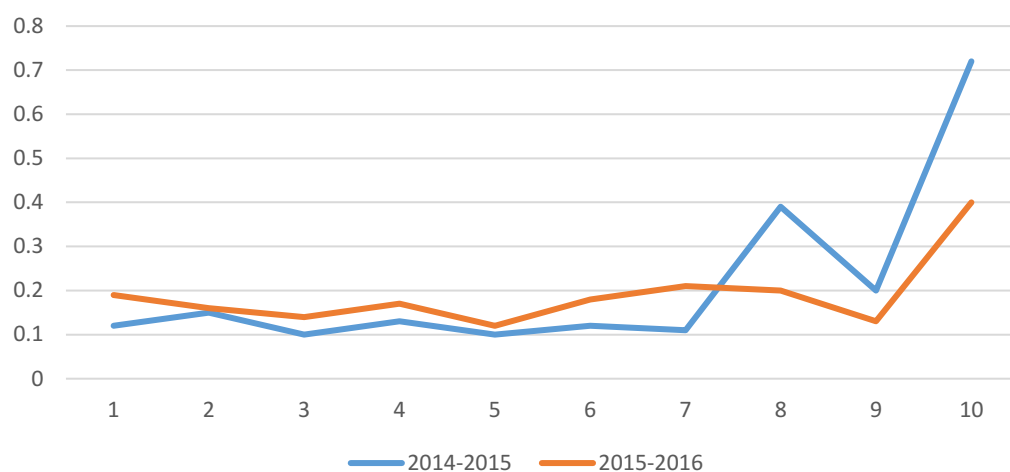
	2014-2015		2015-2016	
	Switch	Default	Switch	Default
N	22491 (.27)	58724	13730 (.28)	34752
Male	0.48	0.48	0.51	0.47
Age	48	46	48	47
Switch Incentive Decile	3.9	5.7	4.13	5.6
Current Premium (\$)	216	220	237	237
Past Premium (\$)	229	209	224	216
Silver (%)	57	50	47.3	50
Bronze (%)	34	37	43.5	38

Note: Table shows individual-level mean summary statistics by year by enrollment type. The sample includes all continuing enrollees given the option of default reenrollment across plan years.

In a closer examination of switching behavior, Figure 2.3Aa and 2.3Ab present graphs that plot enrollee plan switch rate by increasing financial incentive to switch (divided into deciles). Figure 2.3Aa measures a continuing enrollee's incentive to switch by comparing an

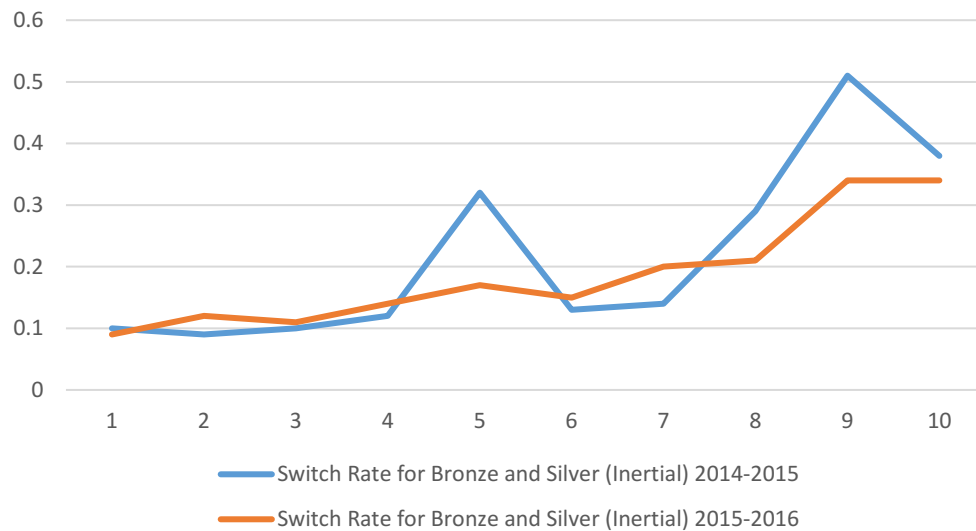
enrollee's revealed willingness to pay for their plan over the price of the lowest cost plan in the base year to the differential in the following year (the year of the switching choice). Figure 2.3Ab measures the incentive to switch by comparing the cost to stay in the base year's plan to the cost of switching to the lowest cost plan in the choice year. Both charts show that the switch rate increases with increasing incentive to switch, although switching rate remains relatively low and flat until higher deciles, which switching rates increase more sharply.

**Figure 2.3Aa. Switch Rate for Continuing Enrollees
-- Measure 1**



Note: Vertical axis represents the percent of enrollees who switch. Horizontal axis presents an enrollee's revealed willingness to pay for their plan over the price of the lowest cost plan in the base year to the differential in the following year (the year of the switching choice) segmented into deciles. Sample includes only enrollees continuously enrolled across year thresholds who were given the option to default into their same plan if they chose not to act during open enrollment.

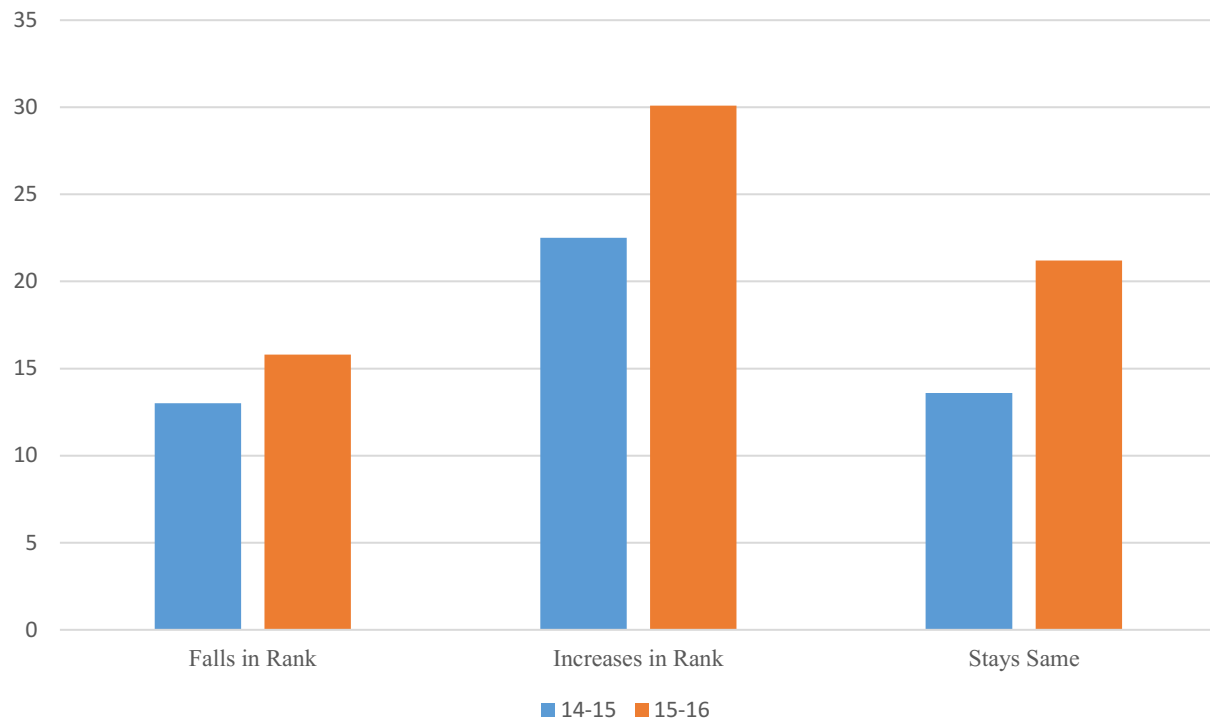
Figure 2.3Ab. Switch Rate for Continuing Enrollees-- Measure 2



Note: Vertical axis represents the percent of enrollees who switch. Horizontal axis presents the comparison between an individual's cost to stay in their plan to the cost of switching to the lowest cost plan in the choice year segmented into deciles. Sample includes only enrollees continuously enrolled across year thresholds who were given the option to default into their same plan if they chose not to act during open enrollment.

In recognition that consumers may find it easier to compare relative prices, another important question to ask is whether or not a plan's rank relative in a given plan year rather than its absolute price effects the switch rate of continuing consumers. Figure 2.4A graphs the switch rate by the change in rank across year. When a plan falls in rank across years (i.e. when a plans moves to a relatively cheaper rank in the choice year than in the base year), the switching rate is lower than when a plan stays the same rank and when a plan increases in rank over the year.

Figure 2.4A. Switching by Existing Plan Rank Change (Silver)



Note: Vertical axis represents the percent of enrollees who switch. Horizontal axis categorizes continuing enrollees into three groups: those that saw their plan fall, increase, or stay the same in terms of relative rank within an enrollee's choice set. Sample includes only enrollees continuously enrolled across year thresholds who were given the option to default into their same plan if they chose not to act during open enrollment.

Appendix 3

Table 3.1A. 2013 per person spending											
		Spending per Person									
		MHSUD Spending								Total Spending	
		Inpatient		Outpatient		Drug		Total			
Diagnoses	N	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
With MHUSE	292667	261	3082	631	3405	479	1454	1371	5586	13165	39071
Recognized	60396	1147	6517	1799	7036	1215	2517	4161	11384	18483	51946
Unrecognized	232271	31	816	327	1137	288	916	645	1752	11782	34822
W/O MHSUD	1719413	0	60	3	126	35	348	38	375	3704	14365
All Individuals	2012080	38	1180	94	1323	100	660	232	2209	5080	20236

NOTES [Recognized and Unrecognized rows are mutually exclusive. Individuals without MHSUD diagnoses have mental health spending because treatments, particularly prescription drugs, are not limited to treating MHSUD]

Table 3.2A Predictive ratios for MHSUD individuals by CCS

CCS Category	Predictive Ratios		
	Unrecognized	Recognized	All MHSUD ^a
All MHSUD individuals	0.79	0.97	0.84
Adjustment disorders	0.69	0.84	0.73
Anxiety disorders	0.76	0.88	0.8
Attention-deficit/conduct/disruptive behavior disorders	0.6	0.85	0.69
Delirium/dementia/amnestic/other cognitive disorders	0.87	0.8	0.84
Developmental disorders	0.99	0.83	0.91
Disorders usually diagnosed in infancy/childhood/adolescence	0.52	0.94	0.79
Impulse control disorders	0.68	0.72	0.71
Mood disorders	0.78	0.97	0.88
Personality disorders	--	0.71	0.71
Schizophrenia and other psychotic disorders	1.43	0.9	0.9
Alcohol-related disorders	0.87	0.78	0.83
Substance-related disorders	0.78	0.87	0.87
Suicide and intentional self-inflicted injury	0.8	0.69	0.7
Screening and history of MHSUD codes	0.83	0.82	0.83
Miscellaneous mental disorders	0.71	0.81	0.74

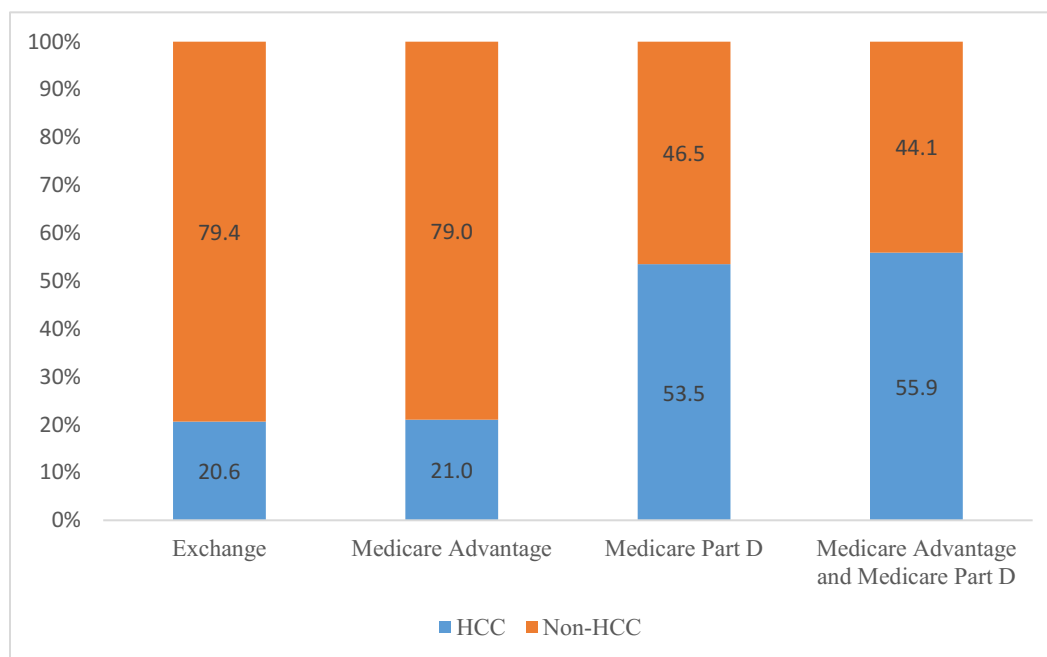
Sources/notes: Authors' analysis of sample. Recognized and unrecognized categories are mutually exclusive. Predictive ratios measure how well the risk adjustment system compensates plans for a subgroup by taking the ratio of average plan liabilities (total costs minus (compensated) predicted costs based on the HHS-HCC model) to average actual total costs for each subgroup of individuals.

Table 3.3A. Comparison of MHSUD-HCC identification in the Exchange, Medicare Advantage, and Medicare Part D risk adjustment

Individuals with MHSUD	HHS-HCC		CMS-HCC		CMS-RxHCC		CMS-HCC and -RxHCC	
	N	%	N	%	N	%	N	%
HCC	60396	20.6	61496	21.0	156688	53.5	163728	55.9
Non-HCC	232271	79.4	231171	79.0	135979	46.5	128939	44.1

Notes. Authors' analysis of sample using publicly-available definitions provided by HHS.

Figure 3.1A. Comparison of MHSUD Recognition in the Exchange, Medicare Advantage, and Medicare Part D Risk Adjustment Systems



Notes. Authors' analysis of sample using publicly-available definitions provided by HHS.