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2020

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UNIVERSITY OF CALIFORNIA

Los Angeles

Understanding Consumer Health Insurance Decision-Making

Under the Affordable Care Act

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy in Health Policy and Management

by

Petra Willis Rasmussen

2020

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ABSTRACT OF THE DISSERTATION

Understanding Consumer Health Insurance Decision-Making Under the Affordable Care Act

by

Petra Willis Rasmussen

Doctor of Philosophy in Health Policy and Management

University of California, Los Angeles, 2020

Professor Thomas Rice, Chair

Following the implementation of the Affordable Care Act (ACA), millions of Americans have gained coverage, many for the first time in their lives. The law has created more options for affordable coverage and put millions into the driver seat when it comes to selecting their coverage and enrolling in a health plan. The individual health insurance market has undergone significant changes under the ACA, including the creation of state-based and federally facilitated marketplaces where individuals in all states can go to shop for and enroll in potentially subsidized individual market coverage. This dissertation seeks to improve our understanding of consumer decision-making in this new health insurance landscape. Through three sets of analyses of consumer behavior during the insurance decision-making process, this dissertation will provide needed updates to the literature on this topic. It also highlights key considerations for policymakers and agencies to weigh when evaluating how consumers might respond to policies that change their available coverage options.

The first paper examines two key components of health plans that individuals weigh when making enrollment decisions - cost and quality. The ACA requires both federally facilitated and state-based marketplaces to provide easy to understand plan quality information to customers shopping for coverage. Through two hypothetical choice experiments, this paper examines how consumers weighed health plan costs and quality in different choice environments and explored the consumer characteristics associated with a preference for high quality plans as well as with the selection of inferior plans. In each experiment, participants responded to a series of choice scenarios that asked them to choose between five health plans that differed only in their costs and quality ratings, represented by stars. Overall, between scenarios individuals were willing to pay more for higher quality plans when the quality ratings of all available plans were lower, when the higher quality plan's rating was two stars higher rather than one star higher than other plans, and when the price differential was lower. More risk averse participants had higher predicted probabilities of consistently choosing the higher quality, more expensive plan. However, a significant portion of the study population made poor decisions: more than a third of participants chose a dominated plan at least once. The less numerate, those with higher risk-seeking tendencies, and those with low health insurance literacy had the highest predicted probabilities of choosing poorly. The second experiment also found that individuals are more likely to choose a dominated plan when the quality star ratings are similar across plans.

The second and third papers use data from California's health insurance marketplace, Covered California, to examine consumer behavior following the implementation of silver loading in 2018. Silver loading is a policy California and other states put into place after the cancellation of federal funding for a set of subsidies included in the ACA that reduce the amount of cost-sharing required by low-income enrollees in silver tier marketplace plans, known as cost-sharing reductions (CSRs). Silver loading placed the cost of providing CSRs in the absence of federal funding onto the premiums of silver plans, subsequently raising premium subsidies which are tied to the cost of silver coverage.

The second paper focuses on enrollment in silver plans that became dominated because of silver loading. This paper looks at enrollment in these plans over time (both before and after they became dominated) and by enrollees' prior year enrollment decisions to examine differences in enrollment by pre-existing biases regarding metal tier labeling and the potential role of status quo bias. Overall, more than 60,000 Californians enrolled in a dominated plan in 2018 and, on average, households enrolled in dominated plans in 2018 spent an additional \$38.87 per month in premiums. Households that were enrolled in silver coverage in the year before the examined silver plans became dominated had the highest predicted probability of enrolling in a dominated plan in 2018.

The third paper examines Covered California consumers' decisions to switch health plans during open enrollment over the first four open enrollment periods where individuals could renew their coverage (2015-2018). Under the ACA, switching rates in the individual market have been much higher than those previously seen in other markets. Looking at re-enrollees in Covered California, this paper provides data on consumer switching behavior over time and identifies the consumer, plan, and choice environment characteristics associated with consumers' decisions to change their coverage during open enrollment. The percentage of re-enrollees in Covered California who made changes to their coverage steadily increased between the 2014-15 and 2017-18 open enrollment periods. Following the implementation of silver loading the proportion of consumers who moved into gold plans during the 2017-18 open enrollment period drastically increased, compared to previous years. Among bronze or silver plan enrollees who switched metal tiers during open enrollment, those who could enroll in gold plans that were no more than \$49 per month more expensive than their initial bronze or silver plan had a significantly higher probability of switching into gold coverage than those who faced larger premium differences.

The results of this dissertation identify several consumer, health plan, and choice environment characteristics that can influence consumer health insurance decision-making. Policymakers and

marketplace regulators can use this work to help inform the decisions they make around marketplace choice architecture, policies aimed at retaining enrollees and recruiting new consumers, and decisions about re-enrollment for consumers who do not actively renew their coverage during annual re-enrollment periods.

The dissertation of Petra Willis Rasmussen is approved.

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2020

For Ziggy.

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ACKNOWLEDGEMENTS

First, I want to thank the members of my committee, Jerry Kominski, Fred Zimmerman, and Stephen Spiller, who have given me superb feedback on my dissertation and have pushed me to produce better, more policy relevant research. And most of all, to Tom Rice, my dissertation chair and mentor, who has provided me with excellent guidance and support over the past five years. Tom, thank you for always encouraging me and helping me to feel confident in my work and for never letting me get too caught up in the stress of this process. In addition I want to thank Corrina Moucheraud for her mentorship and top-notch advice throughout my doctoral career and for organizing a writing accountability group that helped me to focus and stay on track, and Jerry for his encouragement and advice as my academic advisor, for bringing me onto the CalSIM team, and for connecting me with people and projects that have helped to propel my career forward.

Thank you also to my dissertation funding sources, including the Agency for Healthcare Research and Quality's R36 Dissertation Grant, the UCLA Dissertation Year Fellowship, and the UCLA health policy and management department's dataset funding. The financial support of these awards allowed me to collect the data I needed for my hypothetical choice experiments and focus on my research, particularly in my final year. And thank you to Covered California, and specifically to Isaac Menashe and Matthew Valeta, for providing the data for my second and third papers.

I want to acknowledge and express my gratitude to the co-authors on my papers. To Andrew Barnes at Virginia Commonwealth University and Yaniv Hanoach at the University of Southampton, thank you for teaching me everything I know about MTurk and for all of the feedback and guidance you have given me as we have explored, with Tom, how consumers weigh costs and quality. To Dave Anderson at the Duke-Margolis Center for Health Policy, thank you for finding me at AcademyHealth and on Twitter and setting me on the path to explore plan domination in Covered California. I have

so enjoyed working with you and I look forward to many more fruitful collaborations. And to Tom and Jerry, thank you for all of your contributions to our *Health Affairs* paper and for getting me through my first (but hopefully not last!) experience of being the first author on a revise and resubmit.

To my friends and family, I have so much to thank you all for. To all of my fellow health policy and management Ph.D. students, particularly the incredible cohort of people I started with, you have been the best group I could ask for to travel with through this program. Michelle, Andrea, and Narissa, your wisdom and willingness to share your experiences has guided me throughout this process and your dedication to happy hours has kept me feeling connected and my spirits high. Sara, since day one when we both mumbled “Amanda Bynes” during orientation we have been fast friends and I couldn’t have gotten through this without you and Bravo. And to my non-UCLA friends in Los Angeles and New York, thank you for reminding me that there is life outside of health policy and for riding that wave of knowing when to ask about my dissertation and when to steer clear. To Anne and Kyle in particular, I hope you know just how much your friendship and support has meant to me over the years. You have helped make Los Angeles feel like home. Anne, I am forever grateful to have had you with me on this wild ride. Throughout you have been there to knowingly nod when times were rough, give me feedback on an untold number of applications and proposals, join me in GoogleDoc planning escapes, and force me to adopt the greatest cat in the world. You truly are the best and must be protected at all costs. To my big brother and best friend, Ivan, who has worked hard his entire life to keep my ego in check while simultaneously singing my praises to anyone who will listen and never letting me forget just how proud he is of me: thank you, I know I’ve only gotten this far because of you. And finally, to my parents, who have supported me ceaselessly, have raised me to care deeply for others and stand up for what is right, and have taught me to be a strong and independent woman: I am where I am, and I am who I am because of the two of you. I love you all more than words can express.

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CHAPTER 1: INTRODUCTION

Having health insurance can be beneficial for people's overall health, psychological well-being, economic productivity, and financial stability (Baicker, Finkelstein, Song, & Taubman, 2014; Baicker et al., 2013; Hadley, 2003; Institute of Medicine, 2001; Sommers, Long, & Baicker, 2014; Wherry & Miller, 2016). Without coverage, the uninsured struggle to access care, are less likely to receive preventive services and manage chronic illnesses, and are more likely to have high medical bills (Collins, Gunja, Doty, & Beutel, 2017; Davis, 2003). Gaining insurance can help to alleviate these issues and improve individuals' mental health status (Finkelstein et al., 2012). For decades the number of uninsured was increasing in the United States, pushing lawmakers to take action and eventually draft and pass the Patient Protection and Affordable Care Act (ACA) in 2010. Under the ACA, the health insurance landscape has drastically changed. The law includes several provisions aimed at increasing access to affordable coverage, shoring up the health insurance market, and making insurance a more appealing and affordable option for potential consumers. The majority of these provisions were implemented in 2014 and since then the number of Americans without health insurance has decreased significantly from 44.8 million in 2013 to a low of 28.6 million in 2016. More recently, following changes to the law and how it is regulated, the number of uninsured individuals has begun to climb slightly. As of 2018, there were 30.4 million uninsured individuals in the United States (Cohen, Zammitti, & Martinez, 2019).

Overview of ACA coverage provisions

The ACA's Medicaid expansion is a key part of the changes brought on by the ACA. As the law was originally written, all states were required to expand their Medicaid program eligibility to include residents with incomes below 138 percent of the federal poverty level (FPL). Prior to the ACA, there were both categorical and income requirements for Medicaid eligibility. The income requirements

varied by state and by category, which included children, pregnant women, adults with dependent children, seniors, and people with disabilities. For example, in 2013, prior to the implementation of the ACA's Medicaid expansion, income eligibility thresholds for adults with dependent children ranged from a low of 16 percent FPL in Arkansas to a high of 251 percent FPL, with an overall average of 64 percent FPL (Kaiser Family Foundation, 2020b). Under the ACA, the categorical eligibility requirements were to be removed and the minimum income threshold for adults was set at 138 percent FPL. A legal challenge to the law, however, led to a 2012 U.S. Supreme Court ruling that made the Medicaid expansion optional for states. Since then, 36 states and the District of Columbia have adopted Medicaid expansions (Kaiser Family Foundation, 2020c). As of December 2019, nearly 71 million individuals were covered by Medicaid and Children's Health Insurance Program (CHIP), which is 14 million more than the pre-ACA average monthly enrollment (Centers for Medicare & Medicaid Services, 2018; Kaiser Family Foundation, 2020d).¹

The individual health insurance market has also undergone significant changes under the ACA. The law's health insurance marketplaces, or exchanges, help to connect millions of Americans with comprehensive coverage. Under the ACA, the number of people enrolled in health insurance through the individual market has increased from about 16.3 million in 2013 to a high of 21.9 million in 2016 (Kaiser Family Foundation, 2014, 2016). For many enrollees (those with incomes that fall between 100 and 400 percent FPL who do not have an offer of affordable coverage from an employer), the law also provides advanced premium tax credits, more commonly known as premium subsidies, to help individuals pay for their coverage. These subsidies are tied to the cost of benchmark plans, which most often are the second-lowest cost silver plan available to the individual, and are adjusted on a sliding scale with the most generous subsidies going to those with the lowest incomes. In addition to

¹ Some states decided to expand their Medicaid programs early using section 1115 waivers and others did not expand until later (e.g., Louisiana's expansion began in 2016 and Maine and Virginia's expansions began in 2019).

receiving premium subsidies, individuals between 100 and 250 percent FPL are eligible for cost-sharing reductions (CSRs). Individuals with incomes in this range who enroll in a silver plan through the marketplace will have to pay less for the deductibles, copayments, and coinsurance associated with their coverage. Insurance companies are required to reduce these payments for those eligible and, until October 2017, were reimbursed by the federal government for providing these reductions. Under the Trump administration, however, the federal government has stopped paying for the CSRs, leading marketplace and insurance regulators to institute policies that allow insurers to raise premiums to cover their costs.

One of the most widely supported parts of the ACA is the guaranteed issue provision, known more commonly as the pre-existing condition provision. Prior to the ACA, insurance companies could charge people different premiums based on their age, gender, and health status, and could refuse to cover certain pre-existing health conditions or even deny coverage to individuals altogether. Guaranteed issue, however, prohibits insurers from engaging in these practices and requires them to cover anyone who applies for coverage and purchases a plan, regardless of their health status. The ACA also made it so that insurance companies can only vary the rates they charge individuals by age and geography and cannot carve out coverage for pre-existing conditions.²

Other key insurance related provisions in the ACA include the requirement that employers provide coverage to employees' dependents up to age 26, the shared-responsibility provisions (better known as the individual and employer mandates), the establishment of essential health benefits, and limits on insurers' medical loss ratios.

In addition to the 2012 U.S. Supreme Court case that made expanding Medicaid voluntary, there have been other changes to the law made by the federal government. In October 2017, the Trump

² States can also allow insurers to charge tobacco smokers higher rates, although not all states have decided to allow this.

administration ended federal payments to insurers for providing the law's cost-sharing reductions to consumers. This followed a multi-year lawsuit that had started under the Obama administration when the Republican-controlled House sued the Executive branch for paying insurers for the CSRs without getting funding authorized through Congress. Also, at the end of 2017, after a long debate in the Republican controlled U.S. Congress over repealing the ACA, Congress zeroed out the individual mandate's tax penalty, a change that went into effect in 2019. While the individual mandate technically remains in the law, this move via budget reconciliation removed the mandate's financial incentive and has been likened to a repeal of the individual mandate. In response, some states have instituted their own mandate penalties to encourage individuals to maintain coverage. However, this change to the enforcement of the ACA and the discussion around repealing the law, as well as the decrease in federal spending for outreach and marketing for enrollment in the federally facilitated marketplaces, a shortening of the marketplace open enrollment windows, and concerns around changes to immigration rules regarding receiving public assistance have been pointed to as possible reasons for the increase in the number of uninsured since 2016.

Overall, the changes to individual market coverage under the ACA have put millions more consumers into direct contact with the complicated process of selecting a health plan. In 2019, nearly 11.5 million Americans enrolled in coverage through the marketplaces (Kaiser Family Foundation, 2020a). Prior research looking at consumer health insurance decision-making has found that individuals often struggle to make wise choices for themselves and even choose to enroll in dominated health plans - that is, a health plan that is the same or worse on all plan elements than another available option and worse in at least one dimension (Abaluck & Gruber, 2011; Sinaiko & Hirth, 2011). With this influx of consumers who are interacting so closely with their health insurance has come a need to better understand the consumer decision-making process and their experiences with enrolling in and maintaining coverage.

Overview of dissertation

This dissertation focuses on the decisions that individuals make when enrolling and re-enrolling in coverage in the individual market. Under the traditional economic model of the consumer, when making decisions individuals calculate their expected utility from a purchase and make decisions that maximize that utility. The von Neumann-Morgenstern theory of expected utility is an economic model for consumer decision-making under uncertainty where the probability of an event happening is multiplied by its utility to calculate its expected utility (Morgenstern & Von Neumann, 2007). The expected utilities of different options can then be compared against each other to determine which action an individual should take. This theory is based on three standard assumptions: 1) consumers act rationally and make the right decisions for themselves, 2) consumers have access to all pertinent information and have no problems processing and evaluating it, and 3) consumers have an immutable set of preferences. If these three assumptions hold, then the decisions that consumers make are a rational representation of their needs and desires and are in their own best interest.

However, in reality consumers struggle to make decisions. When consumers face a great deal of uncertainty, when the decision they are making is complex and requires the consideration of multiple factors, and when the timing of costs and benefits is staggered, the decision-making process is particularly challenging. Selecting health care coverage includes all these factors - the amount of health care an individual will use is uncertain, insurance requires a premium to be paid by the consumer up front with the benefit of coverage kicking in only if the consumer accesses care later, and health plans differ across a variety of attributes, from costs to quality to accessibility.

Recognizing that traditional economic theory does not accurately describe consumer behavior and that consumers make consistent and predictable errors, the field of behavioral economics has focused on better explaining consumer behavior. Building off of Herbert Simon's (1955, 1956, 1978) theory

of bounded rationality that emphasized the role of consumers' limited information and computation abilities that can lead individuals to "satisfice" rather than optimize, theorists and researchers working in the field of behavioral economics have identified several ways that consumers violate the traditional expected utility model. When making decisions individuals will often rely on heuristics to help them decide. Of the many heuristics and biases identified in the field, some of the most often studied and cited include status quo bias, confirmation bias, anchoring, representativeness, categorization, present bias, and the availability heuristic. Individuals also make decisions based on their own reference points and assign values based on gains and losses from that reference point rather than final assets or utility amounts. Understanding probabilities is also a challenge for consumers who often overweight small probabilities and underweight moderate and high probabilities. Finally, consumers are loss averse and the pain of a loss is about two times the pleasure of a gain (Kahneman & Tversky, 1979; Tversky & Kahneman, 1974; Tversky & Kahneman, 1992).

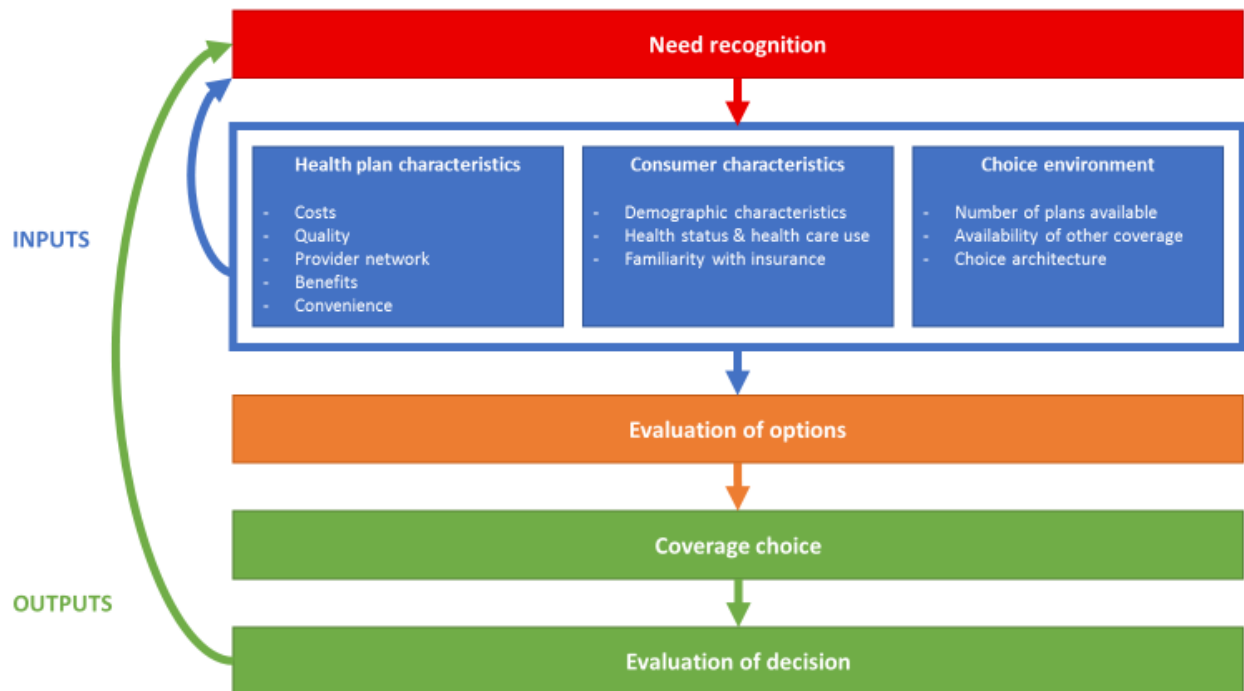
Conceptual framework for consumer health insurance decision-making

The conceptual framework for this dissertation focuses on consumer health insurance decision-making and takes into account the findings of behavioral economics in its adaptation of models of health plan choice from Scanlon, Chernew, and Lave (1997) and Sainfort and Booske (1996) as well as the Milner and Rosentreich (2013) model of consumer decision-making for financial services and Bettman's (1979) theory of consumer choice (see Figure 1).

Need recognition

Need recognition is the first stage of the consumer health insurance decision-making process and represents a realization by the consumer that they should consider the available coverage options. For those with private insurance, this could be during annual open enrollment periods when new enrollees

Figure 1. Conceptual framework of consumer health insurance decision-making



can gain coverage and existing customers can renew their plan or shop around. Some existing customers may decide to automatically re-enroll in their health plan and not participate in the shopping experience, a decision that is influenced by a consumer's prior year experience and satisfaction with their coverage, as well as any significant changes such a premium increase, a change in the consumer's health status, or a change in their eligibility for coverage, any of which may push an individual to consider switching plans. New enrollees may perceive their need to shop for coverage during open enrollment or during a special enrollment period following a change in their life circumstances, including an employment change or a change in their family makeup (e.g., a birth, death, marriage, or divorce), that makes them eligible to purchase coverage outside of the regular annual open enrollment period. Individuals with public coverage may recognize their need to shop for coverage following a life change or during their annual eligibility redetermination process.

Inputs

Once a consumer recognizes that they should consider their available coverage options, there are several sources of inputs that go into the decision-making process: 1) health plan characteristics, 2) characteristics of the choice environment, and 3) consumer characteristics.

Table 1. Details of input variables

Consumer characteristics	Health plan characteristics	Choice environment
Demographic characteristics - Age - Gender - Household income - Educational attainment - Marital status - Employment status - Numeracy - Risk seeking preferences Health status and health care use - Self-reported health status - Presence and number of chronic conditions - Visits to emergency room in previous year - Number of doctor visits in previous year - Presence of a usual source of care - Prescription drug use Familiarity with insurance - Health insurance literacy - Number of years enrolled in current coverage (or uninsured)	Costs - Premium - Deductible level - Copayment or coinsurance - Maximum out-of-pocket costs Quality - Consumer satisfaction - Medical care quality Provider network - Percent of providers covered - Plan network type (EPO, PPO, HMO) Reputation Benefits - Metal tier - Benefits covered Convenience - Travel time to providers - Appointment waiting time	Number of plans available Availability of other coverage Choice architecture - Order display - Filtering options - Personalization of information - Alerts/automated responses to consumer action - Default decisions

Health plan characteristics

When selecting a plan, the consumer weighs information about a health plan's costs, quality rating, provider network, benefit design, and convenience (Table 1 details the variables included under each

of these health plan characteristics). Prior research has found that consumers pay close attention to out-of-pocket costs associated with health plans, particularly premiums and cost-sharing levels, but also consider a plan's provider network, benefit design, and quality when choosing which plan to enroll in (Abraham, Feldman, Carlin, & Christianson, 2006; Ericson & Starc, 2012; Marquis et al., 2006; Polsky, Stein, Nicholson, & Bundorf, 2005; Rice, Jacobson, Cubanski, & Neuman, 2014; Royalty & Solomon, 1999; Schwartz, Hadler, Ariely, Huber, & Emerick, 2013; Strombom, Buchmueller, & Feldstein, 2002; Tumlinson, Bottigheimer, Mahoney, Stone, & Hendricks, 1997; van den Berg et al., 2008).

Choice environment

The choice environment within which an individual is making health insurance decisions may also play a role (see Table 1 for more details). Decisions around the type of coverage an individual enrolls in will depend on the availability of coverage. For example, a consumer could be eligible for Medicaid, have an offer of employer-sponsored insurance, or could enroll in unsubsidized coverage in the individual market. The availability of these different types of coverage will play a role in determining the ultimate plan that an individual selects.

The number of plans a consumer is deciding between will also affect the decision-making process. Research has found that when faced with too many options to choose between, consumers may experience choice overload and end up making a poor selection for themselves, avoid making a decision altogether, or may use heuristics to quickly cut plans and reduce the number they comprehensively compare (Chernev, Böckenholt, & Goodman, 2015; Iyengar & Lepper, 2000; Schwartz, 2004). On the opposite end of the spectrum, there will also be some consumers who find themselves without a choice between health insurers and thus only deciding between plans from the same insurer (if more than one is available) or not enrolling at all.

In instances where the available health insurance options are displayed jointly, the choice architecture employed also acts as an input in consumer decision-making (Thaler & Sunstein, 2008). For individuals shopping through the ACA's health insurance marketplaces, the display order of plans, the placement of plan attributes in the description of the plan, the ability to filter what plans are displayed, the presence of personalized information, the inclusion of alerts or responses to consumer decisions, and the decision around default plan selection or automatic plan renewal if the consumer does not make a final decision all affect consumer enrollment (Taylor et al., 2016).

Consumer characteristics

Consumer characteristics are another set of inputs in the consumer decision-making process. An individual's demographic profile, health status and health care use, and familiarity with insurance are all key characteristics that could affect the decisions that she will make (see Table 1 for more details). Consumer characteristics play a role in the decision-making process by influencing the weight that an individual consumer places on various health plan characteristics.

A consumer's age, gender, household income, educational attainment, marital status, and employment status are key characteristics that play a role in the health insurance decision-making process. Some of these characteristics (age, income, marital status, and employment status) affect the consumer's eligibility for coverage, either through a public program or for employer-sponsored insurance through their own job or that of a spouse or parent, and thus their choice set. Younger individuals and those with lower incomes have also been found to put more weight on a plan's cost and are more price sensitive than older, wealthier consumers (Marquis & Long, 1995; Strombom et al., 2002). Prior to the ACA and the implementation of essential health benefits, women were more likely to enroll in plans that covered obstetric and maternity benefits. Other research looking at Medicare enrollees found that those with higher incomes and higher levels of education are more likely to choose higher quality plans

(Rice, McCall, & Boismier, 1991). Consumer characteristics can also exacerbate issues around choice overload, with prior research finding that less numerate consumers benefited less from a decrease in the number of choices available than more numerate consumers (Barnes, Hanoch, & Rice, 2015; Szrek & Bundorf, 2014). Consumer risk preferences may also play a role in their health insurance decision-making. Those who are more risk averse may be more likely to enroll in coverage and select more generous plans than those who are more risk-seeking.

The health status and health care use of an individual also affects the way that they evaluate their coverage options. Research has found that consumers with worse health are more likely to be willing to spend more money on plans than those in better health (Naessens et al., 2008). Individuals who use more health care may also place a greater weight on a plan's provider network, quality, benefits, and convenience than those who do not use as much care.

A consumer's familiarity with insurance also plays a role in the consumer decision-making process. Many people haven't interacted with their insurance that often and therefore do not have personal experience to use in their decision-making process. This can also lead to low health insurance literacy and a lack of understanding of key insurance terminology such as premium, deductible, network, co-payment, or co-insurance. How well an individual understands these terms will influence the weight they put on them during the plan selection process.

The number of years that an individual has been enrolled in the same plan is an indicator of how familiar they are with their coverage and may suggest they have a preference of sticking with their coverage regardless of changes to the plan, a tendency known as status quo bias. In the context of selecting health plans during open enrollment, for example, researchers found that new and existing enrollees made different decisions about which plan to enroll in with new enrollees having higher price elasticities than incumbents (Sinaiko & Hirth, 2011; Strombom et al., 2002). For the uninsured

population, the length of time they are uninsured may indicate a distaste for insurance or a willingness to take risks.

All of these inputs, from the consumer, health plan, and the choice environment, are then used by the consumer in evaluating the options. During this initial evaluation process, consumers develop criteria based on their own preferences, needs, and prior experience to compare the available options.

Outputs

The final component of the decision-making model is the output, where the consumer selects a health plan, enrolls in coverage, and then evaluates her decision. This decision evaluation is a continuous process over the course of the plan year and can lead to disenrollment if the consumer is unsatisfied with the plan, either at the next annual open enrollment period or prior to that. If the consumer is satisfied with her decision, she may choose to re-enroll in the same plan the next year (following either an active shopping experience or a decision to automatically re-enroll without considering the other options available). In a dynamic insurance environment like the health insurance marketplaces where new plans enter each year and networks and premiums change, it is important for consumers to at least consider switching plans. However, consumers are subject to inertia and status quo bias, which may lead them to stay in the plan they enrolled in longer than they might ideally want to and end up paying more for coverage than if they had switched plans (Abaluck & Gruber, 2011; Handel, 2013; Ho, Hogan, & Scott Morton, 2017; Marzilli Ericson, 2014; Sinaiko & Hirth, 2011). Changes to any of the input sets (consumer characteristics, health plan characteristics, and the choice environment) can also lead to a re-evaluation of a consumer's current coverage and induce a consumer to begin the decision-making process again.

Using this conceptual framework, my dissertation consists of three papers that explore decisions consumers make when selecting a health plan.

Chapter 2

The first analyses of my dissertation are presented in Chapter 2. This paper examines two key components of health plans that individuals weigh when making enrollment decisions - cost and quality. The ACA requires both federally facilitated and state-based marketplaces to provide easy to understand plan quality information to customers shopping for coverage. Through two hypothetical choice experiments, this paper seeks to understand the tradeoffs consumers make between cost and quality and to examine the association of consumer characteristics with the selection of dominated health plans, particularly health insurance literacy, risk seeking behavior, and numeracy. This paper uses multiple logistic regression and conditional linear regression models to estimate the consumer characteristics associated with a preference for quality over cost and the likelihood of selecting a dominated health plan (i.e., a lower quality plan that costs more).

Aim 1: Identify whether consumers prefer higher quality, more expensive plans at the same rate regardless of the choice environment.

Hypotheses: Consumers will act predictably between scenarios so that a higher percent of participants will select the higher quality, more expensive plans when: 1) the quality ratings are lower, 2) the price differential is lower, or 3) the star difference between plans is greater.

Aim 2: Examine if consumers' health insurance literacy, risk preferences, and numeracy are associated with their selection of higher quality, more expensive plans.

Hypothesis: Consumer characteristics play a role in the decision-making process. Individuals' risk preferences affect the weight they put on a health plan's quality rating so that participants who are more risk averse have a higher probability of choosing the higher quality, more expensive plans.

Aim 3: Examine if consumers' health insurance literacy, risk preferences, and numeracy are associated with their selection of dominated plans.

Hypotheses: Dominated plan selection is associated with consumer characteristics that indicate a lack of familiarity with health insurance and having lower numerical skills. Participants with lower health insurance literacy and poor numeracy have a higher probability of selecting dominated plans

Chapter 3

States have significant flexibility in implementing the ACA - they can choose how to design and run their health insurance marketplaces and whether to expand eligibility for their Medicaid programs. The decisions that states make on these key parts of the ACA affect the coverage options available to individuals and the shopping experience for individuals looking to enroll in coverage. California has embraced the ACA and has been one of the success stories of the law (Rasmussen & Kominski, 2019). The state expanded Medicaid early through a section 1115 waiver, and it was the first to pass legislation creating a state health insurance marketplace, now known as Covered California. Since the passage of the ACA in 2010, the uninsured rate has been dropping in California. Although the main coverage provisions of the law did not go into effect until 2014, the state began implementation early and quickly began seeing coverage gains. The uninsured rate among 18-to-64-year-olds in the state has dropped from a high of 25.8% in 2010 to 10.9% in 2018, with most of this reduction occurring between 2013 and 2017 (from 23.7% to 9.7%)³ (Cohen & Martinez, 2013; Cohen, Martinez, & Ward, 2010; Cohen et al., 2019; Zammitti, Cohen, & Martinez, 2017).

³ Like most states, the uninsured rate increased in California starting in 2017. However, in 2019 the state instituted its own individual mandate, expanded Medicaid coverage to low-income undocumented young adults, and provided enhanced individual market premium subsidies for those with incomes between 100 and 600 percent of the federal poverty level, effective in 2020.

Both Medi-Cal (the state's name for Medicaid) and the state's individual market have undergone significant changes under the ACA. Medi-Cal enrollment has grown from about 7.8 million in 2013 to over 12.6 million⁴ as of November 2019 (California Department of Health Care Services, 2019). Covered California has also had robust annual enrollment with between 1.1 and 1.4 million Californians enrolled in coverage through the marketplace since 2014 (Covered California, 2014a, 2018b, 2019). While coverage through the marketplace hasn't been immune to premium increases, the rate changes over the years have been lower to those seen in most other marketplaces (Rasmussen & Kominski, 2019).

One of the defining aspects of Covered California is that it is an “active purchaser.” As an active purchaser, the marketplace negotiates premiums with insurance companies and reviews applications from health insurers before approving them to sell plans in the marketplace (Covered California, 2014b; Scheffler, Arnold, Fulton, & Glied, 2016). To facilitate comparison shopping, Covered California requires all insurers to offer a standardized benefit design within each metal tier under the ACA (i.e., bronze, silver, gold, and platinum), meaning that all plans in the same tier have the same deductible, maximum out-of-pocket costs, and co-payment or coinsurance levels. Standardizing policies to promote comparisons of similar products by price is a key aspect of Alain Enthoven's managed competition (Enthoven, 1978). Covered California's plan standardization allows consumers to be able to look only at the premium levels, provider networks, and quality ratings of plans in the same metal tier when deciding which one to enroll in.

California was also the first state to respond to the cancellation of federal funding for CSRs in October 2017 by allowing insurers to place the entire cost of providing the subsidies onto the premium of silver plans sold through the marketplace, a practice known as silver loading. This maximized the benchmark

⁴ Medi-Cal enrollment peaked in December 2016 with nearly 13.6 million enrollees but has been decreasing since then.

premium, increased premium subsidies, and decreased net premiums paid for the least expensive plan for most subsidized enrollees (Anderson, Abraham, & Drake, 2019). Under silver loading, subsidized enrollees can continue purchasing silver plans through the marketplace with their subsidies and without seeing a significant increase to their premiums and unsubsidized enrollees can enroll in silver plans outside of the marketplace without incurring large increases to their premiums.

Furthermore, because of silver loading, for the first time there were three silver plans sold through Covered California that had higher premiums and cost-sharing than matched gold plans - making the silver plans dominated by the gold plans. These plans, sold by Kaiser Permanente and Sharp Health Plan, were from the same issuers and had the same provider network and plan type. In chapter 3, I use enrollment data from Covered California to examine enrollment in dominated silver plans in the real world to examine this unintended consequence of silver loading. In addition to quantifying the extent of plan domination enrollment, my analyses explore the relationship between households' enrollment decisions in the prior year with enrollment in these silver dominated plans.

Aim 1: Identify the percent of Covered California enrollees who chose a dominated health plan in 2018 and the average financial consequences of that decision.

Aim 2: Examine differences in the probability of enrolling in a dominated plan by consumers' prior year's enrollment status to identify the role of status quo bias and whether some consumers overly relied on the labeling of metal tiers in their decision to enroll in silver dominated plans in 2018.

Hypotheses: Consumers previously enrolled in 2017 in silver plans have a higher probability of enrolling in a silver dominated health plan in 2018 than new enrollees and those previously enrolled in non-silver plans.

Chapter 4

Chapter 4 again uses enrollment data from Covered California to examine consumers who switched health plans during open enrollment. Under the ACA, switching rates in the individual market have been much higher than those previously seen in employer-sponsored insurance and Medicare Part D (Hoadley, Hargrave, Summer, Cubanski, & Neuman, 2013). Looking at re-enrollees in California's individual marketplace, this study employs multiple logistic regression models to identify the consumer, plan, and choice environment characteristics associated with plan switching during open enrollment. The data for this study covered the open enrollment period following the implementation of silver loading. Using this external shock to silver plan premiums, I examine whether consumers responded to rising silver plan premiums by moving into gold plans, which were more affordable compared to previous years.

Aim 1: Determine if switching rates have remained relatively steady over time, fluctuated, or continually increased or decreased.

Hypotheses: The overall switching rate increased over time and the percent of re-enrollees switching metal tiers increased following the implementation of silver loading with more re-enrollees switching into gold plans in 2017-18 than in previous years.

Aim 2: Explore the consumer, plan, and choice environment characteristics associated with switching coverage during open enrollment.

Hypotheses: Consumers whose premiums increased significantly between years have higher predicted probabilities of making changes to their coverage during open enrollment than those with lower premium increases or premium decreases. Those who receive consumer assistance and who have more plans to choose between have higher predicted probabilities of switching plans during open enrollment.

Aim 3: Examine changes in plan switching behavior among re-enrollees following the implementation of silver loading.

Hypotheses: Consumers whose premiums increased between years have higher predicted probabilities of making changes to their coverage during open enrollment in 2017-18 than those with similar premium changes in 2016-17. This is particularly pronounced with regard to the decision to switch from silver or bronze coverage into gold plans.

Chapter 5

The final chapter of this dissertation reviews the key findings of my work, summarizes the policy implications of these findings, and discusses my plans for future analyses and research in this area.

CHAPTER 2: STAR POWER: HOW DO CONSUMERS RESPOND TO HEALTH PLAN QUALITY STAR RATINGS?

Introduction

Selecting a health plan is a complicated process that requires individuals to weigh and compare premium levels, deductible and co-pay amounts, provider networks, insurance company customer service, benefit design packages, and health plan quality. For the majority of Americans who get their health insurance through their employer, this decision is made easier by human resource departments which, often working with insurance brokers or directly with insurance companies, review and vet the variety of options available before presenting employees with a single plan or a smaller set of plans to choose between. For example, the Kaiser Family Foundation 2019 Employer Health Benefits Survey found that 75% of firms that offer health benefits do not offer more than one type of health plans for employees to choose between, 21% offer two plan types, and only 4% offer three or more plan types (Claxton et al., 2019). But for millions of consumers on the individual market, the process of finding a health insurance plan has long been a challenging and costly experience. Until the implementation of the Affordable Care Act's (ACA) health insurance marketplaces in 2014, there were very few centralized repositories of health plan information where individuals could see their coverage options and enroll. Under the ACA, however, the health insurance landscape in the United States has dramatically changed. The law's health insurance marketplaces, or exchanges, provide these repositories where individuals who are eligible for subsidized or unsubsidized individual market or Medicaid coverage can more easily shop for and enroll in coverage. Although the ACA introduced some plan standardization by requiring that coverage offered through the marketplaces fit into one of four metal tiers (bronze, silver, gold, and platinum), representing the plan's actuarial value, in most states there is still wide variation between plans in how these actuarial values are reached (i.e., different

benefit design or cost-sharing structures). Through the health insurance marketplaces, individuals often come face to face with a large choice set of insurance plans that can be vastly different from one another. The average American had 25 health plans to choose from in states with a federally facilitated marketplace for coverage in 2018 (Assistant Secretary of Planning and Evaluation, 2017).

Under the traditional economic model, having so many plans to choose from is a good thing - more options allow individuals to satisfy their desires and needs and increase price competition. However, there is more debate about the benefits of choice in other fields. While some have found that having more choices can motivate consumers in a positive way, other research has highlighted how, when faced with too many options, individuals often rely on heuristics rather than reviewing all of the information available to them before making a decision, and can experience decision fatigue, choice overload, and buyer's remorse (Hanoch, Rice, Cummings, & Wood, 2009; Schwartz, 2004; Schwartz et al., 2002).

Similarly, traditional economic theory suggests that providing more information to consumers will allow them to make the right decisions for themselves. However, Herbert Simon's theory of bounded rationality recognizes that people are limited in their ability to process information. When individuals are given too much information they may struggle to make a decision or take action (Milgram, 1970; Simon, 1955, 1956, 1978). These issues about choice and consumers' ability and willingness to process complicated information are of paramount importance in a consumer decision-making situation like the health insurance marketplaces where it is up to policymakers to decide how to design, build, and regulate the online platforms and the products sold there.

Two key pieces of information that consumers can turn to when making purchasing decisions are cost and quality. The ACA requires state-based and federally facilitated marketplaces to display quality rating information to consumers. In 2018, the federal health insurance marketplace began piloting the

use of quality star ratings for health plans in Virginia and Wisconsin, joining the ten state-based marketplaces that provide consumers with quality ratings when shopping for coverage (Dash, Corlette, & Thomas, 2014; HealthCare.gov, 2017).⁵ The federal marketplace then added Michigan, Montana, and New Hampshire in 2019 and expanded the ratings program to all states for 2020 plan year coverage. While the calculation of quality ratings poses its own challenges, the fact that the federal marketplace and several state-based marketplaces are moving forward with including these ratings alongside plan information indicates that there is a need to better understand the effect of their inclusion on consumer choice.

To help policymakers design the marketplaces so that they can best serve consumers and make the enrollment process appealing to Americans looking to become insured, recent research has focused on consumer decision-making in the health insurance marketplaces and how the choice architecture of the marketplaces and the amount and type of information provided to customers affects their decisions. Prior work has found that while giving information on plan quality can help consumers make better decisions, effectively providing quality information to consumers so that they can incorporate the information into their decision-making process can be challenging (Hibbard, Slovic, Peters, & Finucane, 2002; Kolstad & Chernew, 2009). The information must be given to consumers in a way that is easy to understand, and which does not simply add to an already abundant amount of information that the consumer needs to process (Barnes, Hanoch, Wood, Liu, & Rice, 2012; Peters, Dieckmann, Dixon, Hibbard, & Mertz, 2007). In an online hypothetical choice experiment conducted in 2015, researchers randomized 1,025 participants to select from five health plans (Greene, Hibbard, & Sacks, 2016). Participants were given cost information and quality ratings to use in their decision-

⁵ California, Colorado, Connecticut, DC, Maryland, Minnesota, New York, Rhode Island, Vermont, and Washington are all state-based marketplaces that provide quality ratings in their shop and compare tool. 12 states and the District of Columbia run their own state-based marketplaces and websites while the other 38 states use the federal platform for enrollment. Nevada and Idaho are the remaining two state-based marketplaces that still do not provide shoppers plan quality information.

making process. The researchers manipulated the amount of cost information given, the placement of the quality information given (i.e., before, after, or not adjacent to the cost information), and the labeling of the quality stars (i.e., doctor quality, quality rating, or star rating) to create eighteen different displays comparing the health plans. From this experiment, the researchers found that participants who received summarized (rather than detailed) cost information and/or who saw displays that placed quality information adjacent to cost information selected the high-value plan at higher rates than those who did not. The labeling of the quality stars did not make a statistically significant difference.

While this prior research covered a broad set of topics important to quality ratings and their role in the health insurance marketplaces, none of this research has investigated the tradeoff between the consumer's estimated total yearly spending under a health plan and the number of stars that plan receives - that is, are people willing to spend more money to purchase a plan with higher quality, and if so, under what conditions?

Furthermore, research examining the potential role of quality ratings in aiding consumers' choice of non-dominated plans has not been conducted. A dominated plan is one that is inferior to other available options along one or more dimensions without ever being superior. The plan that is superior to the dominated plan is called a dominant plan. For example, a plan that has a higher premium but does not provide any additional benefit to the consumer would be a dominated health plan and its cheaper counterpart would be the dominant plan. There is ample evidence showing that consumers can and do make poor decisions for themselves by enrolling in health plans that are dominated. In research examining the employer-sponsored insurance market, as many as 61% of enrollees at a single firm were identified as having enrolled in a dominated plan and enrollees who chose these dominated plans could have saved \$372 per year if they had chosen a different plan (Bhargava, Loewenstein, & Sydnor, 2017). Similarly, in the Medicare Part D market, millions of enrollees could have saved as

much as \$368 a year by enrolling in different prescription drug plans (Zhou & Zhang, 2012). Although some research has studied the association between consumer characteristics and their decisions to enroll in dominated plans in the employer sponsored and Medicare markets, the results of this work has been at times conflicting. While one study found that women, older enrollees, and those with higher salaries are less likely to enroll in a dominated plan (Sinaiko & Hirth, 2011), another found the opposite (Bhargava et al., 2017). Additionally, there is a gap in the literature when it comes to the individual market, particularly under the ACA. Millions have enrolled in individual market since 2014 and many of these are consumers who have less experience purchasing insurance coverage, lower health insurance literacy, and lower incomes compared to those with employer sponsored insurance. With these individuals facing the challenging prospect of comparing plans and then facing most of or the full cost of paying for their coverage, enrollment in dominated plans is a costly mistake for both consumers and the federal government subsidizing the cost of coverage.

Research objectives

Through two hypothetical choice experiments, this study examined how the provision of quality information affects consumer choice. The first area of interest was examining when participants chose to enroll in higher quality rated plans that were more expensive than a similar, lower quality plan. We were interested in looking at this by the difference in star ratings (e.g., 2- vs. 3-star plans compared to 4- vs. 5-star plans), the number of stars separating the two plans of interest (i.e., a 1-star difference between plans versus a 2-star difference), and how much more the higher rated plan costs compared to the cheaper, lower quality plan (i.e., \$500 vs. \$1,000).

We also included dominated plans as options for participants to select in our experiment so that we could explore individuals' decisions to enroll in dominated plans more closely. We wanted to examine the association of consumer characteristics and dominated plan selection to see if there were

subgroups who were more likely to select a dominated plan than others. In our second experiment, we extended our finding from the first experiment by examining whether the probability that consumers selected a dominated plan changed as the available options shifted. In other words, did consumers choose dominated plans at higher rates when there was not much differentiation between the quality star ratings of the available plans?

Questions that allowed us to estimate three key consumer characteristics - health insurance literacy, risk-seeking behavior, and numeracy - were also included in the experiment. Information on these three measures are rarely available outside of an experiment or research study that gathers its own data and thus have not been examined in prior studies looking at enrollee selection of dominated plans. These three characteristics are the key predictors in our study.

Health insurance literacy has previously been identified as a probable predictor for enrollment in dominated plans (Bhargava et al., 2017; Loewenstein et al., 2013). Because of this, we expected those with higher insurance literacy to better understand the provided plan information and use it more effectively to avoid choosing dominated plans. Similarly, we hypothesized that more numerate individuals would be better equipped to compare plans and identify situations where a plan is more expensive without added benefits. Finally, we were interested in examining risk-seeking behavior to determine if an individual's risk profile was associated with their plan selection. Much like how the risk averse have a greater demand for health insurance because they have increased utility from the security of having coverage in case they have a catastrophic health expenditure, we also expected them to be willing to spend more in order to be enrolled in a plan with a higher quality rating that should provide better quality of care as they would want to be secure in their choice of plans should they need to use it.

Experiment 1

Methods

Participants

The first hypothetical choice experiment was conducted as an online survey of U.S. adults ages 19 and older. The survey was fielded using the Amazon Mechanical Turk (MTurk) platform for participant recruitment and a self-designed website to display the survey and gather responses. MTurk is a widely used platform for conducting social science experiments and provides the opportunity to quickly survey individuals. Participants were given \$1 for completing the survey. All participants were asked the same questions, which included a set of choice scenarios focused on health plan costs and quality ratings, as well as questions about participants' demographics, health status, risk preference, numeracy, and health insurance literacy.

There were 803 individuals who participated in the study between November 30, 2018 and December 6, 2018. Four questions aimed at gauging whether participants were reading the prompts and paying attention to the task were included in the survey and 88 participants failed at least one of these questions and therefore were dropped from the analyses. Another 69 individuals did not answer one or more questions of interest in our analyses or fell into groups that were excluded from the analyses (e.g., those older than age 64). This left a final analytic sample of 646 adults ages 19 to 64 who took an average of 12.8 minutes to complete the survey.

Demographic characteristics, health status and health care use, health insurance literacy, risk preference, and numeracy levels of the sample are shown in Appendix Tables A, B, and C. Compared to the non-elderly adult U.S. population, participants were younger, less likely to be non-white, more educated, and wealthier. However, we controlled for demographic and health characteristics in our regression analyses.

Measures and procedures

The choice scenarios of this study required participants to make a tradeoff between a health plan's cost and quality, represented by stars. The experiment simplified the decision-making process by having participants choose between five health plans that differed only in their cost and quality rating in order to be able to more clearly discern the tradeoffs that individuals make between these two elements. This decision also reflects the findings of earlier research that suggest consumers make better decisions when given more simplified cost estimates (Barnes, Hanoch, Rice, & Long, 2017; Greene et al., 2016). The choice experiment consisted of nine questions, and, after the first comprehension scenario, the remaining choice scenarios were randomized between participants to mitigate order effects. These scenarios all had the same prompt, but the health plans that participants could choose among differed between scenarios. Within each choice scenario, the display order of the plans was randomized, and the prompt was as follows:

***Imagine** that you are buying health insurance coverage only for yourself for next year and that **you expect to use a significant amount of medical services over the year**, including several office visits to doctors, a surgery in an outpatient clinic, and follow-up care.*

*Assume that you have a choice of five health insurance plans that are the same in all respects **except** in two ways. First, the plans vary in the total amount you would have to spend. And second, the plans differ in their quality ratings.*

Below is a table that shows, for each health plan, the total amount of money you can expect to spend on premiums and out-of-pocket health care expenses in the next year under that plan and the quality rating of the plan. The quality ratings are based on the quality of medical care provided by doctors included in that plan's network and member satisfaction. The quality rating ranges from a low of 1 star to a high of 5 stars.

Which of the five health insurance plans would you select?

Comprehension scenario

The first scenario that participants encountered was aimed at measuring how well people understood what they were being asked to do. There is an obvious correct choice in this scenario, as the cheapest plan is also the highest rated (Plan A in Figure 2). For our main analyses, we included those who chose any plan in this first scenario but conducted a set of sensitivity analyses that excluded those who did not select the dominant plan in the comprehension scenario.

Figure 2. Table with health plan for comprehension scenario

Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
Plan A	★★★★★	\$8,000
Plan B	★★★★☆	\$8,500
Plan C	★★★☆☆	\$9,000
Plan D	★★★☆☆	\$9,500
Plan E	★★☆☆☆	\$10,000

Note: The order of plans was randomized between participants.

Experimental scenarios

The next eight choice scenarios examined whether participants prefer higher quality, more expensive plans or cheaper plans with one to two-star lower quality ratings. In each of these scenarios, participants were shown a table with five health plans with the following differences:

- \$500 or \$1,000 difference between a 3-star plan (the highest rated plan) and the cheapest 2-star plan.
- \$500 or \$1,000 difference between a 4-star plan (the highest rated plan) and the cheapest 3-star plan.

- \$500 or \$1,000 difference between a 5-star plan (the highest rated plan) and the cheapest 4-star plan.
- \$500 or \$1,000 difference between a 5-star plan (the highest rated plan) and the cheapest 3-star plan.⁶

In each of these eight scenarios at least one of the two above-mentioned plans dominate the other three available options either by being of equivalent quality and cheaper or by being both cheaper and having a higher quality rating. The table shown in Figure 3 illustrates this. Plan B dominates Plans C, D, and E and Plan A dominates Plan C because they are less expensive and have higher quality ratings. Plan A also dominates Plans D and E because it has the same quality rating of the other two but is cheaper. While hypothetical choice experiments often have a “best” plan, there is no single preferred plan in each of the scenarios in this study. We deliberately gave participants a choice of dominant plans (e.g., Plans A and B in Figure 3) through which they could express their valuation of quality ratings.

Figure 3. Example of table with health plan information, \$500 difference between three-star and four-star plans

Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
Plan A	★★★★☆	\$8,000
Plan B	★★★★☆	\$8,500
Plan C	★★★☆☆	\$9,000
Plan D	★★★★☆	\$9,500
Plan E	★★★★☆	\$10,000

Note: The order of plans was randomized between participants.

⁶ The order of these scenarios was randomized between participants.

Following these questions, participants were asked about their demographic profile, including their health status and health care use. They were also asked to complete measures that evaluated their numeracy, health insurance literacy, risk preferences, and discount rate. Finally, participants were asked if they had previous experience with quality star ratings when enrolling in coverage.

We empirically defined our key outcomes and predictors as follows:

Main outcome variables: A nominal response variable was constructed for each of the eight choice scenarios to categorize whether the plan chosen was: a) the high cost, high quality plan, b) the lower cost, lower quality plan, or c) one of the remaining three dominated plans. We also defined a set of dichotomous variables indicating if individuals always chose the high quality, more expensive plan across the \$500 comparisons and across the \$1,000 comparisons, excluding individuals who chose a dominated plan in any of the choice scenarios with that price difference. For a second set of analyses, a count variable of the number of times an individual chose a dominated health plan was created. From this variable, a dichotomous variable was made, categorizing individuals as either having never chosen a dominated plan or having chosen a dominated plan at least once.

Health insurance literacy measure: A composite measure of individuals' health insurance literacy was created using a 19-question scale developed by Paez and colleagues (Paez et al., 2014). Individuals were asked how confident they were on several insurance-related issues. For each question, individuals were awarded between 1 and 4 points (1 for not being confident at all and 4 for being very confident). Therefore, the lowest possible health insurance literacy score was 19 and the highest was 76. A categorical variable was created from the continuous measure to represent low (<50), medium (50-60), and high (61+) health insurance literacy and to ensure that enough sample was included in each category.

Risk preference: Respondents were asked 15 questions about their likelihood of engaging in risky behaviors (e.g., eating expired foods, betting a day's income at the horse races, or smoking a pack of cigarettes a day). For each question, individuals could say they were extremely unlikely, moderately unlikely, somewhat unlikely, not sure, somewhat likely, moderately likely, or extremely likely, and respondents were awarded between 1 and 7 points (1 for being extremely unlikely and 7 for being extremely likely) based on their responses. The lowest possible riskiness score was a 15 and the highest was 105. A categorical variable was created from the continuous measure to represent low (≤ 30), medium-low (31-45), medium-high (46-60), and high (61+) willingness to take risks.

Numeracy: Four questions were included in the survey to estimate respondents' numeracy levels (Lipkus, Samsa, & Rimer). The number of correct responses that respondents gave to these questions was calculated for a scale from 0 to 4.

Descriptive analyses

In our descriptive analyses, we examined the unadjusted percent of respondents who chose: 1) the higher quality, more expensive plan; 2) the lower quality, cheaper plan, or 3) one of the remaining dominated plans for each scenario. We also calculated the percent of respondents who consistently chose the higher quality, more expensive plan in each price comparison group, who chose a dominated plan at least once and, among those who chose a dominated plan at least once, the mean number of times those participants chose a dominated plan.

Regression analyses

For the regression analyses, we conducted logistic regression models for the outcome variables indicating consistent choice of a higher quality, more expensive plan in each price differential category (\$500 and \$1,000). We also ran a logistic regression model for the variable examining whether individuals chose a dominated health plan at least once and a conditional regression model on the

number of times a dominated plan was selected. The key predictors in these models include health insurance literacy, risk preference, and numeracy.

Additional covariates were included in these models, including age, gender, race/ethnicity, educational attainment, household income, marital status, household size, employment status, discount rate, health insurance coverage, health status, health care use, prior experience with a star-rating system, and the length of time it took participants to take the survey. Predicted probabilities from the logistic regression models for the key predictors were calculated and are presented in the results section.

Sensitivity analyses

A set of sensitivity analyses were run that excluded participants who did not choose the clearly dominant plan in the first comprehension scenario (the \$8,000, 5-star plan). Overall, 81.4% of the sample chose the dominant plan in the first scenario, leaving a sample of 526 respondents in the sensitivity analyses.

Results

Descriptive analyses

In both the \$500 and \$1,000 difference scenarios, most participants chose the higher quality, more expensive plan (between 69-81.9% in the \$500 difference set and 51.4-72.4% in the \$1,000 difference set) (Exhibit 1). Furthermore, the largest percent of respondents chose the higher quality, more expensive plan when it was two stars higher than its cheaper counterpart (i.e., 5- vs. 3-stars, 81.9% at a \$500 difference and 72.4% at a \$1,000 difference). However, as the star ratings increased, more people chose the cheaper, lower quality plan (9.4% in the 2- vs. 3-star \$500 comparison compared to 21.5% in the 4- vs. 5-star \$500 comparison and 14.1% in the 2- vs. 3-star \$1,000 comparison compared to 39.9% in the 4- vs. 5-star \$1,000 comparison). Overall, among those who did not choose a

dominated plan, 70.7% always chose the higher quality, more expensive plan in the \$500 comparisons and 47.6% did so in the \$1,000 comparisons (Table 2).

In all scenarios except those where the dominant plans had 2-and 3-stars between 8.7 and 10.4% chose a dominated plan (Exhibit 1). However, in the 2- and 3-star comparisons between 18.0 and 20.9% chose a dominated plan.

Overall, 34.8% chose a dominated plan at least once (Exhibit 2). On average, among those that chose a dominated plan at least once, participants chose a dominated plan 2.76 times out of the eight choice scenarios (Table 3).

Regression analyses

In our first logistic regression models examining the predicted probability of always choosing the higher quality, more expensive plan we found that, in the \$500 comparison scenarios, those with the lowest risk score (most risk averse) had the highest probability of selecting the higher quality plan at 79.4% compared to 59.6% among those with the highest risk scores (i.e., least risk averse) ($p=0.01$), controlling for all other factors in the model (Table 2). Among the other predictors, there were no statistically significant relationships at either the \$500 or \$1,000 levels.

The next logistic regression model we conducted examined the predicted probability that participants chose a dominated plan at least once by our three main predictors: health insurance literacy, risk preference, and numeracy. Based on the health insurance literacy scale, those with a low health insurance literacy score (under 50) had a probability of choosing a dominated plan of 45.0%, compared to 29.7% ($p<0.01$) for those with the highest literacy score (61 or higher), controlling for all other factors in the model (Exhibit 2).

High risk-seeking participants (score of 61 or higher) had a predicted probability of choosing a dominated plan of 52.3%, compared to 28.0% among those with the lowest risk-seeking score (30 and under) ($p < 0.001$), 27.9% among those with a medium-low risk score (31-45) ($p < 0.001$), and 33.8% among those with a medium-high risk score (46-60) ($p < 0.01$). We considered the possibility that the risk-seeking scale could be serving as a proxy for individuals not paying close attention to the survey and finishing it very quickly. To explore this further we looked at the length of time that it took participants to finish the survey by their risk score and found no significant differences between the groups. Those with the lowest risk scores took an average of 12.03 minutes to finish the survey, those with medium-low risk scores took 13.0 minutes on average, those with medium-high risk scores took 13.47 minutes, and those with the highest risk scores took 12.68 minutes. Furthermore, we controlled for the length of time it took participants to take the survey in all models.

Participants with different numeracy levels also had different predicted probabilities for selecting a dominated plan at least once. Among participants that answered none of the numeracy questions correctly, 49.1% chose a dominated plan at least once, compared to 22.5% of those who correctly answered all four of the numeracy questions ($p < 0.001$) and 27.8% of those who correctly answered three out of the four numeracy questions ($p < 0.001$).

We also conducted a conditional regression model to examine the association of our key predictors with the number of times participants chose a dominated plan, conditional on having ever selected a dominated plan. Of our main predictors, only risk preferences had a statistically significant relationship with the outcome. For every 1-point increase in the risk preference scale, there was a 0.02 increase in the number of times a participant selected a dominated plan ($p < 0.001$).

Sensitivity analyses

Compared to the main analytic sample, the sample in the sensitivity analyses had higher health insurance literacy, lower risk-seeking behavior, and were more numerate. Regardless, the trends identified in the main descriptive and regression analyses hold in the sensitivity analysis (Appendix Exhibit C and Appendix Tables A, B, and C). Most participants were willing to pay more for higher quality plans, although this decreased as the quality star ratings got higher (Appendix Exhibit C). Those with the lowest health insurance literacy, highest risk scores, and lowest numeracy having higher predicted probabilities of choosing a dominated plan more than once (Appendix Table B). The only statistically significant relationship with the number of times participants chose a dominated plan remained the risk preference scale (Appendix Table C). However, the differences seen in consistent choice of the higher cost, higher quality plan and risk preference were no longer statistically significant in the sensitivity analysis, although the trend was the same.

Discussion

How do star ratings impact consumer behavior in the health insurance market? Our first study was designed to examine the impact of star rating on consumer choice behavior. Overall, we found that people were willing to pay more for higher quality rated plans. However, this decreased as the number of stars increased, indicating that people are less willing to pay for an additional star when comparing higher rated plans (e.g., 4- vs. 5-star plans) than when comparing lower rated plans (e.g., 2- vs. 3-star plans). People also acted predictably between scenarios and were more willing to pay for a higher quality rated plan when it was a 2-star increase rather than a 1-star increase between dominant plans.

Similarly, when examining who consistently chose the higher quality rated, more expensive plans, we found that across the \$500 scenarios a larger percentage consistently were willing to pay more for the higher quality rated plans than across the \$1,000 scenarios. We also found that the risk averse were

more likely to choose the high quality, more expensive plans, but this was only statistically significant in the \$500 price comparison scenarios. We expected the risk averse to gravitate towards the higher quality plans as they would want to be secure in their choice of plans should they need to use it.

Even in the simplified decision environment of the experiment where plans only differed by cost and quality, a high percent of participants chose a dominated plan at least once. Those with low health insurance literacy, high risk-seeking tendencies, and poor numeracy chose dominated plans at the highest rates. While we had hypothesized that consumers' health insurance literacy and numeracy levels would be associated with the selection of dominated plans, we had not predicted this would also be the case for risk preferences. Future research should explore this in more depth to better understand why those with higher risk-seeking tendencies are more likely to choose inferior plans.

Finally, the greatest proportion of participants chose a dominated plan when comparing 2- vs. 3-star plans, in both the \$500 and \$1,000 difference scenarios. Initially, we were not sure why this is the case, considering that a fairly consistent proportion of participants chose dominated plans in all other scenarios. Upon closer examination of the differences between scenarios, we realized that in the 2- vs. 3-star scenarios the dominated plans had quality ratings close to or at the same level as the dominant plans. By comparison, in the other scenarios the dominated plans had lower quality ratings than the dominant plans. We hypothesized that respondents found it more challenging to distinguish between plans in the 2- vs. 3-star comparison when the quality ratings were clustered than in the other scenarios when the quality ratings were not clustered. We decided to test this hypothesis in our second experiment.

Experiment 2

Methods

Participants

The second hypothetical choice experiment was again conducted via an online survey of U.S. adults ages 19 and older using the MTurk platform for participant recruitment and Qualtrics for programming and data collection. Participants were given \$1 for completing the survey. All participants were asked the same questions, which included choice scenarios focused on health plan cost and quality, as well as questions about participants' demographics, health status, health care use, risk preferences, numeracy, and health insurance literacy. For the majority of choice scenarios, we changed the quality star ratings for the dominated plans from experiment 1. We adjusted the quality star ratings of the dominated plans to be similar to those of the dominant plans so that all of the plan ratings were clustered around the same level. A full discussion of this change is in the measures and procedures section.

There were 800 individuals who participated in the study between August 6, 2019 and August 12, 2019. Four questions aimed at gauging whether participants were reading the prompts and paying attention to the task were again included in the survey and 95 participants failed at least one of these questions and therefore were dropped from the analyses. Another 44 responses were dropped due to duplicate IP addresses and 34 individuals did not answer one of the key questions needed for analyses or fell into groups that were excluded from the analyses due to sample size (e.g., those older than age 64). This left an analytic sample of 627 adults ages 19 to 64 who took an average of 15.3 minutes to complete the survey.

Demographic characteristics, health status and health care use, health insurance literacy, risk preference, and numeracy levels of the sample are shown in Appendix Tables A, B, and C. As in experiment 1, participants in experiment 2 were younger, less likely to be non-white, more educated, and wealthier than the non-elderly adult U.S. population. The samples from the two experiments were

comparable but were not the same, indicating that we were able to reach different participants between the two experiments with minimal overlap.

Measures and procedures

The choice scenarios of this study again required participants to make a tradeoff between a health plan's cost and quality. The design of the experiment mirrored that of the first experiment. However, a few important changes were made.

As previously discussed, in experiment 1, the percentage of respondents who chose a dominated plan when the dominant health plans had 2- and 3-star ratings was double that of all other scenarios. After examining how these questions were presented to participants, we noticed that in the 2- vs. 3-star scenarios the quality ratings of the dominated plans were equal to the quality ratings of the dominant plans. Meanwhile, in the other scenarios, the dominated plans had lower quality ratings than the dominant plans (see Figure 4). This was born from our original decision to design experiment 1 so

Figure 4. Comparison of Scenarios from Experiment 1

2 vs. 3-star scenario			Example from other scenarios		
Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)	Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
Plan A	★ ★ ☆ ☆ ☆	\$8,000	Plan A	★ ★ ★ ★ ☆	\$8,000
Plan B	★ ★ ☆ ☆ ☆	\$8,500	Plan B	★ ★ ☆ ☆ ☆	\$8,500
Plan C	★ ★ ★ ☆ ☆	\$9,000	Plan C	★ ★ ★ ★ ★	\$9,000
Plan D	★ ★ ★ ☆ ☆	\$9,500	Plan D	★ ★ ★ ☆ ☆	\$9,500
Plan E	★ ★ ★ ☆ ☆	\$10,000	Plan E	★ ★ ★ ☆ ☆	\$10,000

that the dominated plans were the same across scenarios (there was always a 2-star dominated plan and two 3-star dominated plans). However, what we hadn't accounted for was how this consistency across scenarios would affect the plan comparisons within scenarios. In both of the plan comparison tables in Figure 4, plans B, D, and E are the dominated plans. Across scenarios the plan attributes of

the dominated plans were held constant. For the 2- vs. 3-star scenario this meant the quality star ratings of the dominated plans were equal to the quality star ratings of the dominant plans.

However, for the other scenarios this meant the quality star ratings of the dominated plans were lower than the quality star ratings of the dominant plans.

Figure 5. Example of changes to clustering of health plan star quality ratings between experiments 1 and 2

(a) \$1,000 difference between three-star and four-star plans

Experiment 1 (not clustered)			Experiment 2 (clustered)		
Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)	Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
Plan A	★ ★ ★ ☆ ☆	\$8,000	Plan A	★ ★ ★ ☆ ☆	\$8,000
Plan B	★ ★ ☆ ☆ ☆	\$8,500	Plan B	★ ★ ☆ ☆ ☆	\$8,500
Plan C	★ ★ ★ ★ ☆	\$9,000	Plan C	★ ★ ★ ★ ☆	\$9,000
Plan D	★ ★ ★ ☆ ☆	\$9,500	Plan D	★ ★ ★ ★ ☆	\$9,500
Plan E	★ ★ ★ ☆ ☆	\$10,000	Plan E	★ ★ ★ ★ ☆	\$10,000

(b) \$1,000 difference between two-star and three-star plans

Experiment 1 (clustered)			Experiment 2 (not clustered)		
Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)	Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
Plan A	★ ★ ☆ ☆ ☆	\$8,000	Plan A	★ ★ ☆ ☆ ☆	\$8,000
Plan B	★ ★ ☆ ☆ ☆	\$8,500	Plan B	★ ☆ ☆ ☆ ☆	\$8,500
Plan C	★ ★ ★ ☆ ☆	\$9,000	Plan C	★ ★ ★ ☆ ☆	\$9,000
Plan D	★ ★ ★ ☆ ☆	\$9,500	Plan D	★ ★ ☆ ☆ ☆	\$9,500
Plan E	★ ★ ★ ☆ ☆	\$10,000	Plan E	★ ★ ☆ ☆ ☆	\$10,000

To examine whether individuals have a harder time discerning the dominant plans when the quality ratings are similar across plans, we modified the design of the quality ratings for the non 2- vs. 3-star scenarios so that the dominated plans had quality ratings at the same level of the dominant plans, what we refer to as clustered star ratings (see Figure 5a). We only included the \$1,000 difference scenarios to minimize participant burden, but again included a 2- vs. 3-star comparison, a 3- vs. 4-star

comparison, a 4- vs. 5-star comparison, and a 3- vs. 5-star comparison. A fifth hypothetical choice question adjusted the 2- vs. 3-star comparison to more clearly differentiate the dominant plans' quality star ratings from those of the dominated plans (see Figure 5b).

The questions following the choice scenarios were the same as in first experiment. We then used this data to again create several measures to represent key predictors of interest, including a health insurance literacy measure, a risk preference scale, and a numeracy scale. Our main outcome variables were also the same as experiment 1. We created a nominal response variable for each choice scenario that respondents encountered that categorized respondents as having chosen a) the high cost, high quality plan, b) the lower cost, lower quality plan, or c) one of the remaining three dominated plans. In addition, a binary variable indicating if individuals consistently selected the higher quality, there was a count variable of the number of times an individual chose a dominated health plan, more expensive plan across all clustered scenarios, and a variable indicating if individuals chose a dominated plan at least once. For the latter group of variables only the clustered star scenarios were included, meaning that at most participants could choose a dominated plan 4 times (compared to 8 in experiment 1).

Descriptive analyses

In our descriptive analyses, we were most interested in seeing if the percent of participants choosing a dominated plan was higher when the star ratings were clustered across all star comparison scenarios as we had seen in the first experiment with the 2- vs. 3-star comparisons. We also replicated the analyses from experiment 1 and examined a) the unadjusted percent of respondents who chose: 1) the higher quality, more expensive plan; 2) the lower quality, cheaper plan, or 3) one of the remaining dominated plans for each scenario, b) the percent of respondents who chose a dominated plan at least once, and c) the mean number of times those participants chose a dominated plan, conditional on having ever chosen a dominated plan.

Regression analyses

We conducted the same regression analyses as in experiment 1 to determine if the results from the first experiment held up with a different sample. For the regression analyses, logistic regression models were conducted for the variables examining consistent choice of the high quality, more expensive plan and examining whether individuals chose a dominated health plan at least once and a conditional regression model on the number of times participants chose a dominated plan among those who chose a dominated plan at least once. The key predictors in the model include health insurance literacy, risk preference, and numeracy.

Additional covariates were included in these models, including age, gender, race/ethnicity, educational attainment, household income, marital status, household size, employment status, discount rate, health insurance coverage, health status, health care use, prior experience with a star-rating system, and the length of time it took participants to take the survey. Predicted probabilities from the logistic regression models for the key predictors were calculated and are presented in the results section.

Sensitivity analyses

A set of sensitivity analyses were conducted that excluded participants who had not chosen the clearly dominant plan in the first comprehension scenario (the \$8,000, 5-star plan). Overall, 85.3% of the sample chose the dominant plan in the first scenario, leaving a sample of 535 respondents in the sensitivity analyses.

Results

Descriptive analyses

As we hypothesized, more participants chose a dominated plan when the quality star ratings were clustered. In all of the scenarios where the stars were clustered, between 16.7 and 19.0% of

respondents chose one of the dominated plans (Exhibit 3). By comparison, in the non-clustered scenario only 7.2% of respondents chose a dominated plan. Comparing the selection of a dominated plan when the quality star ratings were not clustered to when they were clustered across both experiments, we can clearly see the higher percentage who chose a dominated plan when ratings were clustered (Exhibit 4). While between 7.2 and 9.9% chose a dominated plan when the stars were not clustered, between 16.7 and 19.0% did so when the ratings were clustered.

We saw similar patterns to experiment 1 when it came to willingness to pay for the higher quality rated plans. More people chose the higher quality, more expensive plan when choosing between 2- and 3-star plans (66.5%) than when choosing between 4- and 5-star plans (42.3%). Within the clustered scenarios, the highest percent of participants chose the more expensive, higher rated plan when it was 2-stars better than the other dominant option, the lower quality, cheaper plan (67.1%). Overall, across the scenarios where the stars were clustered, 45.9% consistently chose the higher quality rated, more expensive plan and 34.3% chose a dominated plan at least once (Table 2, Exhibit 5). Among those that chose a dominated plan at least once, on average they chose a dominated plan 2.1 times out of 4 scenarios (Table 3).

Regression analyses

In the regression analysis looking at consistent choice of the higher quality rated, more expensive plan, the results in the second experiment were similar to those seen in the \$1,000 price differential groups from the first experiment, with no statistically significant relationships (Table 2). As in the first experiment, those with the lowest health insurance literacy, highest risk-seeking behavior, and the lowest numeracy had the highest predicted probabilities of choosing dominated plans, although there were no statistically significant differences by health insurance literacy.

Sensitivity analyses

As in experiment 1, compared to the main analysis sample, more of the sample in the sensitivity analyses had high health insurance literacy, lower risk-seeking behavior, and were more numerate. Regardless, the trends identified in the main descriptive and regression analyses held in the sensitivity analysis (Appendix Tables A, B, and C).

Discussion

The results of our second experiment supported those of our first while also providing evidence for our hypothesis that individuals are more likely to select dominated plans when the quality star ratings of the plans are similar. This suggests that while quality star ratings may provide useful information to consumers, when the plans all have the same or similar ratings, they can also make it more challenging for some consumers to sort through their available options.

General discussion

Choosing a health insurance plan is a particularly challenging decision that people have to make and the choice environment in which consumers must make this important decision can either help or hurt them. Policymakers and insurance companies have the capacity to implement choice architecture that could assist millions of consumers with making good coverage decisions. One intuitive idea that has been used in a wider range of consumers cases (e.g., movies, hotels, cars), is the inclusion of star ratings to signal health plan quality. Whether showing star ratings to consumer is helpful is an empirical issue, one to which this study has tried to provide some preliminary answers.

For most participants in our study, the availability of quality star ratings helped them decide between otherwise similar plans with different price tags. Overall, individuals were willing to pay more for higher quality plans when the quality ratings were lower, when the price differential was lower, and when the difference in star ratings was greater. Those who had the lowest risk-seeking scores had a higher predicted probability of consistently choosing the higher quality, more expensive plan

compared to those with higher risk seeking behavior. This behavior is not surprising for a group that is more likely to behave in a way that would avoid potentially risky situations, such as enrolling in a health plan with a lower quality rating than others available.

However, a significant portion of the study population made poor decisions. More than a third of participants chose a dominated plan at least once in each experiment, and the less numerate, those with lower health insurance literacy, and those with risk-seeking tendencies had the highest predicted probabilities of choosing poorly. With so many participants selecting dominated plans even in the simplified decision environment of the experiment, it is clear that decision support is needed in the real world. While there are consumer assistance resources for those enrolling in the individual health insurance marketplace, few consumers choose to use assistance (Sinaiko & Rosenthal, 2016). Further work focused on educating consumers about health insurance plans and innovative web tools to ease the numerical burden of enrollment are needed. For example, one option that marketplaces could consider is alerting individuals when they might be making a bad decision based on their health needs.

Not only were consumer characteristics associated with selection of dominated plans, the choice environment itself also played a role in increasing or decreasing the percent of individuals who chose a dominated plan. When the quality star ratings were similar across plans, more people chose one of the inferior plans. The percent of respondents who chose a dominated plan in scenarios when the plans all had similar ratings was roughly double that of the scenarios where the quality ratings were more disperse. For the most recent open enrollment period, the federally facilitated marketplaces implemented quality star ratings for plans in all states. However, the methodology behind the star ratings relies on a benchmark system rather than a one that compares plans to one another. This means that all plans could, in theory, receive the same score. As seen in our experiment, the provision of quality ratings that are all the same can cause greater confusion and does not help ease the decision-

making process for consumers. Knowing this highlights even more the importance of accurately calculating these ratings so that they represent meaningful differences between plans for consumers.

There are several limitations to this study. First, while the platform used to field the hypothetical choice experiment, MTurk, is a widely used platform for conducting social science experiments and provides the opportunity to quickly survey individuals (Eriksson & Simpson, 2010; Marvel, 2015), and while MTurk users are more diverse than the traditional sample of college undergraduates that is typically been used in social science experiments, the sample is not perfectly representative of the U.S. population. Prior research has found that, when compared to the Current Population Survey (CPS), U.S. MTurk samples tend to be younger, more likely to have never married, and under representative of blacks and Latinos (Berinsky, Huber, & Lenz, 2017). The payment to participants is low at \$1 for an average of 15 minutes of work, but previous studies have shown that the amount paid to a participant does not affect the quality of the data collected through MTurk (Buhrmester, Kwang, & Gosling, 2011; Mason & Suri, 2012; Mason & Watts, 2009).

The controlled environment of the hypothetical choice experiment, where participants are told what their health care usage will be in the upcoming year and are only asked to compare plans based on quality and cost is a simplified version of the actual decision-making experience enrollees in the individual market must go through. While this control is key for the experimental setting, it makes the generalizability of the results to more complicated situations tenuous. In addition, the experiment asks participants to consider a hypothetical situation where the decisions they make will not have real life financial consequences. Without actual money being exchanged, participants may not have felt their decisions were as consequential as they would have had their own money been on the line. If so, we expect this may have led more people to choose the higher quality, more expensive plans than they would have in the real world.

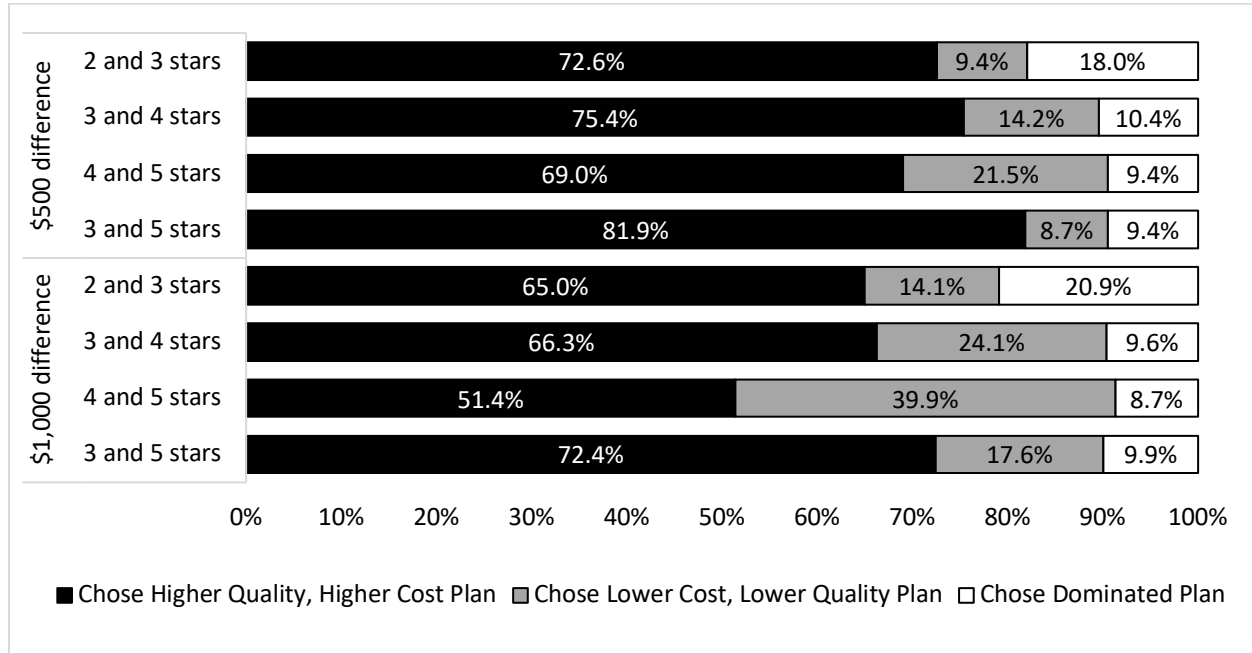
Conclusion

Millions of adults are choosing health insurance yearly. Marketplace regulators can implement choice architecture to help consumers make better decisions for themselves. Here, we evaluated one simple choice architecture design, namely the inclusion of star ratings. Although star ratings have been used extensively in many consumer domains, their merit and applicability to the health insurance market has received little attention despite widespread adoption. In two studies, we show that including star ratings does not necessarily make the plan selection process easier. In fact, in some cases it complicates matters even more. As marketplace regulators continue to improve the websites where consumers browse and enroll in plans, they should consider whether providing quality star ratings is the best option for communicating quality information to consumers. If star ratings continue to be used, the underlying methodologies for calculating those ratings must be rigorous and represent meaningful differences between plans.

Our findings around the difference in selection of a dominated plan by consumer characteristics also highlight the importance of enrollment assistance and further consumer education. While some states have maintained significant budgets for enrollment assistors and navigators to help consumers enrolling in state-based marketplaces, the federal government has cut enrollment programs and budgets drastically since 2017. Decisions like these can lead to greater health inequities between those who struggle to compare plans and select inferior plans and those with greater health insurance familiarity and numeracy who are more adept at the health insurance decision-making process.

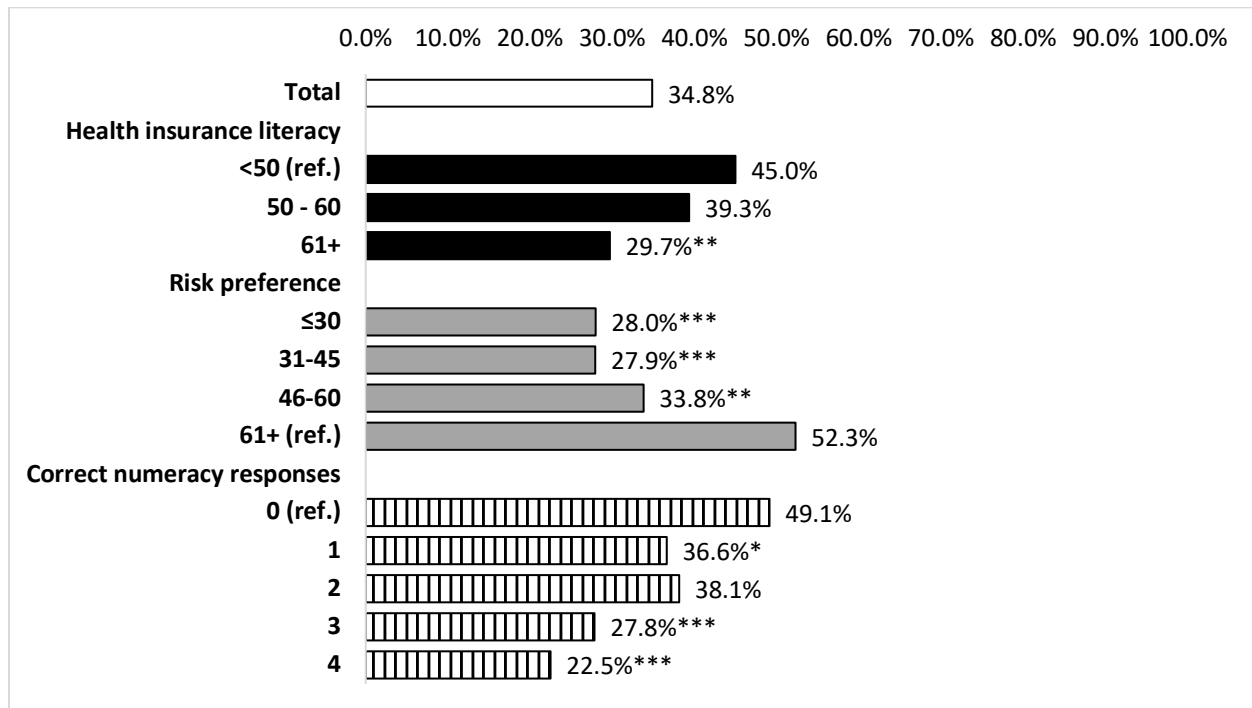
CHAPTER 2: EXHIBITS AND TABLES

Exhibit 1. Plan Choice by Dollar and Star Difference, Experiment 1



Source: Authors' analysis of hypothetical choice experiment 1.

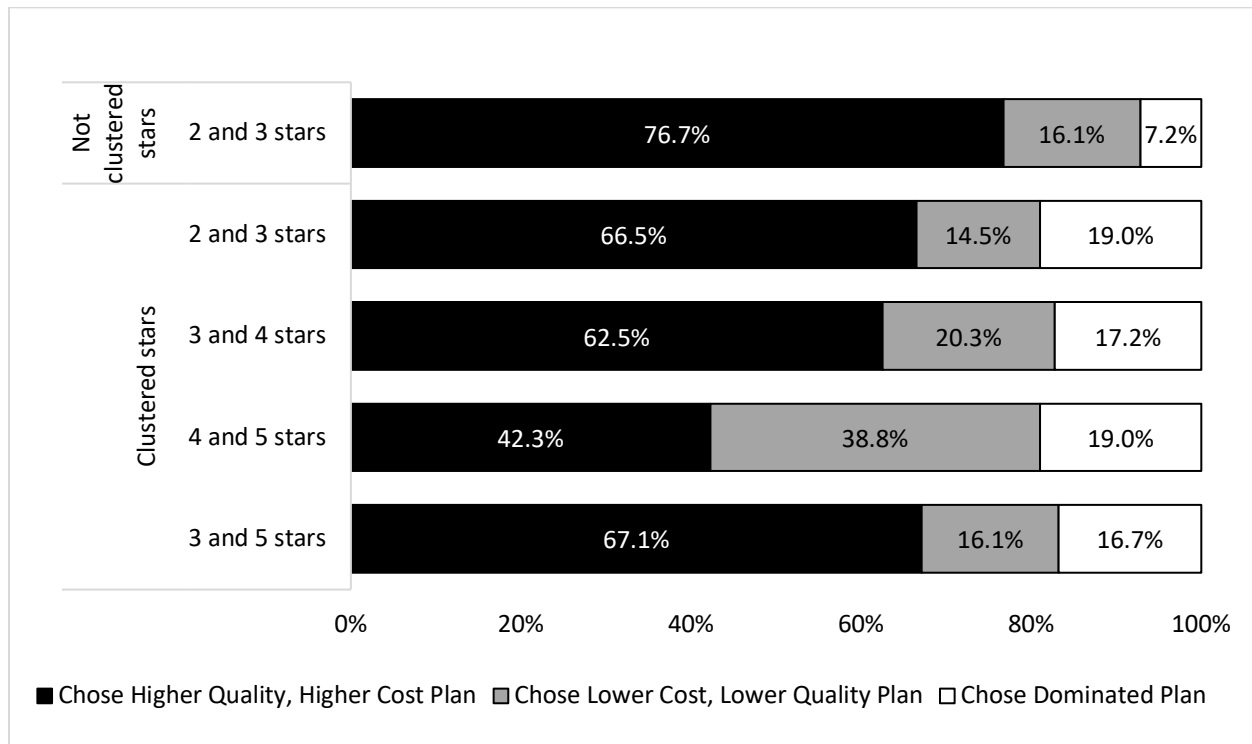
Exhibit 2. Predicted probability of choosing a dominated plan at least once by health insurance literacy, risk preference, and numeracy, Experiment 1



Source: Authors' analysis of hypothetical choice experiment 1.

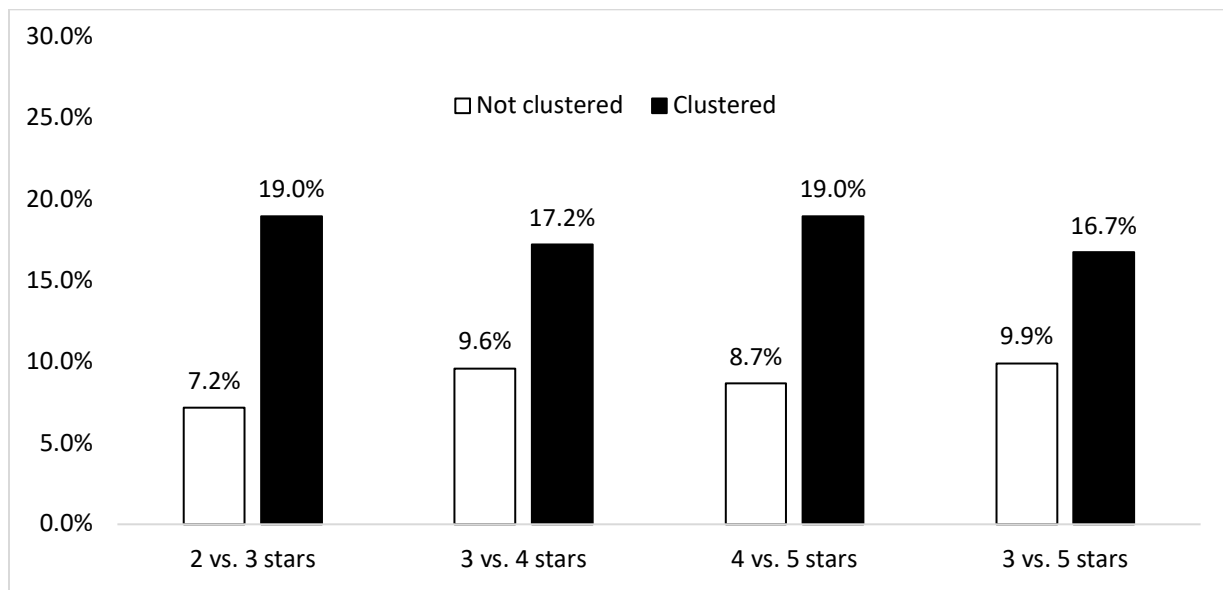
Notes: * p-value<0.05, ** p-value<0.01, *** p-value<0.001. Model also controlled for age, gender, race/ethnicity, educational attainment, household income, marital status, household size, employment status, discount rate, health insurance coverage, health status, health care use, prior experience with a star-rating system, and duration of experiment.

Exhibit 3. Plan Choice by Star Difference, Experiment 2



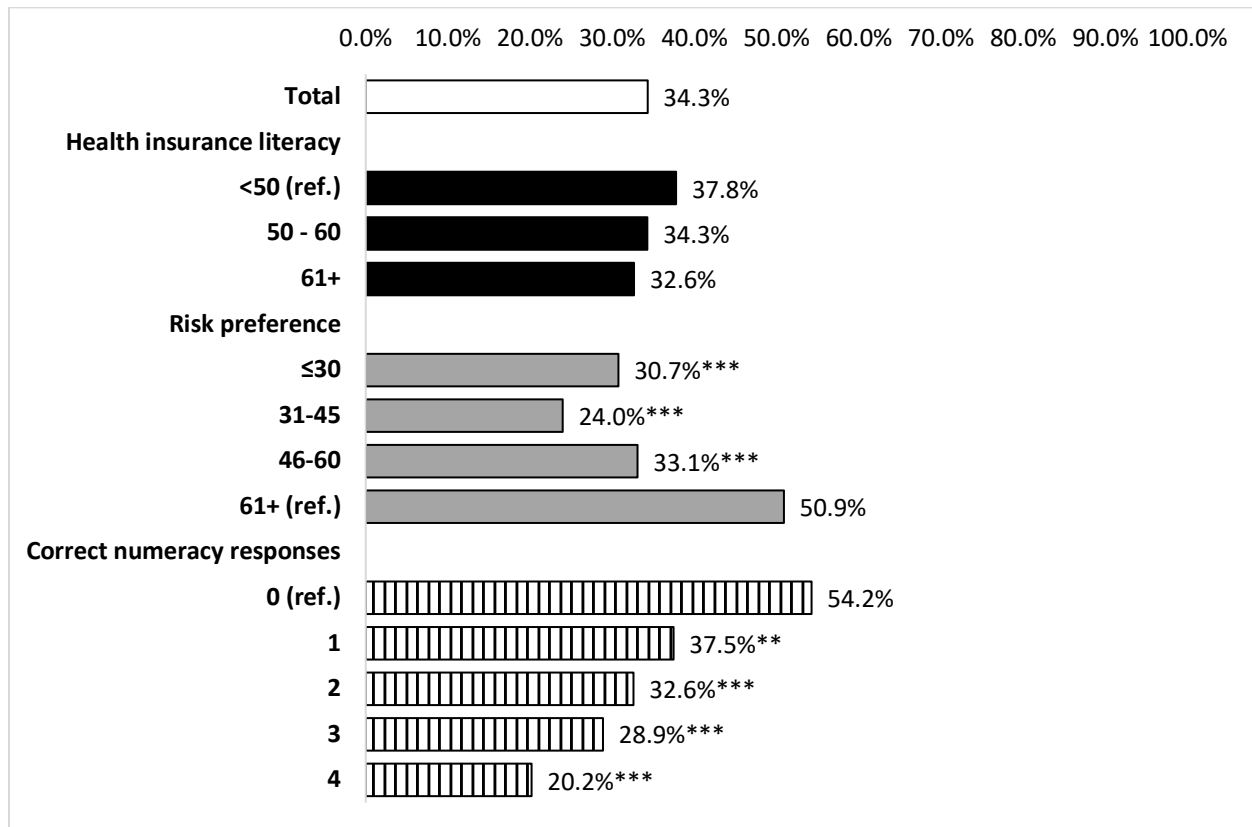
Source: Authors' analysis of hypothetical choice experiment 2.

Exhibit 4. Percent who chose a dominated plan by clustering of stars



Source: Authors' analysis of hypothetical choice experiment 2.

Exhibit 5. Predicted probability of choosing a dominated plan at least once by health insurance literacy, risk preference, and numeracy, Experiment 2



Source: Authors' analysis of hypothetical choice experiment 2.

Notes: * p-value<0.05, ** p-value<0.01, *** p-value<0.001. Model also controlled for age, gender, race/ethnicity, educational attainment, household income, marital status, household size, employment status, discount rate, health insurance coverage, health status, health care use, prior experience with a star-rating system, and duration of experiment.

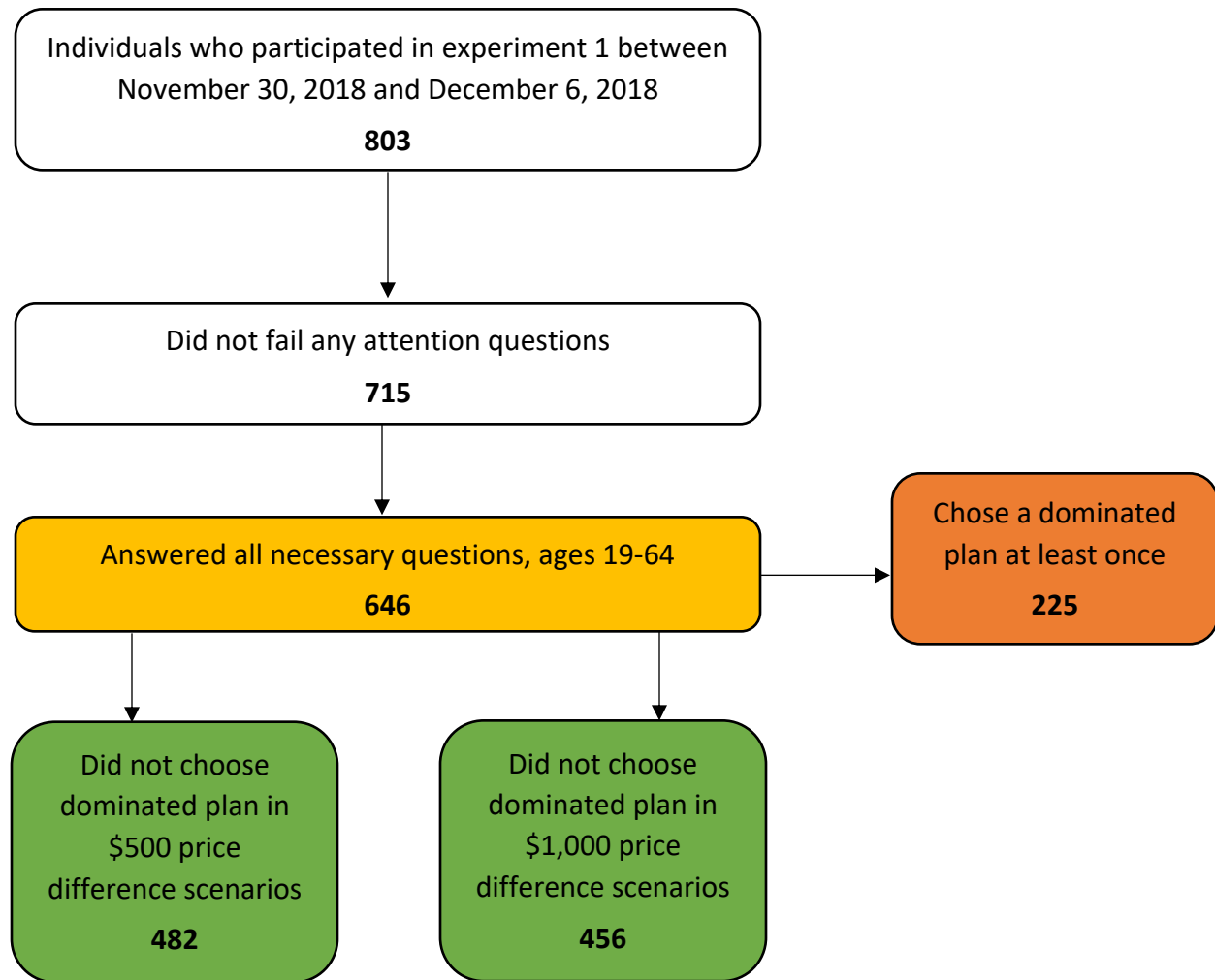
Table 2. Predicted probability of consistently choosing high quality health plan, across price difference scenarios									
		<u>Experiment 1, \$500 difference</u>			<u>Experiment 1, \$1,000 difference</u>			<u>Experiment 2, \$1,000 difference</u>	
	Sample size	Consistently chose higher quality, more expensive health plan		Sample size	Consistently chose higher quality, more expensive health plan		Sample size	Consistently chose higher quality, more expensive health plan	
			p-value			p-value			p-value
Total	482	70.7%		456	47.6%		412	45.9%	
Health insurance literacy									
<50	54	62.8%	ref.	51	39.6%	ref.	68	46.4%	ref.
50 - 60	126	74.2%	0.13	112	49.9%	0.21	146	41.6%	0.51
61+	302	70.7%	0.30	293	48.1%	0.30	198	48.8%	0.74
Risk preference									
≤30	134	79.4%	0.01	136	53.3%	0.93	106	52.4%	0.57
31-45	217	70.0%	0.22	200	42.6%	0.27	187	45.0%	0.83
46-60	79	63.3%	0.69	74	47.3%	0.58	77	38.4%	0.37
61+	52	59.6%	ref.	46	52.6%	ref.	42	47.0%	ref.
Correct numeracy responses									
0	47	76.7%	ref.	42	47.7%	ref.	38	41.1%	ref.
1	77	66.2%	0.23	75	51.1%	0.72	84	48.8%	0.43
2	106	70.4%	0.45	95	42.6%	0.58	77	51.3%	0.30
3	110	67.7%	0.29	107	51.5%	0.68	89	40.2%	0.92
4	142	73.7%	0.70	137	46.2%	0.87	124	46.1%	0.60
Source: Authors' analysis of hypothetical choice experiments 1 and 2.									
Notes: Individuals who chose a dominated health plan in one of the included choice scenarios were excluded from the analyses. Models also controlled for age, gender, race/ethnicity, educational attainment, household income, marital status, household size, employment status, discount rate, health insurance coverage, health status, health care use, prior experience with a star-rating system, and duration of experiment.									

Table 3. Regression analysis on number of times participants chose a dominated plan among those that ever chose a dominated plan, experiments 1 and 2

	<u>Experiment 1</u> <u>(n=225)</u>		<u>Experiment 2</u> <u>(n=215)</u>	
	Beta	p-value	Beta	p-value
Overall mean number of times chose a dominated plan	2.76		2.10	
Health insurance literacy	-0.01	0.38	-0.02	0.04
Risk preference	0.02	0.00	0.01	0.00
Correct numeracy responses	-0.16	0.14	-0.01	0.91
Source: Authors' analysis of hypothetical choice experiments 1 and 2.				
Notes: Only those who chose a dominated plan at least once in each experiment were included in the analysis. Models also controlled for age, gender, race/ethnicity, educational attainment, household income, marital status, household size, employment status, discount rate, health insurance coverage, health status, health care use, prior experience with a star-rating system, and duration of experiment.				

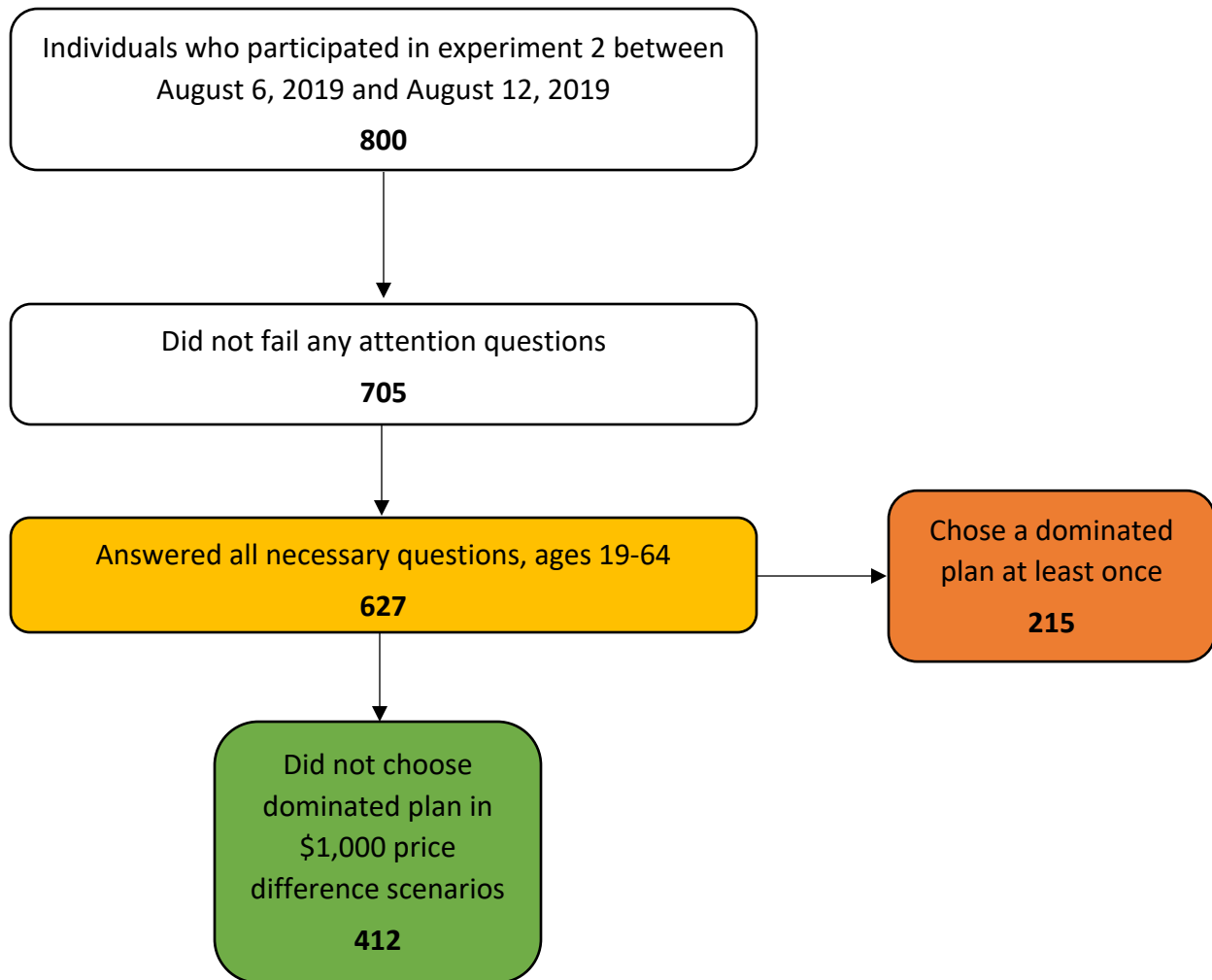
CHAPTER 2: APPENDIX

Appendix Exhibit A. Experiment 1 Sample Flowchart



Note: Analytic sample in the yellow box was used for the descriptive analyses and to examine choice of a dominated plan at least once. Analytic sample in the orange box was used for the conditional linear regression model for the number of times individuals chose a dominated plan. Analytic samples in the green boxes were used for the logistic regression model for consistent choice of the higher quality, more expensive plan.

Appendix Exhibit B. Experiment 2 Sample Flowchart



Note: Analytic sample in the yellow box was used for the descriptive analyses and to examine choice of a dominated plan at least once. Analytic sample in the orange box was used for the conditional linear regression model for the number of times individuals chose a dominated plan. Analytic sample in the green box was used for the logistic regression model for consistent choice of the higher quality, more expensive plan.

Appendix Figure A. Example Screenshot of Choice Scenario, Experiment 1

Health Plan	Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
Plan A	★★★★☆	\$9,000
Plan B	★★★★☆☆	\$8,000
Plan C	★★★☆☆	\$8,500
Plan D	★★★★☆☆	\$10,000
Plan E	★★★★☆☆	\$9,500

Please indicate which plan you would choose from the table above:

☐ A
 ☐ B
 ☐ C
 ☐ D
 ☐ E

Next

Appendix Figure B. Example Screenshot of Choice Scenario, Experiment 2

Please select one of these health plans.

☐

Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
★★★★☆	\$10,000

☐

Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
★★★★☆	\$9,500

☐

Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
★★★☆☆	\$8,500

☐

Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
★★★★☆☆	\$8,000

☐

Quality Rating	Your estimated total yearly costs (premium + out of pocket expenses)
★★★★☆	\$9,000

Question series used to measure health insurance literacy

1. Descriptions of health insurance plans often include several technical terms. For the following terms, please tell us how confident you are that you know what the word means.

	Not at all confident	Not too confident	Somewhat confident	Very confident
Premium				
Deductible				
Copayment				
Coinsurance				
Maximum annual out-of-pocket spending				
Provider network				
Covered services				

2. Choosing health insurance is a complex process. How confident would you feel that you...?

	Not at all confident	Not too confident	Somewhat confident	Very confident
Know how to estimate what you would have to pay for your health care needs in the next year, not including emergencies				
Know what questions to ask so you can choose the best health plan for you				
Know where to find the information you need to choose a health plan if you were not offered insurance through an employer				

3. When comparing health plans how likely are you to...?

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Understand what you would have to pay for emergency department visits				
Find out if you have to meet a deductible for health care services				
Look to see which doctors and hospitals are covered in each plan				

4. How confident are you that...?

	Not at all confident	Not too confident	Somewhat confident	Very confident
You know what to do if your health plan refuses to pay for a service you think should be covered				
You know how to figure out your share of the cost for care, after the health plan pays their share				
You know how to find out what is and is not covered before you receive a health care service				

5. When using your health insurance plan, how likely are you to...?

	Very unlikely	Somewhat unlikely	Somewhat likely	Very likely
Look into what your health plan will and will not cover before you get health care services				

Review the statements you get from your health plan showing what you owe and what they paid for a service				
Find out if a doctor is in-network before you see him/her				

Question series used to measure risk preferences

Using the scale below, mark the box that best describes how likely you would do the activities in the following statements.

	Extremely unlikely	Somewhat unlikely	Not sure	Somewhat likely	Extremely likely
Eating 'expired' food products that still 'look okay'					
Frequent binge drinking					
Ignoring some persistent physical pain by not going to the doctor					
Taking a prescription drug that has a high likelihood of negative side effects					
Engaging in unprotected sex					
Never wearing a seatbelt					
Not having a smoke alarm in or outside of your bedroom					
Regularly riding your bicycle without a helmet					
Smoking a pack of cigarettes per day					
Investing 10% of your annual income in a moderate growth mutual fund (like a 401K or other retirement plan)					
Betting a day's income at a high-stakes poker game					
Investing 5% of your annual income in a very speculative stock (like a stock with high risk relative to any potential positive returns)					
Betting a day's income on the outcome of a sporting event					
Betting a day's income at the horse races					
Investing 10% of your annual income in a new business venture					

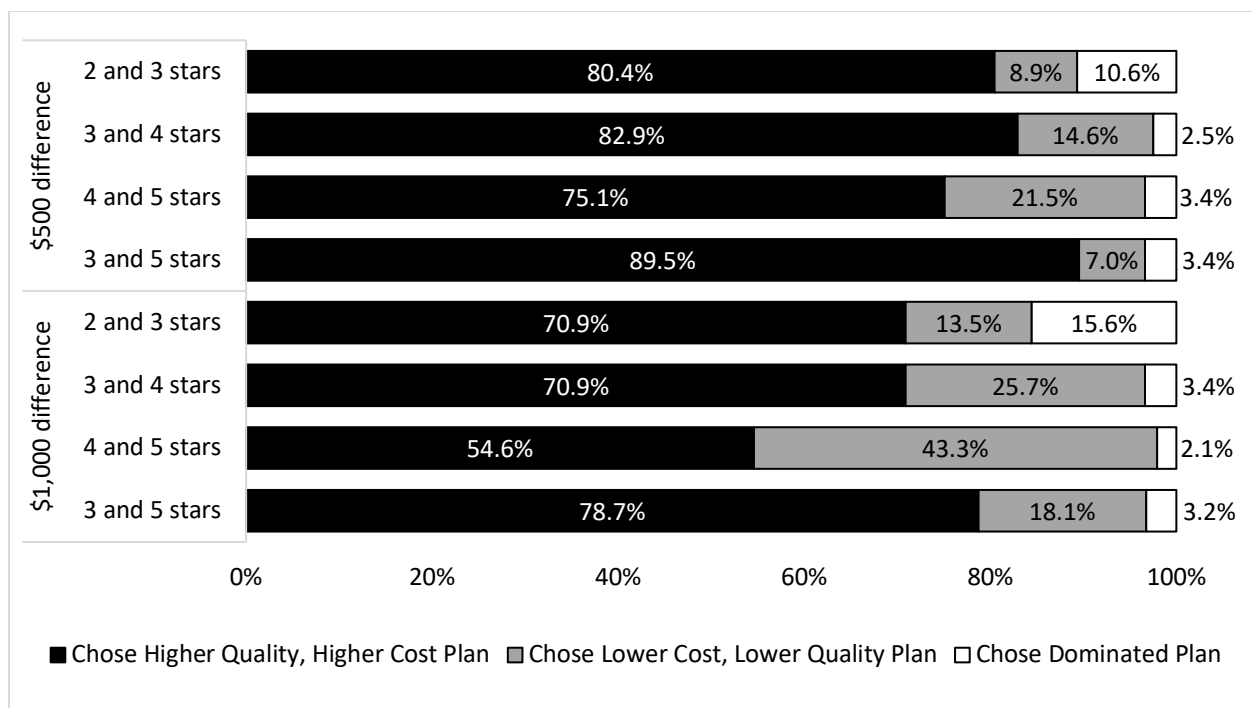
Question series used to measure numeracy

Now we will ask you some questions about chance and probabilities. Please answer the following questions to the best of your ability and give your response in NUMBERS not words (i.e., 12, not "twelve").

1. Imagine that we roll a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up even (2, 4, or 6)?

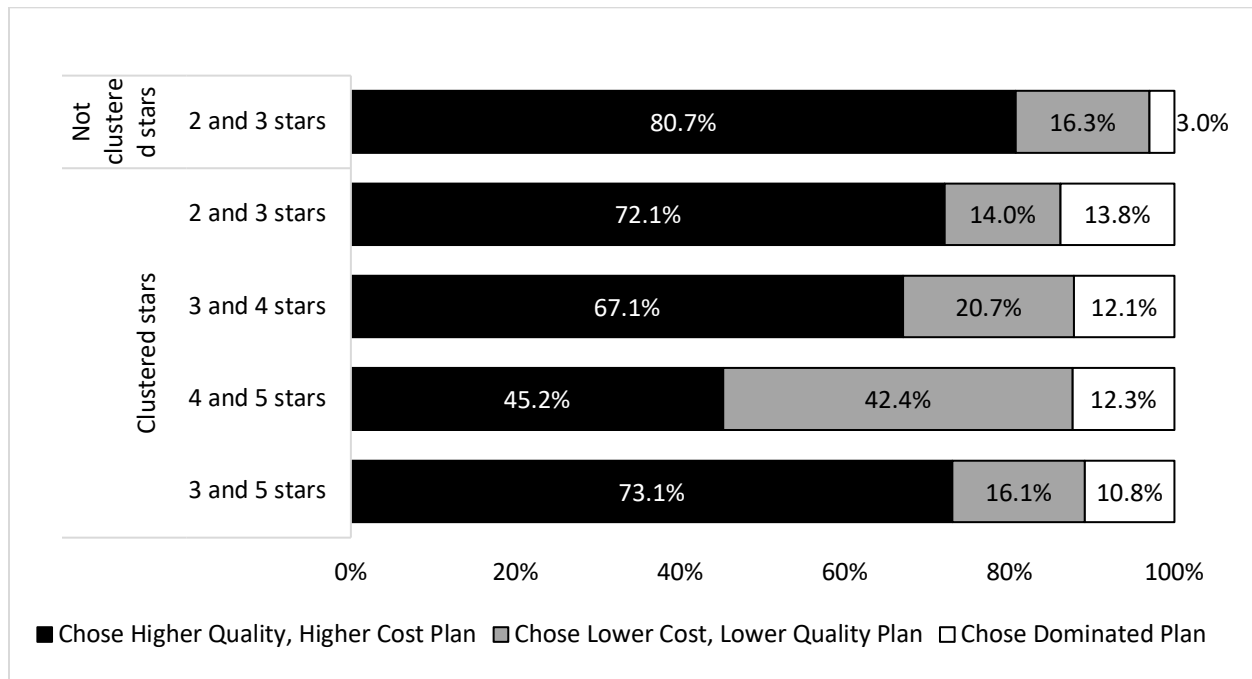
- Number of times:_____
2. Imagine that we are throwing a five-sided die 50 times. On average, out of these 50 throws how many times would this five-sided die show an odd number (1,3 or 5)?
- Number of times:_____
3. In BIG BUCK LOTTERY, the chances of winning a \$10 prize are 1%. What is your best guess about how many people would win a \$10 prize if 1,000 people each buy a single ticket from BIG BUCKS?
- Number of people:_____
4. In the ACME PUBLISHING SWEEPSTAKES, the chances of winning a car are 1 in 1,000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car?
- Percent of tickets:_____

Appendix Exhibit C. Sensitivity Analysis of Plan Choice by Dollar and Star Difference, Experiment 1



Source: Authors' analysis of hypothetical choice experiment 1.

Appendix Exhibit D. Sensitivity Analysis of Plan Choice by Star Difference, Experiment 2



Source: Authors' analysis of hypothetical choice experiment 2.

Appendix Table A. Results of full logistic regression models on consistent choice of higher cost, higher quality plan

	<u>Main analysis</u>						<u>Sensitivity analysis</u>					
	\$500 price difference, experiment 1		\$1,000 price difference, experiment 1		\$1,000 price difference, experiment 2		\$500 price difference, experiment 1		\$1,000 price difference, experiment 1		\$1,000 price difference, experiment 2	
	<i>n</i>	<i>OR</i>	<i>n</i>	<i>OR</i>	<i>n</i>	<i>OR</i>	<i>n</i>	<i>OR</i>	<i>n</i>	<i>OR</i>	<i>n</i>	<i>OR</i>
Total	482	-	456	-	412	-	446	-	422	-	399	-
Health insurance literacy												
<50	54	ref.	51	ref.	68	ref.	46	ref.	41	ref.	65	ref.
50 - 60	126	1.8	112	1.64	146	0.8	115	1.96	103	1.4	142	0.74
61+	302	1.49	293	1.5	198	1.12	285	1.78	278	1.32	192	1.03
Risk preference												
≤30	134	2.87*	136	1.04	106	1.28	129	2.33	129	0.76	105	1.21
31-45	217	1.66	200	0.63	187	0.91	202	1.43	187	0.54	185	0.91
46-60	79	1.19	74	0.78	77	0.67	68	1.18	64	0.74	73	0.64
61+	52	ref.	46	ref.	42	ref.	47	ref.	42	ref.	36	ref.
Correct numeracy responses												
0	47	ref.	42	ref.	38	ref.	39	ref.	36	ref.	32	ref.
1	77	0.57	75	1.17	84	1.42	73	0.65	70	0.97	84	1.31
2	106	0.7	95	0.79	77	1.59	95	0.71	87	0.6	74	1.57
3	110	0.61	107	1.2	89	0.96	104	0.6	98	0.89	86	0.85
4	142	0.84	137	0.93	124	1.26	135	0.85	131	0.66	123	1.13
Health insurance												
Uninsured	62	ref.	59	ref.	61	ref.	57	ref.	54	ref.	59	ref.
Employer-sponsored insurance	239	1.31	229	0.94	208	2.38*	221	1.26	215	0.85	201	2.45*
Individual market	90	1.44	86	0.51	82	1.72	80	1.51	76	0.53	79	1.95
Medicaid, Medicare, or other	91	1.32	82	1.76	61	2.70*	88	1.12	77	1.68	60	2.95*

Health status												
No chronic diseases and excellent, very good, or good health	332	ref.	318	ref.	286	ref.	307	ref.	293	ref.	276	ref.
At least one chronic disease or fair/poor health	150	0.98	138	0.74	126	0.85	139	1.08	129	0.71	123	0.83
Number of ER visits												
0	391	ref.	372	ref.	333	ref.	359	ref.	342	ref.	327	ref.
1 or more	91	2.48**	84	2.82**	79	1.33	87	2.51*	80	2.52**	72	1.48
Number of doctor visits												
0	151	ref.	146	ref.	121	ref.	137	ref.	132	ref.	119	ref.
1	110	1.38	108	1.85*	103	0.8	101	1.41	100	2.28**	99	0.74
2 to 3	127	1.16	118	1.80*	120	1.04	119	1.13	110	2.22*	116	1.01
4 or more	94	0.84	84	0.73	68	1.1	89	0.81	80	0.92	65	1.18
Gender												
Male	241	ref.	228	ref.	202	ref.	213	ref.	204	ref.	195	ref.
Female	241	0.7	228	1.04	210	1.21	233	0.71	218	1.12	204	1.16
Age												
19-29	142	ref.	133	ref.	115	ref.	126	ref.	118	ref.	110	ref.
30-39	187	0.6	174	0.66	152	1.01	175	0.68	162	0.64	146	1.13
40-49	88	1.21	86	0.92	88	0.67	81	1.34	80	0.85	86	0.71
50-64	65	0.68	63	0.67	57	0.42*	64	0.67	62	0.62	57	0.45
Race/ethnicity												
Non-white	110	ref.	105	ref.	102	ref.	99	ref.	96	ref.	98	ref.
White, non-Hispanic	372	0.71	351	0.85	310	0.77	347	0.71	326	0.89	301	0.79
Educational attainment												
High school graduate, GED, or less	51	ref.	52	ref.	58	ref.	43	ref.	44	ref.	56	ref.

Some college or vocational/technical school	158	1.4	152	0.93	135	0.79	150	1.24	141	0.94	134	0.75
Graduated college or higher	273	1.86	252	1.11	219	1.1	253	1.73	237	1.13	209	1.09
Household total annual income												
Under \$30,000	105	ref.	98	ref.	94	ref.	96	ref.	88	ref.	93	ref.
\$30,001 - \$45,000	90	0.56	85	0.58	69	1.41	82	0.6	77	0.55	67	1.36
\$45,001 - \$60,000	101	0.68	103	0.97	81	0.86	93	0.63	95	0.85	76	0.78
\$60,001 - \$75,000	68	0.91	64	0.93	62	0.58	66	0.89	63	0.86	59	0.61
More than \$75,000	118	1.03	106	1.97	106	1.28	109	0.97	99	1.85	104	1.36
Discount Rate												
Low	249	ref.	230	ref.	201	ref.	230	ref.	212	ref.	195	ref.
High	233	1.05	226	1.21	211	0.94	216	1.1	210	1.27	204	0.91
Marital status												
Married	231	ref.	217	ref.	197	ref.	215	ref.	204	ref.	188	ref.
Never married, widowed, divorced, or separated	251	1.61	239	1.44	215	0.68	231	1.64	218	1.28	211	0.72
Household size												
1	107	ref.	101	ref.	-	-	100	ref.	95	ref.	-	-
2	148	1.41	134	1.14	-	-	134	1.2	122	0.97	-	-
3	86	1.06	87	1.05	-	-	79	0.94	82	0.75	-	-
4	85	1.49	84	1.37	-	-	81	1.28	78	1.13	-	-
5 or more	56	1.16	50	1.41	-	-	52	1.13	45	1.53	-	-
Employed												
Yes	416	ref.	389	ref.	378	ref.	383	ref.	358	ref.	365	ref.
No	66	0.88	67	0.73	34	1.85	63	0.91	64	0.67	34	1.76
Prior experience with stars												
Yes	185	ref.	168	ref.	163	ref.	171	ref.	155	ref.	156	ref.

No	297	0.9	288	0.74	249	0.60*	275	1.01	267	0.78	243	0.58*
Duration of experiment	-	1.01	-	1	-	1	-	1.01	-	1.01	-	1
N	-	482	-	456	-	412	-	446	-	422	-	399
	-	-	-	-	-	-	-	-	-	-	-	-
ll	-	267.44	-	279.78	-	257.99	-	244.51	-	257.01	-	248.23
chi2	-	47.77	-	71.52	-	52.36	-	40.13	-	70.66	-	54.25
aic	-	610.88	-	635.57	-	583.99	-	565.01	-	590.02	-	564.47
Source: Authors' analysis of hypothetical choice experiments 1 and 2.												
Notes: * p-value<0.05, ** p-value<0.01, *** p-value<0.001.												

Appendix Table B. Results of full logistic regression models, choice of a dominated plan at least once

	<u>Main analysis</u>				<u>Sensitivity analysis</u>			
	Experiment 1		Experiment 2		Experiment 1		Experiment 2	
	Sample size	OR	Sample size	OR	Sample size	OR	Sample size	OR
Total	646	-	627	-	526	-	535	-
Health insurance literacy								
<50	89	ref.	112	ref.	59	ref.	88	ref.
50 - 60	179	0.71	235	0.78	145	0.95	196	0.92
61+	378	0.37**	280	0.69	322	0.43*	251	0.79
Risk preference								
≤30	152	0.25***	136	0.31***	142	0.37*	131	0.40*
31-45	239	0.25***	217	0.20***	218	0.38**	213	0.27***
46-60	108	0.36**	113	0.36**	82	0.45*	94	0.38*
61+	147	ref.	161	ref.	84	ref.	97	ref.
Correct numeracy responses								
0	130	ref.	123	ref.	68	ref.	76	ref.
1	110	0.50*	143	0.38**	94	0.64	119	0.31**
2	128	0.54	104	0.28***	108	0.62	95	0.29**
3	127	0.29***	116	0.22***	113	0.28**	108	0.26**
4	151	0.20***	141	0.11***	143	0.23***	137	0.11***
Health insurance								
Uninsured	86	ref.	83	ref.	70	ref.	71	ref.
Employer-sponsored insurance	320	0.79	320	1.6	264	0.68	275	1.65
Individual market	116	0.81	131	1.94	88	0.64	109	2.1
Medicaid, Medicare, or other	124	0.97	93	1.47	104	0.86	80	1.52
Health status								
No chronic diseases and excellent, very good, or good health	418	ref.	386	ref.	357	ref.	345	ref.
At least one chronic disease or fair/poor health	228	1.38	241	1.5	169	1.39	190	1.59

Number of ER visits								
0	455	ref.	437	ref.	404	ref.	401	ref.
1 or more	191	2.13**	190	2.39**	122	1.44	134	2.73**
Number of doctor visits								
0	192	ref.	178	ref.	161	ref.	153	ref.
1	145	1.04	162	0.63	126	1.48	140	0.75
2 to 3	162	0.76	184	0.35**	133	1.03	157	0.43*
4 or more	147	0.87	103	0.36*	106	1.07	85	0.39*
Gender								
Male	341	ref.	350	ref.	266	ref.	281	ref.
Female	305	0.83	277	0.62*	260	0.68	254	0.71
Age								
19-29	228	ref.	202	ref.	162	ref.	159	ref.
30-39	248	0.97	244	0.94	209	1.27	203	1.06
40-49	97	0.59	107	0.59	87	0.68	102	0.68
50-64	73	0.49	74	1.16	68	0.6	71	1.21
Race/ethnicity								
Non-white	147	ref.	180	ref.	121	ref.	143	ref.
White, non-Hispanic	499	1.38	447	0.82	405	1.23	392	0.81
Educational attainment								
High school graduate, GED, or less	66	ref.	72	ref.	51	ref.	67	ref.
Some college or vocational/technical school	195	0.82	175	1.54	168	0.94	161	1.39
Graduated college or higher	385	1.16	380	2.30*	307	1.27	307	2.21
Household total annual income								
Under \$30,000	139	ref.	122	ref.	113	ref.	113	ref.
\$30,001 - \$45,000	116	0.91	100	0.93	100	1.32	85	0.65
\$45,001 - \$60,000	146	1.14	138	1.6	114	1.14	108	1.32
\$60,001 - \$75,000	93	0.85	109	1.24	73	0.73	91	1.19
More than \$75,000	152	1.29	158	1.49	126	1.54	138	1.09
Discount Rate								
Low	340	ref.	305	ref.	270	ref.	257	ref.

High	306	1.05	322	1.19	256	1.05	278	1.2
Marital status								
Married	325	ref.	329	ref.	252	ref.	273	ref.
Never married, widowed, divorced, or separated	321	0.69	298	0.78	274	1	262	0.65
Household size								
1	128	ref.		-	113	ref.		-
2	172	0.74		-	148	0.96		-
3	124	0.83		-	102	1.04		-
4	128	0.99		-	98	1.05		-
5 or more	94	0.82		-	65	1		-
Employed								
Yes	573	ref.	584	ref.	458	ref.	495	ref.
No	73	0.28**	43	0.51	68	0.33*	40	0.54
Prior experience with stars								
Yes	290	ref.	316	ref.	216	ref.	244	ref.
No	356	0.7	311	0.52**	310	0.72	291	0.55*
Duration of experiment	-	0.99	-	0.99	-	0.99	-	1
N		646		627		526		535
ll		-290.6		-268.27		-236.06		-222.75
chi2		253.94		269.7		122.74		161.1
aic		657.2		604.55		548.11		513.49
Source: Authors' analysis of hypothetical choice experiments 1 and 2.								
Notes: * p-value<0.05, ** p-value<0.01, *** p-value<0.001.								

Appendix Table C. Results of full regression models, number of times chose a dominated plan

	<u>Main analysis</u>				<u>Sensitivity analysis</u>			
	Experiment 1		Experiment 2		Experiment 1		Experiment 2	
	Sample size	coeff.	Sample size	coeff.	Sample size	coeff.	Sample size	coeff.
Total	225		215		133		136	
Health insurance literacy scale	-	-0.01	-	-0.02*	-	-0.01	-	-0.01
Risk taking scale	-	0.02***	-	0.01**	-	0.02**	-	0.02***
Numeracy scale	-	-0.16	-	-0.01	-	-0.09	-	-0.06
Insurance status								
All others	115	ref.	103	ref.	68	ref.	62	ref.
Employer sponsored insurance	110	-0.3	112	-0.09	65	0.26	74	-0.45**
Health status								
No chronic diseases and excellent, very good, or good health	122	ref.	100	ref.	82	ref.	69	ref.
At least one chronic disease or fair/poor health	103	-0.12	115	-0.12	51	-0.17	67	-0.43*
Number of ER visits								
0	103	ref.	104	ref.	79	ref.	74	ref.
1 or more	122	0.61	111	0.45*	54	-0.25	62	0.16
Number of doctor visits	-	-0.12	-	-0.24	-	-0.16	-	0.07
Gender								
Male	133	ref.	148	ref.	79	ref.	86	ref.
Female	92	-0.24	67	0.02	54	-0.32	50	-0.06
Age	-	-0.02	-	0	-	-0.01	-	0
Race/ethnicity								
Non-white	53	ref.	78	ref.	35	ref.	45	ref.
White, non-Hispanic	172	0.62*	137	-0.07	98	0.05	91	0.24
Educational attainment								
All others	74	ref.	54	ref.	46	ref.	38	ref.
Graduated college or higher	151	-0.01	161	0.22	87	0.11	98	0.12
Income	-	0	-	-0.05	-	-0.13	-	-0.02
Discount Rate								
Low	127	ref.	104	ref.	71	ref.	62	ref.

High	98	-0.06	111	0.17	62	0.04	74	0.11
Marital status								
Married	126	ref.	132	ref.	63	ref.	85	ref.
Never married, widowed, divorced, or separated	99	-0.54*	83	0.02	70	-0.15	51	-0.03
Number of people in household	-	-0.09	-	-	-	0	-	-
Prior experience with stars								
Yes	137	ref.	153	ref.	73	ref.	88	ref.
No	88	-0.32	62	-0.33*	60	0.05	48	-0.33
Duration of experiment	-	0.01	-	0	-	0	-	0
N	-	225	-	215	-	133	-	136
ll	-	-432.71	-	-277.65	-	-183.27	-	-163.54
aic	-	901.41	-	589.3	-	402.55	-	361.08
Source: Authors' analysis of hypothetical choice experiments 1 and 2.								
Notes: * p-value<0.05, ** p-value<0.01, *** p-value<0.001.								

CHAPTER 3: WHEN ALL THAT GLITTERS IS GOLD: DOMINATED PLAN CHOICE ON COVERED CALIFORNIA FOR THE 2018 PLAN YEAR

Introduction⁷

The individual health insurance market created by the ACA relies on consumer choice from a menu of plans sold on a health insurance marketplace or exchange. Individuals select from plans in pre-defined metal levels that correspond to target actuarial values. Actuarial values are a measure of a plan's generosity and estimate the share of the total average costs for medical care provided to plan enrollees that will be paid by the health insurance plan rather than out of pocket by the consumer after premiums. Silver plans have the insurer pay approximately seventy percent of allowed expenses, while gold plans have the insurer pay approximately eighty percent of claims. Typically plans that have higher actuarial values will have higher monthly premiums when all other attributes are held constant, although a health plan's cost-sharing features, such as deductibles, coinsurance or copayments, and out-of-pocket limits are also factors in calculating its actuarial value. The marketplaces only sell qualified health plans and display critical plan information such as premium, deductible, out-of-pocket maximums, and quality ratings. By providing a platform where consumers could make informed choices about their individual market coverage, the marketplaces were expected to increase competition. However, these benefits only materialize if consumers choose the higher value plans.

To assist with plan affordability, federal premium tax credits are available to individuals and families who earn between 100 and 400 percent of the federal poverty level (FPL). The premium tax credit is a gap filler between a family's expected contribution, which is determined by their income as a function of FPL, and the benchmark plan's gross premium for non-tobacco using individuals. The benchmark

⁷ A previous version of this chapter has been submitted for publication to the *Journal of Health Economics* and is currently under review.

plan is typically the second least expensive silver plan available to a buyer. A second set of subsidies are tied to silver plans and lower out-of-pocket costs for low income buyers. These cost-sharing reductions (CSRs) increase the actuarial value of silver plans to 94% for people earning between 100 to 150 percent FPL, 87% for people earning between 151 and 200 percent FPL and to 73% for people earning between 201 and 250 percent FPL.

Funding for CSRs has been a political and legal issue for the ACA since its implementation. In 2014, in a lawsuit now known as *House v. Price*, the Republican-controlled House of Representatives sued the Obama administration for reimbursing insurers for the cost of providing CSRs without having Congress appropriate the funding for the reimbursement. Following an initial ruling that sided with the House, the Obama administration appealed and continued to pay insurers as the case continued. When Donald Trump took office in 2017, the appeal was still ongoing and the administration continued paying insurers until, in October 2017, the Department of Health and Human Services decided to side with the House and stopped direct payments to insurers, thus ending the lawsuit. However, insurers were legally required to continue to provide CSR benefits to qualified enrollees despite the cancelation of reimbursements from the federal government. Most state-based and federally facilitated marketplaces responded to this change by loading the cost of providing CSRs onto plan premiums, although different states implemented their responses in different ways. In 2018, 36 states used silver loading, six used broad loading, six used mixed loading, and three had insurers handle the cost (Gaba, Anderson, Norris, & Sprung, 2017). Silver loading states placed the cost of the CSR subsidy cuts onto the premiums of silver plans, broad loading states increased the premiums of all plans, and mixed loading states allowed insurers to decide how to cover the cost of their CSRs (Anderson et al., 2019). Among those states that used silver loading, 15 put the cost of providing CSRs onto the premium of all silver plans while 21 increased the premiums of silver plans only sold on the marketplace, a strategy known more specifically as silver switching or the “silver switcheroo.”

California was one of the states that implemented silver switching (Gaba et al., 2017). Under silver loading, the larger premium increases for silver plans made non-silver plans comparatively less expensive relative to the benchmark premium in 2018 compared to previous years (Anderson et al., 2019; Drake & Abraham, 2019) and many people were newly exposed to zero or near zero premium plans after subsidies (Branham & DeLeire, 2019; Drake & Anderson, 2020).

In 2018, some consumers responded to the changes in relative prices by changing plan choices. In California's marketplace, Covered California, more individuals earning between 201 and 400 percent FPL bought gold plans in 2018 than in 2017, and the silver plan market share decreased for individuals and families with incomes above 200 percent FPL (Sprung & Anderson, 2018). Other research has found that Covered California consumers switched plans more frequently in 2018 than in previous years with many who were enrolled in 2017 in silver plans re-enrolling in comparatively less expensive gold plans in 2018. However, it isn't clear that everyone who should have switched metal tiers in 2018 did, as only 10.3% of re-enrollees switched metal tiers between 2017 and 2018 (Rasmussen, Rice, & Kominski, 2019).

Consumers buying individual market health insurance must choose between plans that differ on a variety of characteristics including premium, network, plan type, insurer reputation, and other attributes (Bhargava et al., 2017). Within each of these attributes, one plan can be better or worse than another and these differences between plans may appeal to different types of consumers. However, there can also be cases when a plan is clearly inferior and dominated by other available options. Instances of dominance occur when one option (the dominant one) is never inferior to and has one or more superior attributes than another option (the dominated one). Prior to the implementation of silver loading there were not issues of clear financial dominance in Covered California as, typically, a silver plan would have more cost-sharing but lower premiums while the gold plan would have less

cost-sharing but higher premiums. The tradeoff between premium and cost-sharing made it so that neither gold nor silver plans were clearly superior for all or almost all consumers.

However, silver loading resulted in a price shock in 2018 that led to dominated plans being sold through Covered California. Insurers increased their silver plan premiums by a set percentage in order to cover the cost of providing CSRs, and among the eleven insurers in California's marketplace, this increase to silver premiums led to instances of dominance among two insurers that offered silver and gold plans on the same network and plan type (HMO, PPO, or EPO) where the gold plan had a lower premium than the silver plan and had lower out-of-pocket expenses. In other words, the gold plan dominated the matched silver plan on all major attributes. The plans sold at the bronze and platinum metal tiers by these two insurers were neither dominant nor dominated, however, as their lower or higher premiums were accompanied by a tradeoff in actuarial value. For example, bronze plans have lower premiums than the other metal tiers but also have lower actuarial values, meaning that enrollees can expect to spend more out-of-pocket when receiving medical care. The opposite is true for platinum plans, which have higher premiums and higher actuarial values.

Choosing dominated plans increases monthly premiums and decreases the amount of financial protection that families enjoy for a given level of premium. Previous research of Medicare Part D plan selections found only 10% of consumers made optimal choices and that the lack of superior decision rules had significant welfare losses approaching \$300 per enrollee per year (Heiss, Leive, McFadden, & Winter, 2013). Other work examining enrollment in dominated Medicare Part D plans found little variation in demographic characteristics of individuals who chose dominated plans (Abaluck & Gruber, 2011). Inertia and status quo bias have also been identified as factors that led to a significant number of Medicare beneficiaries choosing dominated plans (Afendulis, Sinaiko, & Frank, 2015). Analyses of the employer sponsored insurance market have found that employees frequently choose

dominated plans, including selecting high premium and low deductible health plans instead of low premium high deductible health plans (Bhargava et al., 2017; Sinaiko & Hirth, 2011). Consumers who selected these dominated plans paid an average of \$500 more per year (Liu & Sydnor, 2018). Looking at enrollees in federally facilitated marketplaces in 2014 through 2016, researchers found that around two percent of those eligible for CSRs chose a dominated plan (DeLeire, Chappel, Finegold, & Gee, 2017).

Additionally, while automatically re-enrolling consumers in their coverage if they do not manually make changes to their plans during open enrollment periods likely improves coverage retention and reduces health insurance churn, the decision logic for automatic renewal policies may also be a factor in consumer enrollment in inferior coverage (Drake & Anderson, 2019; Handel & Kolstad, 2015; Skinner & Volpp, 2017). Covered California consumers are sent renewal notices at the beginning of each annual open enrollment period. Individuals who do not take action are passively re-enrolled in their same plan using the most recent household size and income information provided to the marketplace. Consumers whose coverage is automatically renewed will not have switched plans between years and are less likely to know if their coverage from the prior year is more costly than other, more comprehensive coverage.

Otherwise well-functioning markets that rely on consumer choice to bring price discipline and preference revelation are dysfunctional when a portion of the population selects or is placed into dominated options. Furthermore, choice inertia is significant in health insurance markets, meaning that returning consumers may not leave plans that become dominated over time. These inefficient choices can have long lasting effects on consumer premiums, out-of-pocket expenditures, retention, and satisfaction as well as insurer outcomes in the presence of imperfect risk adjustment (Handel, 2013; Marton, Yelowitz, & Talbert, 2017).

Research objectives

Selecting health insurance is a complex task that requires significant cognitive capacity and knowledge of insurance terminology in order to comprehensively compare plans (Ali, Combs, Muvuka, & Ayangeakaa, 2018). When faced with challenging decisions, consumers often rely on heuristics and biases that allow them to reduce the number of options they have to compare and more easily come to a decision. In a study published in 2015, researchers found that consumers relied heavily on the labeling of health plans by metal tiers to make enrollment decisions rather than the actual underlying details of those plans (Ubel, Comerford, & Johnson, 2015). While using heuristics and biases can make the decision-making process easier, at times it can also lead individuals to make poor decisions. The architecture of choice environments can also inadvertently exacerbate this issue. In an environment like the marketplaces where the costs of available plans can change annually, it is particularly important for consumers to shop and comprehensively compare plans each year in order to be aware of the changes to their own coverage as well as those to other plans sold in their market. In the absence of this, policymakers can craft policies that help consumers avoid enrolling in inferior plans.

In this study, we describe enrollment in one of the silver plans that became dominated by gold plans on all measurable aspects of premiums and cost-sharing in 2018. In particular, we look at consumers' enrollment in the prior year to examine the potential costs of consumer reliance on metal tier labeling and the role of status quo bias. This analysis provides data to inform potential policy changes that marketplace regulators can implement to help consumers avoid selecting dominated plans in the future. It is also the first work on dominated plan choices in the ACA individual market after silver loading changed relative premiums of matched gold and silver plans.

Study Data and Methods

This study focused on California's state-based marketplace, Covered California. Covered California is an active purchasing marketplace that sets clear rules for participating insurers. Covered California led the nation in adopting the silver switching variant of silver loading that placed all CSR costs onto only on-marketplace silver plans. This maximized the benchmark premium, increased premium subsidies, and decreased net premiums paid for the least expensive plan for most subsidized enrollees (Anderson et al., 2019).

Three data sources were employed for our analyses. We used the Robert Wood Johnson Foundation's HIX Compare to identify 108 pairs of 2018 Covered California silver and gold plans that shared an issuer, provider network identifier, plan type, market segment (on-marketplace, off-marketplace), and rating area. This process was conceptually similar to the one used by other researchers in their analysis of dominated plan choice in a single large firm (Bhargava et al., 2017). We also limited our main analyses to only plans sold by the two insurers who offered the dominated plans in 2018: Kaiser Permanente and Sharp Health Plan. This allowed us to avoid making assumptions about consumer valuation of insurer brand, network, or customer service as we analyzed only plans offered with the same network by the same insurer in the same region.

Three unique silver-gold dyads offered by Kaiser Permanente and Sharp Health Plan had gold dominate on premium, deductible, and maximum out-of-pocket limits. Silver cost-sharing was equal or inferior to gold cost-sharing on all benefit details except for home health and advanced imaging in the unusual case of an individual having at least \$12,500 in allowed claims for either of those benefit categories. Similarly, for households with incomes between 201 and 250 percent FPL who are eligible

for weak CSR benefits,⁸ the silver plans were not dominated by the gold plans for the same two scenarios as above as well as if an individual received 26 preferred brand prescriptions.

We also used individual level enrollment data provided by Covered California for plan years 2014 through May 26, 2018. The data set contained information on 7,930,195 enrollee-years and included demographic, financial, and other enrollee information including eligibility for cost-sharing subsidies and advanced premium tax credits, family income as a function of FPL, age, gender, race/ethnicity, language spoken at home, rating region, and zip code. These data also included selected plan, insurer, and metal level and dates of plan selection, enrollment, and disenrollment. Information seeking behavior such as the use of consumer assistance was also in the data as was whether re-enrollees had their coverage automatically renewed or manually selected a plan.

To calculate minimum household financial losses due to domination, we used publicly available plan pricing data from Covered California's website to estimate each individual's rating area and age specific premiums for the gold and silver plan offered by their chosen insurer. Bronze and platinum plans were excluded from the main analysis because they were neither dominant to nor dominated by plans at other metal tiers.

We focused our analyses on three main populations. The first included 1,562,153 unique enrollees who had coverage through Covered California in the first five months of 2018. We used this sample to calculate the percent of enrollees overall and in each rating region who selected a dominated plan.

⁸ The level of cost-sharing reduction provided by the CSR subsidies is dependent on household income as a percent of the federal poverty level. Those with incomes between 100 and 150 percent of the federal poverty level have strong CSR benefits that increase the actuarial value of silver plans from 70% to 94%. Those with incomes between 150 and 200 percent of the federal poverty level have moderate CSR benefits that increase the actuarial value of silver plans from 70% to 87%. Those with incomes between 200 and 250 percent of the federal poverty level have weak CSR benefits that increase the actuarial value of silver plans from 70% to 73%.

Our second analysis sample included the 2017 and 2018 households with incomes above 200 percent FPL that were enrolled in plans sold by Kaiser Permanente and Sharp Health Plan. This allowed us to compare households' choice of one of the silver plans that became dominated in 2018 rather than one of the other plans sold with the same provider network and insurer at the catastrophic, bronze, gold, or platinum levels. We limited our sample to households that reported earning over 200 percent FPL as the silver plans were not dominated by the gold plans for those with incomes at or below 200 percent FPL. Our household-level samples included the oldest member of each household that fell within our inclusion criteria, giving us a sample of 174,706 households in 2018 and 162,965 households in 2017.

We also looked across 2015-2018 at the households with incomes above 200 percent FPL that were enrolled in plans sold by Kaiser Permanente or Sharp Health Plan, but further restricted to households that actively enrolled rather than having their coverage automatically renewed. We used this analysis sample to examine trends over time of enrollment in silver coverage with these insurers (2018 n=107,599 households; 2017 n=104,480 households; 2016 n=86,733 households; 2015 n=95,329 households). For our regression analyses, we focused on the samples from 2017 and 2018 and again only included households with incomes above 200 percent FPL in plans sold by Kaiser Permanente or Sharp Health Plan that actively enrolled.

Demographic characteristics for the 2018 Kaiser and Sharp enrollees, including by enrollment in a dominated plan and among those who actively enrolled, can be found in Table 1 and more details on sample inclusion criteria can be found in Appendix Exhibit A.

Analysis

The outcome for our analyses was a binary variable indicating whether a household was enrolled in one of the silver plans that became dominated in 2018.

Descriptive analyses

For our first descriptive analysis, we used the entire sample of 1,562,153 enrollees in 2018 to calculate the percent of all enrollees in each rating region that were enrolled in a dominated plan.

Using our household-level samples of enrollees in Kaiser or Sharp plans from 2017 and 2018, we also looked at enrollment in one of the silver plans that became dominated in 2018 by use of auto-renewal. For this variable, households were categorized as being 1) new enrollees (meaning they were not enrolled in marketplace coverage through Covered California at any point in the prior year), 2) incumbent enrollees whose coverage was not automatically renewed, and 3) incumbent enrollees whose coverage was automatically renewed. Incumbent enrollees only included those who were enrolled in marketplace coverage through the end of the prior year. We expected that while in 2017 there would be no significant differences in enrollment in the silver plans by use of auto-renewal, in 2018 incumbent enrollees whose coverage was automatically renewed would have the highest rate of being in dominated plans and that new enrollees and those that did not automatically renew their coverage would have the lowest rates of being in a dominated plan.

In addition, among those that were enrolled in a dominated plan in 2018, we calculated the difference in household premiums between their selected plan at the silver and gold level to determine how much in monthly premiums those households could have saved had they not enrolled in the dominated plan.

We then used data from 2015-2018 to compare enrollment in the silver plans that became dominated in 2018 across years, looking only at those who were enrolled in one of the plans sold by Kaiser Permanente or Sharp Health Plan and who actively enrolled instead of using automatic renewal.

Regression analyses

We conducted a multivariable logistic regression model on our outcome in 2017 and 2018, looking only at households in Kaiser or Sharp plans that actively enrolled. The key predictor in this model was households' enrollment decisions in the prior year. Households were categorized as 1) new enrollees, 2) incumbents who in the prior year were enrolled in the Kaiser or Sharp silver plans that became dominated in 2018, 3) incumbents who in the prior year were enrolled in non-silver Kaiser or Sharp plans, 4) incumbents who in the prior year were enrolled in a silver plan sold by another insurance company, and 5) incumbents who in the prior year were enrolled in a non-silver plan sold by another insurance company. This variable was intended to estimate the potential role of status quo bias and metal tier stickiness. We expected that re-enrollees are likely to stay in their same plan between years which would lead incumbent enrollees from the silver Kaiser and Sharp plans to have a high probability of being in one of the silver plans that became dominated in 2018.⁹ We also anticipated that metal tiers would be sticky so that even those who were in silver plans from other insurers in the previous year would have a high probability of being in silver plans in both 2017 and 2018. For silver incumbents we expected to see a slight decrease in their probability of enrolling in a silver plan between 2017 and 2018, although this would not be as significant as what we expected to see in the other groups. While non-silver incumbent enrollees would have lower probabilities of enrolling in silver plans in both 2017 and 2018, they would particularly benefit from their status quo bias and metal tier stickiness in 2018 and have even lower probabilities of enrollment in one of the dominated silver

⁹ As mentioned previously, some enrollees may have a reason for staying in the silver plan if they anticipate high home healthcare costs or use 26 or more preferred brand prescriptions. While we don't have estimates for how many individuals this may apply to, we do not expect it to be a large proportion of the sample. Furthermore, identifying that falling into one of these categories would mean the silver plan is no longer dominated would require having high health insurance literacy and significant effort on the part of consumers to investigate the details of each plan.

plans. Finally, we expected to see a marked shift for new enrollees between 2017 and 2018, with enrollment in silver plans dropping significantly in 2018 when those plans became dominated.

Our models also controlled for income as a percent of the federal poverty level, gender, age, race/ethnicity, preferred spoken language, number of family members enrolled in the plan, receipt of consumer assistance, and rating region grouping (Northern California and Sacramento Valley, Greater Bay Area, Central Coast, Central Valley and Southern Desert, Los Angeles, and Southern California). The values for these variables represent the information for the oldest member of the household, as this was the unit of analysis for our study. In Exhibit 4 we present the average adjusted predicted probabilities of being enrolled in one of the silver plans that became dominated in 2018 for our key predictor and the odds ratios for the full 2017 and 2018 models are in Appendix Table A.

Sensitivity analyses

We conducted sensitivity analyses on the 2018 regression model to estimate its robustness. Our first two sensitivity analyses reduced the sample to only look at those with incomes above 250 percent FPL and those with incomes above 400 percent FPL in order to explore any differences by subsidy status. We also looked at only households enrolled in Kaiser plans as they made up 95% of the main regression analysis sample in 2018.

Limitations

There are several limitations to our study. First, we only examine a single state, California, which has a fairly unique implementation of the ACA. California's regulations have enabled a strong identification of plan domination which will often not be present in other states and marketplaces and which may limit generalizability. Covered California's standardization of plans sold in the individual market makes it so that differences between plans are limited to their actuarial value, premium amount, provider network, and insurance company's customer service. Other states have not implemented

such strict plan standardization which makes comparisons between plans more complicated and allows for tradeoffs to exist across a range of dimensions beyond those previously mentioned, making the identification of plan dominance prior to plan use challenging. Second, our analysis does not include claims or health data, which could be associated with plan choice. However, increasing age is a reliable proxy for higher health care expenditures and we included age as a control variable in our model (Batty, Gibbs, & Ippolito, 2018). Third, the auto-renewal variable does not necessarily indicate that individuals did not compare plans during open enrollment. Consumers could have shopped online before deciding to stay with their plan and allow themselves to be automatically renewed to avoid any extra hassle. Similarly, those who actively enrolled did not necessarily compare plans but may have decided to stay in their same plan and actively re-enroll without shopping. Data on Covered California's website use was not available to us to use to make a more nuanced assessment of inattention. Finally, our estimate around consumer losses only included premiums. Gold plans have significant cost-sharing advantages over silver plans in California. Because we are unable to estimate incremental differences in consumer cost-sharing expenditures our estimates of total consumer loss are conservative and may underestimate the actual losses households experienced.

Results

Descriptive analysis

Overall, among all Covered California enrollees in 2018, 61,033 enrollees were in a dominated plan. This equates to 3.9% of all individual enrollees across the state (Exhibit 6). However, this varied by rating regions, ranging from a low of 0.02% to a high of 11.2%. This difference by rating region is likely a reflection of Kaiser Permanente's market power. In the three regions where over 10% of individuals were enrolled in a dominated plan in 2018, over 70% of all enrollees were covered by

Kaiser, compared to under 20% in the five regions where less than 2% of enrollees were in a dominated plan.

The average difference in monthly premium for households enrolled in a dominated plan was \$38.87 (95% CI: 38.66 - 39.09; min: \$10; max: \$234) for the silver plan that they purchased compared to the available, dominant gold plan for each household (Table 4). This estimate does not take into account the additional out-of-pocket costs that households would also incur because of their enrollment in silver rather than gold plans. For 2018, silver plans sold through Covered California had a \$2,500 medical deductible for individuals and \$5,000 for families compared to no deductible in gold plans. Cost-sharing was also higher in silver plans, with primary care visits costing \$10 more and specialty care visits costing \$20 more per visit. The annual out-of-pocket maximum for families in silver plans was \$14,000 compared to \$12,000 in gold plans (\$7,000 and \$6,000, respectively, for individuals) (Covered California, 2017).

Among households in Kaiser or Sharp plans in 2018, 20.2 % were enrolled in one of the dominated silver plans (Exhibit 7). This was lower than in 2017 when 37.1% of Kaiser and Sharp enrolled households were in silver plans. While in 2017 differences in enrollment in the silver plans only ranged from 32.5% to 41.8% by use of auto-renewal, in 2018 these differences were larger. Only 6.5% of new enrollees and 19.6% of incumbents that did not use auto-renewal enrolled in one of the dominated silver plans, compared to 31.7% of incumbent enrollees who had their coverage automatically renewed.

Looking specifically at those who actively chose their plan, we examined the time trend from 2015-2018 in enrollment in silver plans among all households with Kaiser and Sharp coverage by their prior year's enrollment status. Between 2017 and 2018, there was a decrease in the percent of households that chose the silver plans in 2018 when they became dominated across all groups, however the extent

of this decrease differed by prior enrollment status. For 2015-2017, between 76.3% and 82.8% of these enrollees who had been enrolled in a silver Kaiser or Sharp plan in the prior year again chose one of the silver plans (Exhibit 8). However, in 2018, when these plans became dominated, this decreased to 40.0%. Between 49.3% and 52.8% of incumbent enrollees who were in silver plans from other insurers in the prior year chose silver Kaiser or Sharp plans in 2015-2017, but only 16.1% did so in 2018. New enrollees also chose silver plans at relatively high rates in 2015-2017, ranging from 32.5% to 36.1%, but only 6.5% did so in 2018. Incumbent enrollees in non-silver plans in the prior year, either from Kaiser Permanente and Sharp Health Plan or from another insurer, chose silver plans at the lowest rates across all years and in 2018 this continued to be the case with only 2.5% of incumbents from non-silver Kaiser or Sharp plans and 3.9% of incumbents from non-silver plans sold by other insurers choosing the dominated silver plans in 2018.

Regression analysis

The results for the models that only included households that actively enrolled showed differences in enrollment in the silver plans that became dominated in 2018 by year and by households' prior year's enrollment status. In both 2017 and 2018 there were differences in enrollment in silver plans by households' prior enrollment status. Controlling for all other factors in the model, incumbents from silver Kaiser or Sharp plans had the highest predicted probability of enrolling in silver plans in both years (71.6% in 2017 and 35.6% in 2018) followed by incumbents from silver plans offered by other insurers and then new enrollees and incumbents in non-silver plans (Exhibit 9).

Between 2017 and 2018, among households with Kaiser and Sharp coverage who actively enrolled, the percent in silver plans decreased from 36.5% to 13.1% among active enrollees. This decrease was seen in all categories of prior enrollment status, although for new enrollees and those who were in

non-silver plans in the prior year their predicted probabilities of enrolling in a silver Kaiser or Sharp plan decreased to below 10% in 2018.

Within 2018, households that had been enrolled in 2017 in the silver Kaiser or Sharp plans that became dominated in 2018 had the highest predicted probability of being in a dominated plan in 2018 - 35.8%. For most of this group, not switching plans led to them staying in a plan that had become dominated with the negative consequence of paying more for worse coverage than they would have if they had switched plans.

Households that had been enrolled in silver plans through another insurer in 2017 had the second highest predicted probability of being enrolled in a dominated plan in 2018 at 14.5%. This group had already expressed a preference for silver-level coverage in their prior year's enrollment decision and may have not paid attention to plans at other levels.

New enrollees, incumbents that had been enrolled in 2017 in a non-silver plan from another insurer, and incumbents that had been enrolled in 2017 in a non-silver Kaiser or Sharp plan had the lowest predicted probabilities of being in a silver dominated plan in 2018 (7.0%, 4.0%, and 2.6%, respectively). Incumbents in non-silver plans likely benefited from their own status quo bias and metal tier preferences. New enrollees, on the other hand, are the most likely to have comprehensively compared plans as evidenced by the significant decrease between 2017 and 2018 in their probability of enrolling in silver once that metal tier became dominated.

Sensitivity analysis

Results for the sensitivity analysis for buyers reporting more than 251 percent FPL and for those earning more than 400 percent FPL were similar in direction and magnitude of the main analyses. Kaiser enrollees, who made up 95% of the sample, also have similar results to the baseline model.

Results for our sensitivity analyses are reported in Appendix Table D alongside the full baseline models for 2017 and 2018 for comparison.

Discussion

Over the first five months of 2018, 61,033 Covered California consumers were enrolled in a dominated plan that cost them more in premiums per month for less comprehensive coverage. From the descriptive analyses, we found that, among households enrolled in Kaiser or Sharp plans in 2018, 20.2% of households enrolled in a silver plan when there was a gold plan from the same insurer with the same network and plan type that dominated the silver plan on premiums and cost-sharing. Compared to previous research we found similar magnitudes of premium losses per household. Dominated plan choices led to households spending on average over \$450 per year more on premiums for plans offering the same network but more cost-sharing. This estimate does not include the additional cost-sharing that silver enrollees incur. For those that reach the annual out-of-pocket maximum, families in silver plans would spend \$2,000 more over the course of the year than those in gold plans (\$1,000 more for individuals).

Of the more than 60,000 consumers who were in a dominated plan in 2018, 56.4% automatically renewed their coverage (data not shown). The decision logic around auto-renewal, which currently places all eligible consumers in the same plan as the year before, is one potential policy lever that marketplace regulators could use to minimize enrollment in dominated plans and counteract any negative consequences of status quo bias.

The rest, however, actively enrolled in a dominated silver plan in 2018. In prior years the decision to enroll in a silver plan may have reflected a true preference for the level of coverage of that metal tier, in particular a lower premium with higher cost-sharing. In 2017, we saw that households that made an active decision and were previously enrolled in silver plans had the highest predicted probability of

selecting a silver Kaiser or Sharp plan (71.6% for those already in the silver Kaiser or Sharp plans and 48.2% for those in other silver plans). However, in 2018, after the silver plans became dominated, this preference was no longer rational. Many responded to this by not choosing one of the dominated plans but for a significant portion of silver enrollees the silver metal tier was overly sticky: 14.5% of non-Kaiser or Sharp silver enrollees from 2017 and 35.8% of Kaiser or Sharp silver enrollees from 2017 enrolled in a dominated plan in 2018. Additionally, marketplace choice architecture may have made identifying the silver Kaiser/Sharp plans as inferior options more challenging for this group. When shopping, enrollees can filter the plans displayed by metal tier, which allows them to examine plans only within a single metal tier. In an instance like the one we studied, this could have meant that active consumers who filtered their menu of plans to only show silver plans might not have seen that there was a gold plan from the same insurer with lower premiums.

On the other hand, incumbents previously enrolled in non-silver plans' own status quo bias and preference for non-silver metal tiers may have had a protective effect in this situation. Households in these groups had the lowest predicted probability of enrolling in a silver dominated plan in 2018 - between 2.6% and 4.0%. New enrollees are the least likely to have relied on prior experience with metal tiers and while a significant portion chose the silver Kaiser and Sharp plans in 2017 (34.3%) only 7% did so once those plans became dominated in 2018.

Policy implications

The cancellation of federal funding for CSRs and California's subsequent response of silver loading had several unintended consequences, including making some silver marketplace plans become dominated. Even in a choice environment that has many favorable factors that should mitigate against consumers choosing dominated plans, nearly four percent of Covered California enrollees chose dominated plans in 2018. Marketplace administrators need to adopt strategies to better present the

available options to minimize the likelihood of dominated plans being chosen. Providing additional information to individuals during open enrollment has been shown to increase shopping behavior but it has not been shown to increase switching behavior (Marzilli Ericson, Kingsdale, Layton, & Sacarny, 2017). Decision tools have been shown to increase consumers' confidence in their choice and have led them to choose health plans with higher actuarial values (Politi et al., 2016). Marketplace managers who are concerned about optimizing the effectiveness of choice can alter the choice architecture of the marketplace to reduce the likelihood that consumers choose dominated plans (Hoffman, 2019). One option would be to suppress plans that are strictly dominated to preclude those choices from being on the menu of options seen by consumers.

Another option would be to create a warning and redirection prompt whenever an individual initially chooses a dominated plan. This could be particularly useful in situations like the one we studied where consumers had a plan option with the same issuer and network that would have been more comprehensive and cheaper than the plan they were selecting. Among all enrollees in 2018, 7.1% of those who had been enrolled in a silver tier in 2017 chose a dominated plan in 2018, compared to less than one percent in all other metal tier groups from 2017 (data not shown). Additionally, prior research has found that consumers are heavily influenced by the metal tier labeling when selecting plans (Ubel et al., 2015). Returning consumers with biases towards silver plans may have used the filtering tool available on the marketplace to only compare silver plans, meaning they would not have realized there was a more generous gold plan available at a lower premium. By adding a notification to consumers that there may be better coverage available, the marketplace would aid those actively enrolling in coverage in their decision-making process.

However, these changes require managerial and regulatory foresight. A less intrusive approach would be to change the ordering of plans so that dominated choices are displayed after superior choices.

These steps would provide needed decision-making support to actively engaged consumers while they shop and make it more challenging for them to accidentally choose a dominated plan.

Buyers who are not clearly highly engaged may need different policy solutions. We theorize that a regulatory approach to recast auto-renewal logic could decrease dominated plan choice. Auto-renewal has been found to be significantly associated with higher re-enrollment levels (Drake & Anderson, 2019). However, current rules for auto-renewal on both Covered California and the federally facilitated marketplace strongly incentivize passively auto re-enrolling consumers into the same metal tier. In 2018, thousands of Californians were passively re-enrolled into strictly dominated plans. Policy makers could create decision rules for passive re-enrollment that eliminate dominated plans from any part of the decision tree whenever there is a viable alternative. This would increase consumer welfare by reducing monthly premiums and also reducing out-of-pocket expenses (Ho et al., 2017; Zhou & Zhang, 2012).

CHAPTER 3: EXHIBITS AND TABLES

Table 4. Demographic characteristics of sample, 2018

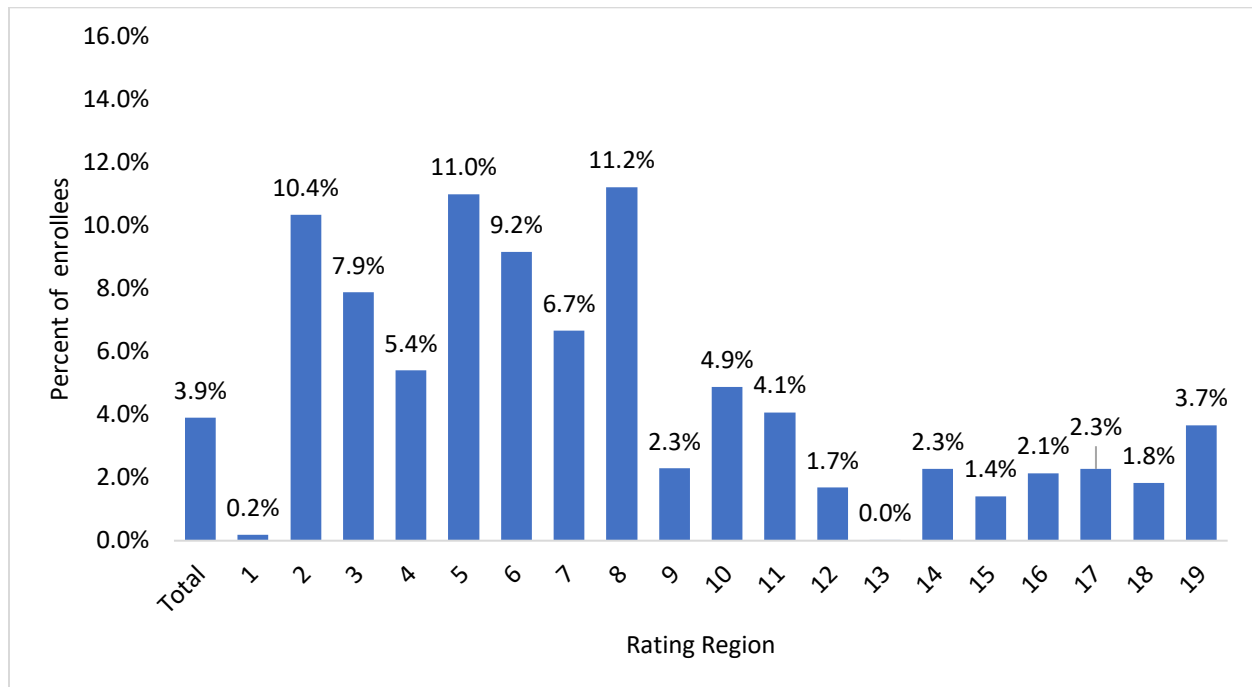
	<u>Total</u>		<u>Did not enroll in dominated plan in 2018</u>		<u>Enrolled in dominated plan in 2018</u>			<u>Not automatically re- enrolled in 2018</u>	
	n	%	n	%	n	%	p- value	n	%
Total	174,706	100.0%	139,352	100.0%	35,354	100.0%	-	107,599	100.0%
Gender									
Male	94,071	53.8%	75,677	54.3%	18,394	52.0%	0.000	56,936	52.9%
Female	80,635	46.2%	63,675	45.7%	16,960	48.0%	0.000	50,663	47.1%
Age									
18-25	8,626	4.9%	7,558	5.4%	1,068	3.0%	0.000	6,533	6.1%
26-29	22,388	12.8%	19,508	14.0%	2,880	8.1%	0.000	15,061	14.0%
30-39	34,429	19.7%	29,406	21.1%	5,023	14.2%	0.000	22,281	20.7%
40-49	29,280	16.8%	23,488	16.9%	5,792	16.4%	0.034	17,973	16.7%
50-59	45,856	26.2%	34,807	25.0%	11,049	31.3%	0.000	26,655	24.8%
60+	34,127	19.5%	24,585	17.6%	9,542	27.0%	0.000	19,096	17.7%
Race/ethnicity									
White	62,563	35.8%	50,528	36.3%	12,035	34.0%	0.000	37,199	34.6%
Black	4,541	2.6%	3,703	2.7%	838	2.4%	0.002	3,060	2.8%
Latino	32,237	18.5%	25,528	18.3%	6,709	19.0%	0.004	20,905	19.4%
Asian	26,456	15.1%	21,196	15.2%	5,260	14.9%	0.120	16,696	15.5%
Other	12,709	7.3%	10,310	7.4%	2,399	6.8%	0.000	8,407	7.8%
Non-respondent	36,200	20.7%	28,087	20.2%	8,113	22.9%	0.000	21,332	19.8%
Preferred spoken language									
English	152,957	87.6%	123,184	88.4%	29,773	84.2%	0.000	94,113	87.5%
Spanish	11,344	6.5%	8,333	6.0%	3,011	8.5%	0.000	7,221	6.7%
Other	6,850	3.9%	5,262	3.8%	1,588	4.5%	0.000	4,501	4.2%
Unknown	3,555	2.0%	2,573	1.8%	982	2.8%	0.000	1,764	1.6%
Federal poverty level									
201-249% FPL	66,206	37.9%	49,441	35.5%	16,765	47.4%	0.000	41,111	38.2%

250-299% FPL	42,774	24.5%	34,357	24.7%	8,417	23.8%	0.001	26,408	24.5%
300-399% FPL	45,122	25.8%	37,201	26.7%	7,921	22.4%	0.000	27,811	25.8%
400-599% FPL	14,400	8.2%	12,800	9.2%	1,600	4.5%	0.000	8,421	7.8%
600% FPL or more	6,204	3.6%	5,553	4.0%	651	1.8%	0.000	3,848	3.6%
Number of family members enrolled in plan									
1	117,647	67.3%	95,489	68.5%	22,158	62.7%	0.000	72,258	67.2%
2	36,899	21.1%	28,114	20.2%	8,785	24.8%	0.000	23,312	21.7%
3	10,505	6.0%	8,043	5.8%	2,462	7.0%	0.000	6,381	5.9%
4 or more	9,655	5.5%	7,706	5.5%	1,949	5.5%	0.904	5,648	5.2%
Customer assistance									
Unassisted	89,256	51.1%	72,864	52.3%	16,392	46.4%	0.000	45,173	42.0%
Used CEC, CEW, or SCR for assistance	26,694	15.3%	21,124	15.2%	5,570	15.8%	0.005	25,061	23.3%
Used CIA or PBE for assistance	58,756	33.6%	45,364	32.6%	13,392	37.9%	0.000	37,365	34.7%
Auto-renewal									
Not automatically re-enrolled	107,599	61.6%	93,541	67.1%	14,058	39.8%	0.000	107,599	100.0%
Automatically re-enrolled	67,107	38.4%	45,811	32.9%	21,296	60.2%	0.000	-	-
Prior enrollment									
New enrollee	53,748	30.8%	50,249	36.1%	3,499	9.9%	0.000	53,748	50.0%
Incumbent in non-silver plan from other insurer in prior year	5,413	3.1%	5,203	3.7%	210	0.6%	0.000	5,413	5.0%
Incumbent in non-silver Kaiser or Sharp plan in prior year	65,766	37.6%	65,274	46.8%	492	1.4%	0.000	19,955	18.5%
Incumbent in silver plan from other insurer in prior year	6,456	3.7%	5,419	3.9%	1,037	2.9%	0.000	6,456	6.0%
Incumbent in silver Kaiser or Sharp plan in prior year	43,323	24.8%	13,207	9.5%	30,116	85.2%	0.000	22,027	20.5%
Mean household monthly premium difference between dominated silver and dominant gold plans					\$38.87				

Source: Authors' analysis of Covered California enrollment data, 2018.

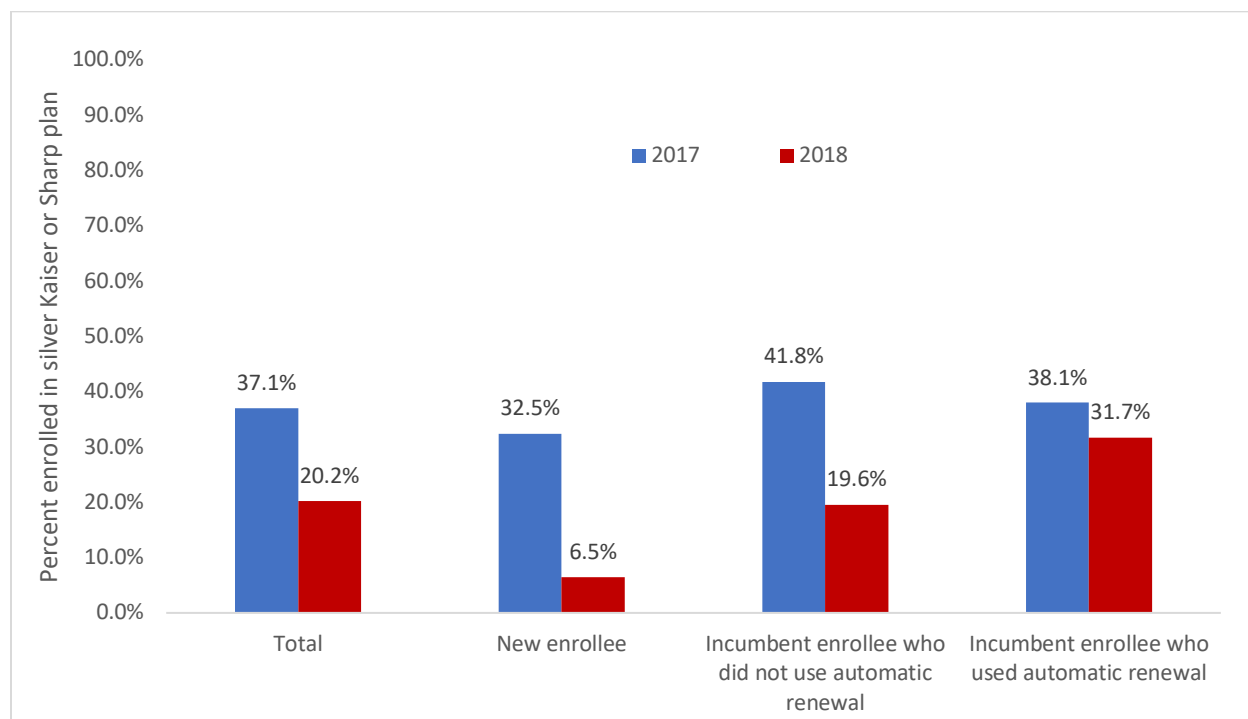
Notes: : FPL = federal poverty level; CEC = certified enrollment counselor; CEW = county eligibility worker; SCR = service center representative; CIA = certified insurance agent; PBE = plan-based enroller

Exhibit 6. Percent of all Covered California enrollees in a dominated plan by rating region, 2018



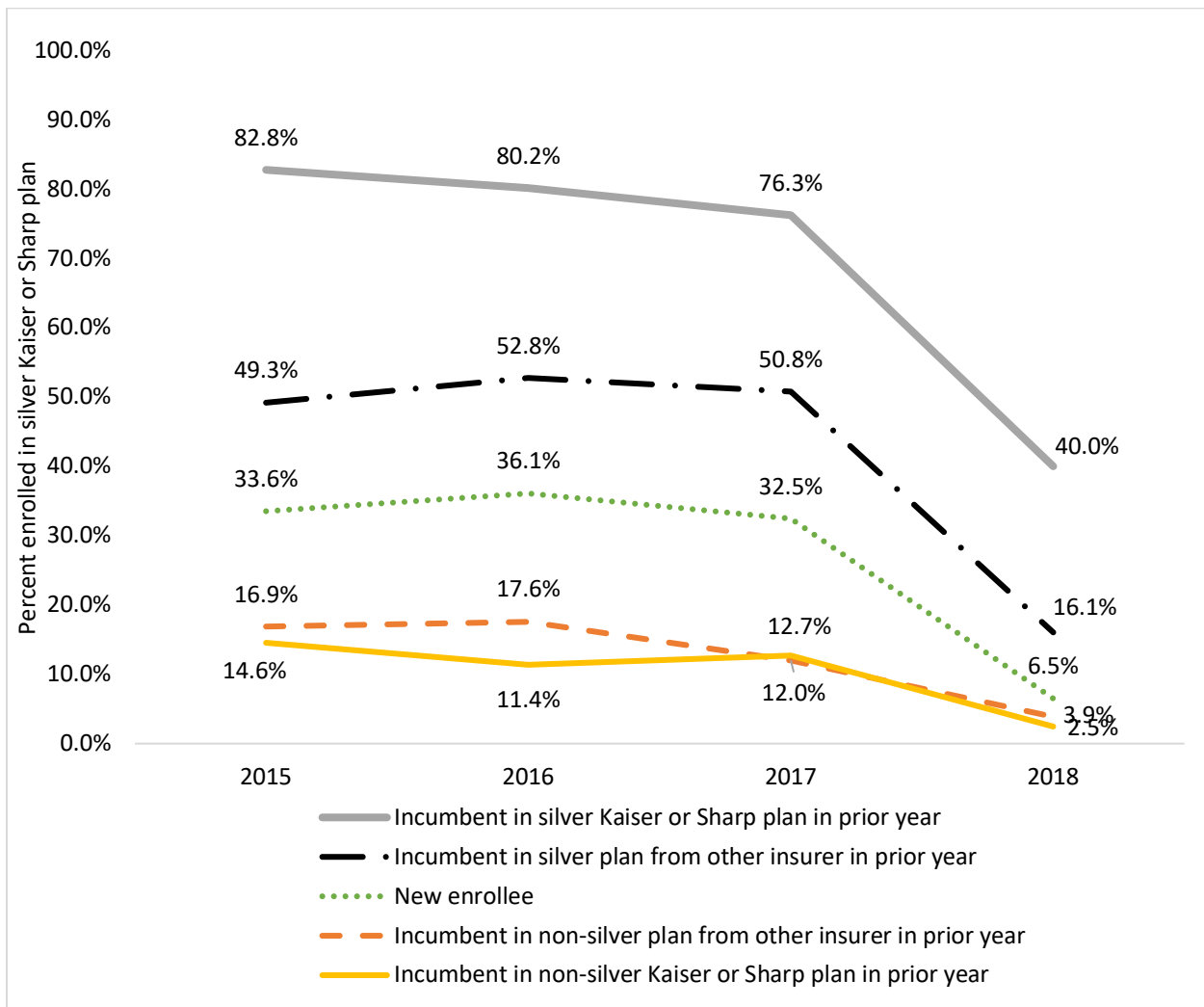
Source: Authors' analysis of Covered California enrollment data, 2018.

Exhibit 7. Percent of Covered California households choosing silver Kaiser or Sharp plans by use of automatic renewal, among Kaiser or Sharp enrollees in 2017 and 2018



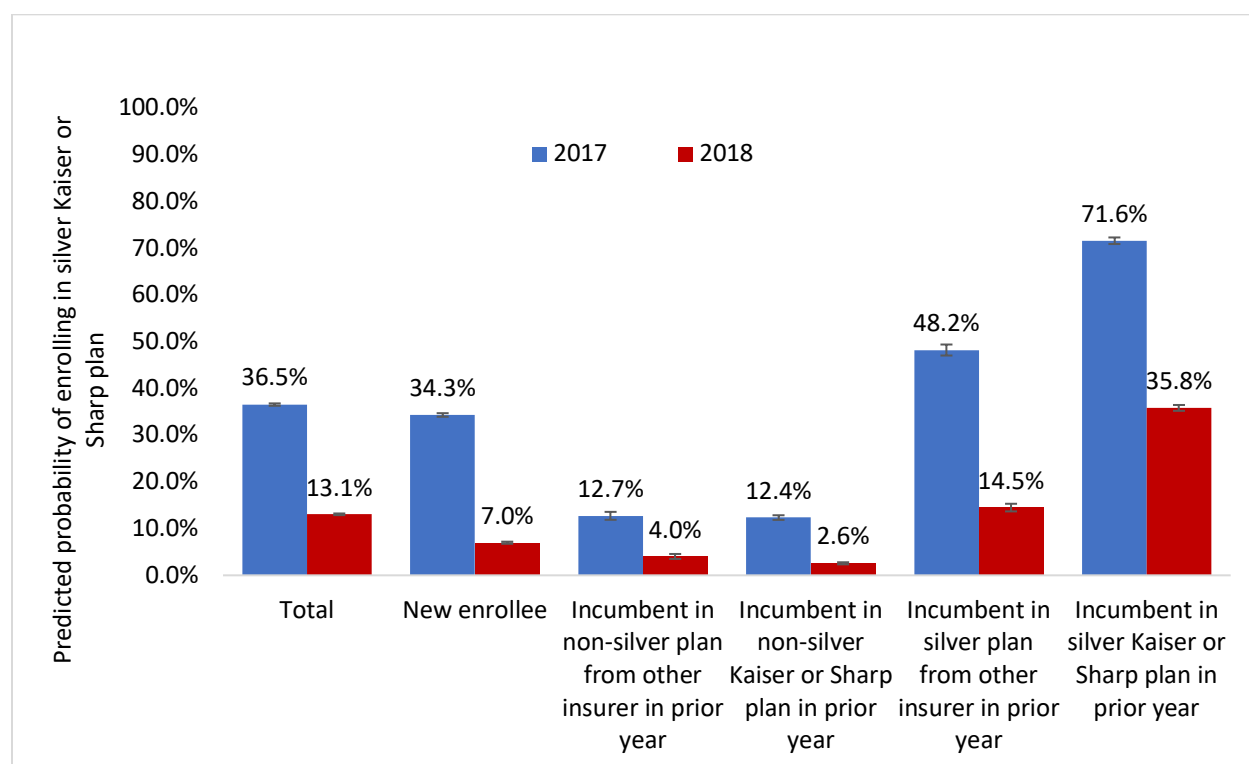
Source: Authors' analysis of Covered California enrollment data, 2017 and 2018.

Exhibit 8. Percent of Covered California households enrolled in silver Kaiser or Sharp plans by prior year's enrollment status, among Kaiser or Sharp enrollees who actively chose their plan, 2015-2018



Source: Authors' analysis of Covered California enrollment data, 2015-2018.

Exhibit 9. Predicted probability of Covered California households enrolling in silver plans that became dominated in 2018 by prior year's enrollment status, among those who actively chose their plan and are Kaiser and Sharp enrollees in 2017 and 2018



Source: Authors' analysis of Covered California enrollment data, 2017 and 2018.

Notes: Predicted probabilities were calculated after adjusting for all other factors in the model, including income as a percent of the federal poverty level, gender, age, race/ethnicity, preferred spoken language, number of family members enrolled in the plan, receipt of consumer assistance, and rating region grouping (Northern California and Sacramento Valley, Greater Bay Area, Central Coast, Central Valley and Southern Desert, Los Angeles, and Southern California).

CHAPTER 3: APPENDIX

Our study population included the oldest member of households with incomes above 200 percent FPL where all enrollees selected a plan from either Kaiser Permanente or Sharp Health Plan. These were the two insurers that sold gold plans that dominated silver plan for all enrollees over 200 percent FPL in 2018. For individuals with duplicate information, we kept only their later enrollment information. We assumed that most families make enrollment decisions in concert with each other as Covered California encouraged families to enroll together. Therefore, we only analyzed households where all family members were enrolled in the same plan and one or more enrollees was over the age of 18 at the time of enrollment. We excluded enrollees for whom we did not have information regarding whether their coverage was automatically renewed. Finally, we excluded households that were not enrolled at the end of the prior year but had been enrolled at some time during that year.

Appendix Exhibit E: Sample inclusion flowchart for study population



Note: Sample size in the orange box represent those included in Exhibit 1 in the main text. Sample size in the green box represent those included in Exhibit 2 in the main text. Sample size in the purple box represent those included in Exhibits 3 and 4 in the main text.

Appendix Table D. Full logistic regression models and sensitivity analyses

	<u>2017 Model</u>	<u>Baseline model, 2018</u>	<u>Only includes those 251% FPL or higher</u>	<u>Only includes those 400% FPL or higher</u>	<u>Only Kaiser enrollees</u>
	Odds Ratio (OR)	OR	OR	OR	OR
Prior enrollment					
New enrollee	0.18***	0.12***	0.11***	0.14***	0.12***
Incumbent in non-silver plan from other insurer in prior year	0.05***	0.07***	0.06***	0.05***	0.07***
Incumbent in non-silver Kaiser or Sharp plan in prior year	0.05***	0.04***	0.04***	0.03***	0.04***
Incumbent in silver plan from other insurer in prior year	0.34***	0.28***	0.29***	0.35***	0.28***
Incumbent in silver Kaiser or Sharp plan in prior year	ref.	ref.	ref.	ref.	ref.
Customer assistance					
Unassisted	ref.	ref.	ref.	ref.	ref.
Used CEC, CEW, or SCR for assistance	2.05***	1.99***	1.81***	1.94***	1.96***
Used CIA or PBE for assistance	1.77***	1.78***	1.68***	1.84***	1.78***
Federal poverty level					
201-249% FPL	ref.	ref.	-	-	ref.
250-299% FPL	0.65***	0.66***	ref.	-	0.66***
300-399% FPL	0.55***	0.57***	0.87***	-	0.57***
400-599% FPL	0.45***	0.25***	0.38***	ref.	0.24***
600% FPL or more	0.45***	0.33***	0.51***	1.27*	0.33***
Gender					
Male	ref.	ref.	ref.	ref.	ref.
Female	1.17***	1.03	1.01	0.93	1.02
Age					
18-25	ref.	ref.	ref.	ref.	ref.
26-29	1.10**	1.03	1.05	1.15	1.04
30-39	1.22***	1.08	1.11	0.89	1.09
40-49	1.37***	1.27***	1.30**	1.14	1.30***

50-59	1.70***	1.56***	1.65***	0.79	1.59***
60+	2.00***	1.83***	2.09***	0.77	1.87***
Race/ethnicity					
White	ref.	ref.	ref.	ref.	ref.
Black	1.02	1.07	1.02	0.85	1.06
Latino	0.99	1.07*	1.13**	0.99	1.06
Asian	0.83***	1.09**	1.09	1.15	1.08*
Other	0.96	1.07	1.11	1.21	1.05
Non-respondent	0.94**	1.04	1.08	0.98	1.04
Preferred spoken language					
English	ref.	ref.	ref.	ref.	ref.
Spanish	0.96	0.93	1.08	0.92	0.94
Other	0.85***	1.07	1.02	0.82	1.08
Unknown	1.05	1.07	1.02	0.93	1.09
Number of family members enrolled in plan					
1	ref.	ref.	ref.	ref.	ref.
2	1.20***	1.03	1.01	0.99	1.02
3	1.44***	1.04	1.04	1.3	1.03
4 or more	1.42***	1	1.03	0.82	0.99
Rating region grouping					
Northern CA and Sacramento Valley	ref.	ref.	ref.	ref.	ref.
Greater Bay Area	0.99	1.45***	1.48***	1.15	1.45***
Central Coast	0.69***	1	1.07	0.64	1
Central Valley and Southern Desert	0.92*	1.26***	1.40***	1.22	1.27***
Los Angeles	0.74***	1.16***	1.19**	1.29	1.16***
Southern California	0.73***	0.90**	0.94	0.99	1.10*
N	104,480	107,599	65,998	12,269	101,988
ll	-56253.67	-32149.13	-16969.35	-1891.43	-31244.44
chi2	24676.9	19117.62	10103.13	713.64	18451.25
aic	112573.34	64364.25	34002.69	3842.85	62554.88
Source: Authors' analysis of Covered California enrollment data, 2017 and 2018.					
Notes: FPL = federal poverty level; CEC = certified enrollment counselor; CEW = county eligibility worker; SCR = service center representative; CIA = certified insurance agent; PBE = plan-based enroller					

CHAPTER 4: CALIFORNIA'S NEW GOLD RUSH: MARKETPLACE ENROLLEES SWITCH TO GOLD-TIER PLANS IN RESPONSE TO INSURANCE PREMIUM CHANGES

Introduction¹⁰

The Affordable Care Act (ACA) has drastically changed the individual health insurance market in the United States by creating new coverage requirements for health plans; creating an easier, more streamlined shopping experience through the federally facilitated and state-based marketplaces; and making individual market coverage more affordable through premium subsidies to about 85% of marketplace enrollees (Houchens, Clarkson, & Fohl, 2018). These changes have also put millions more consumers into direct contact with the complicated process of selecting a health insurance plan. Before the ACA, individual market enrollment had been decreasing, from nearly 17.0 million in 2008 to 15.6 million in 2012 (Kaiser Family Foundation, 2017). Under the ACA, the number of Americans enrolled in an individual market health plan has increased from about 16.3 million in 2013, just before the implementation of the law's major coverage provisions, to 20.5 million in 2017, with 12.2 million enrolled through marketplaces and the rest in off-exchange plans (Kaiser Family Foundation, 2017, 2020a).

Individual market enrollees can change their coverage during annual open enrollment periods. Consumers' decisions to make such changes may reflect dissatisfaction with their plan in the prior year; a change in their plan's provider network or costs; a change in the health plans available to them; or a change in personal circumstances, such as income, family structure, or health status.

¹⁰ A version of this chapter was published in *Health Affairs*: Rasmussen, P.W., Rice, T., & Kominski, G.F. (2019). California's New Gold Rush: Marketplace Enrollees Switch To Gold-Tier Plans In Response To Insurance Premium Changes. *Health Aff (Millwood)*, 38(11), 1902-1910. doi:10.1377/hlthaff.2019.00136

Shopping and switching coverage during open enrollment is an integral part of keeping insurance markets competitive. However, prior studies that examined enrollees in employer-sponsored insurance or Medicare Part D, which make up the bulk of the literature in this field, found that consumer responses to price changes can differ among subgroups. One study of people enrolled in employer-sponsored insurance in the early 2000s found that younger and healthier enrollees were 2-4 times more sensitive to premiums than their older or sicker counterparts were (Strombom et al., 2002). Another study of the individual market found that people who were likely to benefit from the more generous, community-rated ACA-compliant plans (such as women, older adults, and people with higher expected expenditures) were more likely to switch to such plans in 2014 (Gillen et al., 2017).

Other research has focused on identifying the role of key changes or “shocks” that may prompt people to change their health plan. In this work, researchers studied the effects of a noticeable premium increase, a substantial change to plan benefits, or unusually high out-of-pocket spending from a health event on the likelihood that Medicare Part D beneficiaries would switch plans. The researchers found that 87% of switchers had received some shock during the year of the switch (Ho et al., 2017). Furthermore, among those who had received no shock, only four percent switched plans—compared to 9-41% among those who had received one or more shocks.

Not only should shopping and switching coverage encourage a competitive marketplace, but it may also help the consumer save money. Other researchers found that Medicare Part D beneficiaries on average spent \$368 more in 2009 than they would have if they had chosen the cheapest plan available to them at that time (Zhou & Zhang, 2012).

Historically, both in the United States and in other high-income countries, once people select a health plan, those who stay in their same insurance type rarely switch plans during annual open enrollment periods (Hoadley et al., 2013; Rice, Snyder, Kominski, & Pourat, 2002; van Ginneken, Swartz, & Van

der Wees, 2013). Under the ACA, however, marketplace enrollees have shopped and switched at higher rates than had previously been seen in other markets, such as employer-sponsored insurance or Medicare Part D. During the 2016 open enrollment period, for example, 43% of Americans who used the federally facilitated marketplace to re-enroll in coverage switched plans (Assistant Secretary of Planning and Evaluation, 2016). This higher rate of switching in the individual market under the ACA may be in part due to the large number of plans most consumers have to choose between, high premium increases between years, and the learning curve that some individuals are encountering when buying coverage.

Under the ACA, insurers must provide cost-sharing reductions (CSRs) to qualified low-income marketplace enrollees, with the insurers' costs reimbursed by the federal government. In 2014 the Republican-controlled House of Representatives sued the administration of President Barack Obama for making these payments without the funding having been appropriated by Congress. After a federal court sided with the House, the Obama administration appealed the ruling, and after taking office the administration of President Donald Trump initially continued making monthly CSR payments to insurers. However, in October 2017, the Trump administration announced that it would cancel CSR reimbursements starting in 2018 and withdrew from the court case. In response, many states allowed insurers to raise premiums for silver-tier health plans to pay for the cost of providing CSRs, a practice known as "silver loading."¹¹ This made silver-plan premiums much higher in many states in 2018, with some increasing by as much as 34% (Kamal, Semanskee, Long, Claxton, & Levitt, 2017).

One consequence of silver loading is that it raised the premium subsidy amounts for many enrollees, allowing them to purchase coverage at the gold or even platinum levels in 2018 for less than in

¹¹ Plans sold through the health insurance marketplaces fall into different metal tiers with different actuarial values: platinum, with a 90 percent value; gold, 89 percent; silver, 70 percent; and bronze, 60 percent. Minimum coverage plans, also known as catastrophic plans, are also available to people younger than age thirty, although these plans are not eligible for the use of premium subsidies.

previous years. Unsubsidized enrollees, in contrast, faced the entire cost of the premiums for silver-loaded plans. Some of these enrollees likely decided to switch metal tiers or, in states where silver loading was included only in the premiums of marketplace plans, to purchase a silver plan in the off-exchange market. The change to the cost of silver plans for 2018 coverage alone likely increased switching rates, although the extent to which this occurred is unknown.

Research objectives

Overall, there is a lack of information about and research on consumer behavior when re-enrolling in ACA coverage, particularly in the state-based marketplaces. This study used a unique data set that is not publicly available to quantify switching rates in one prominent state-based marketplace during the second through the fifth open enrollment periods and to identify the health plan and choice environment characteristics associated with re-enrollees' decisions to make changes in their coverage—including the decision to switch to gold plans.

Study Data and Methods

In this study, we focused on Covered California, California's state-based marketplace, which is one of the most successful in the nation. Covered California is an active purchaser, setting standards, negotiating premiums with insurance companies, and using a competitive bidding process to decide which insurers can sell plans through it (Covered California, 2014b; Scheffler et al., 2016).

Health plans in Covered California are defined by combinations of issuer, product, and metal tier—with the product determining the network type (health maintenance, preferred provider, or exclusive provider organization), providers included in the network, and prescription drug formularies. While insurers can offer different products (for example, Blue Shield offers both preferred provider and health maintenance organization products), they must sell exactly one health plan at each metal tier for each product offered. This requirement minimizes redundancy among plans sold through the

marketplace, reduces the possibility of choice overload for consumers, and inhibits insurers from cherry-picking enrollees by selling only plans with lower actuarial values.

To facilitate comparison shopping, Covered California requires insurers to offer a standardized benefit design within each metal tier of coverage, meaning that all plans in the same tier have the same deductible, annual out-of-pocket spending maximums, and copayment or coinsurance levels. Standardizing policies to promote comparisons of similar products by price was a key aspect of Alain Enthoven's original theory of managed competition, which dates back to the 1970s (Enthoven, 1978). Covered California's plan standardization allows consumers to focus on comparing only premium levels, provider networks, and quality ratings of issuer-products in the same metal tier.

During the early years, Covered California enrollees switched insurers at lower rates than those in federally facilitated marketplaces did (Covered California, 2018a; DeLeire & Marks, 2015). The agency has pointed to lower than average premium increases and the design and regulation of the individual market in the state as possible reasons for the lower switching rates (Covered California, 2018b). For example, because issuers are restricted from selling more than one plan at each metal tier there are fewer plans to choose between on Covered California than in the federally facilitated marketplace. However, Covered California has not produced estimates of enrollee switching behavior beyond the 2016-17 open enrollment period when it released the percent of re-enrollees who switched issuers, or more detailed information on rates of switching issuer-products or metal tiers.

Data

We used individual-level enrollment data from Covered California for the period January 2014-May 2018. The full data set contains information on more than 3.5 million unique enrollees who moved in and out of the marketplace over time and includes demographic and other information about enrollees

(age, sex, race/ethnicity, preferred spoken language, income as a percentage of the federal poverty level, whether they received a premium subsidy, rating region, and ZIP code) and their enrollment experiences (whether they used consumer assistance during enrollment, the date when they selected their plan, and the dates their coverage began and ended). The data set also contains enrollee plan information, including insurance carrier, plan network type (health maintenance, preferred provider, or exclusive provider organization), metal tier, and net and gross premiums (net premiums represent the cost to enrollees after advanced premium tax credits). Deductibles, maximum out-of-pocket spending, and copayments or coinsurance are not included in the data, as these are standardized across metal tiers for all plans sold through Covered California.

Descriptive Analyses

In the descriptive analyses, we included all people who were enrolled in a plan at the end of one year and re-enrolled in coverage during open enrollment for the next plan year for Covered California's second through fifth open enrollment windows (2014-15, 2015-16, 2016-17, and 2017-18), with certain exclusions. A full description of the inclusion criteria for the descriptive analyses and demographic information for each year's sample is available in the appendix (Appendix Exhibit F and Appendix Table E).

Our main outcomes were dichotomous variables that indicated whether a person had made a specific type of change to their coverage between years. We examined three types of switching behavior. The first was a change in issuer-product only. Switches in issuer-products are indicative of an enrollee's dissatisfaction with their current plan's issuer, network, or cost. The second type of switch was a change in metal tier only (that is, within the same issuer-product). People who made this type of switch were likely satisfied with their issuer and network but felt the need for either more or less comprehensive coverage. The third type of switch was changes in both issuer-product and metal tier.

These three types of switches were added together to create a fourth measure: the overall change in coverage.

Regression Analyses

For the regression analyses, we made further restrictions, including limiting our sample to re-enrollees ages 18-64 in the 2016-17 and 2017-18 open enrollment periods. A full description of the enrollees included in the regression analyses and their demographic profiles are available in the appendix (Appendix Exhibit G and Appendix Tables F - H). We chose to compare the 2016-17 and 2017-18 open enrollment periods because they were the periods before and after the implementation of silver loading. We added rating region-specific premium levels for plans sold in 2016, 2017, and 2018 to the data to calculate the premium changes people would have faced between the first and second years examined (for example, 2016 and 2017 for 2016-17 open enrollment) if they stayed in their original plan, as well as the premiums for their same issuer-product at different metal tiers.

We conducted two sets of multiple logistic regression models. The main outcomes for the first set were dichotomous variables that indicated whether enrollees participated in each of the three types of switching behavior. The key individual-level predictors included the net premium change between years for their baseline plan selection (calculated at the family level), receipt of consumer assistance during open enrollment, the number of issuer-products they could choose among, and initial metal tier selection.

The outcome for the second set of regression analyses was a dichotomous variable indicating whether the consumer had switched into a gold plan. For these analyses, we looked only at people who were initially enrolled in a bronze or silver plan and who switched metal tiers during open enrollment. The key predictor for these models was the difference in net premiums that people faced between their chosen issuer-product at the gold level and their original health plan in the second year. For example,

in 2017-18, for someone who initially enrolled in a silver Kaiser health maintenance organization plan and re-enrolled in a different issuer-product at the gold level, we took the difference between the net premiums of their new gold plan and their original silver Kaiser plan at the 2018 level.

In all regression analyses we also controlled for whether a new issuer-product entered the market between years and for people's initial issuer-product selection, sex, age, race/ethnicity, receipt of a subsidy over two years, income as a percentage of the federal poverty level over two years, preferred spoken language, rating region groupings (Northern California and the Sacramento Valley, the Greater Bay Area, Central Coast, Central Valley and the Southern Desert, Los Angeles, and Southern California), number of years of continuous enrollment in Covered California, and number of family members enrolled in the marketplace.

We explored multilevel mixed-effects logistic models with enrollees nested in rating region groups, but the results were consistent with those of the simple logistic regression models. For ease of interpretation, we present only the logistic regression model results. We also calculated the average adjusted predicted probability of switching for the key predictors.

Sensitivity Analyses

We conducted several sensitivity analyses to estimate the robustness of our model. The full description of the sensitivity analyses and their results are available in appendix and Appendix Tables I – W.

Limitations

Our study had several limitations. First, it considered enrollee behavior in only one state. California is one of the most geographically and demographically diverse states in the nation and has made policy decisions surrounding its individual market that differ from those made by most other states. Therefore, the results of this study are not necessarily generalizable to other states. However, in 2018,

enrollees in Covered California accounted for 13% of all marketplace enrollees in the United States, making California an important state to study (Kaiser Family Foundation, 2020a).

Second, the data did not include information about plan use or consumers' health status, both of which likely play a role in a person's satisfaction with their plan and decision to consider changing their coverage (Ho et al., 2017; Strombom et al., 2002).

Third, one of the key predictors examined in this study was the change in net premiums. While we did include variables aimed at capturing the overall choice environment that enrollees faced, we were not able to explicitly model how the chosen plan's premium compared to premiums of other available plans. Due to the heterogeneity of the different rating regions' choice sets, there was no measure that could consistently capture relative pricing across the state. For subsidized consumers, the relative cost of plans was partially accounted for in their net premium, because premium subsidies are tied to the cost of the second lowest-cost silver plan.

Finally, while this study focused on the effect of changes to a person's existing plan's premium between years on re-enrollment, future research using conditional choice models could more adequately explore the role of relative cost in plan selection.

Study Results

Descriptive Analysis

Switching rates in Covered California have varied over time. While around four percent of re-enrollees switched their metal tier only during the 2014-15, 2015-16, and 2016-17 open enrollment periods, 7.2% made this change in 2017-18 (Exhibit 10). Similarly, the percentages of re-enrollees who changed both their issuer-product and metal tier hovered around two percent during the first three periods and

increased slightly to 3.1% in 2017-18. However, the percentage of re-enrollees who changed their issuer-product only has steadily increased over the years, reaching a high of 9.1% in 2017-18.

Among re-enrollees who changed at least their metal tier, their movement between metal tiers was similar during the first three open enrollment periods, with most people switching into silver or bronze plans and the fewest moving into catastrophic plans (Exhibit 11). During the 2017-18 open enrollment period, however, 36.7% of re-enrollees moved into gold plans, compared to 9.5-12.2% in previous periods. This change in movement between metal tiers coincided with the implementation of silver loading discussed above and provides evidence of a “gold rush” among re-enrollees. Furthermore, this suggests that consumers were feeling the effects of policy changes at the federal level and responding to these changes by shopping and switching their coverage.

Regression Analyses

Consumers should consider changes in premiums when evaluating their health insurance plans, both during their initial enrollment and annually during open enrollment. We examined whether this occurred by testing the association between re-enrollees’ net premium changes compared to their initial plan selection and their switching behavior in the 2016-17 and 2017-18 open enrollment periods. In both periods we found that the probability that a person would change any aspect of their health plan increased as their net premium change increased. The probability that enrollees facing a \$200 or more monthly premium increase would change some aspect of their coverage was 41.6% in 2017-18 and 28.4% in 2016-17, compared to only 10.6% and 6.8% , respectively, for those who saw a premium decrease or an increase of less than \$10 per month (Table 5). Among people who made any change to their coverage, 83.3% in 2016-17 and 76.4% in 2017-18 paid a lower net premium under their new plan than they would have if they had stayed in their previous coverage (data not shown).

We also examined the experience of consumers when enrolling, particularly whether they received consumer assistance and the number of plans from which they could choose. Enrollment assistance should aid consumers in comparing plans and understanding their options, which could lead to a greater likelihood of switching. Similarly, people with more plans to choose from might have a greater opportunity to find coverage that better fits their needs, leading to higher switching rates.

In both the 2016-17 and 2017-18 open enrollment periods, people who received assistance while shopping for coverage had a higher probability of switching issuer-products only than those who did not receive assistance, with all other factors in the model controlled for (10.7% vs. 4.9% in 2017-18 and 9.0% vs. 3.6% in 2016-17) (Table 5). The probability of enrollees changing their issuer-products only also increased as the number of issuer-products from which they could choose increased, from 4.2% for those with two issuer-products from which to choose to 9.1% for those with four or more issuer-products in 2017-18 and from 5.1% to 7.4% in 2016-17.

There were differences between 2016-17 and 2017-18 in the probability of switching by baseline metal tier. In 2016-17, before the implementation of silver loading, people initially in silver plans had a probability of switching their metal tier of only 2.6%, compared to 6.7% in 2017-18. Meanwhile, the probability of switching metal tiers decreased for those initially in gold or platinum plans, from 15.2% for gold and 12.2% for platinum in 2016-17 to 7.9% for gold and 7.8% for platinum in 2017-18.

The likelihood of switching into gold plans also changed substantially between 2016-17 and 2017-18. Overall, the probability that consumers initially in bronze or silver plans who switched metal tiers during open enrollment would switch to gold plans increased from 9.3% in 2016-17 to 38.9% in 2017-18 (Exhibit 12). This difference between years was largest among those who faced a gold net premium that was less than \$50 more than the net bronze or silver premium of their original issuer-product (14.7% in 2016-17 vs. 51.6% in 2017-18).

Sensitivity Analyses

Overall, the results from the sensitivity analyses were consistent with and similar to those reported from the main model. Regression results for the sensitivity analyses can be found in Appendix Tables I - W. Although there were some instances where regression coefficients in the sensitivity analyses were significantly different from those in the main analyses, the magnitude and direction of the coefficients were comparable.

Discussion

The overall percentage of re-enrollees who switched between plans in Covered California increased each year, with the largest percentage of enrollees switching coverage during the 2017-18 open enrollment period—when silver loading took effect. During the first two open re-enrollment periods (2014-15 and 2015-16), premium increases were quite low, and between 2014 and 2015 Covered California did not allow insurers to change their product offerings (Covered California, 2018b). However, premiums have grown over time; rate increases reached double digits in 2016-17; issuers have changed their products; and one of the newest insurers in the country, Oscar Health Plan, entered the market in 2016 (Covered California, 2017). These increases in premiums and changes to products may be among the reasons why we observed switching rates increase over time.

During the first three open re-enrollment periods, there was a consistent proportion of enrollees who switched their metal tier only or switched both metal tier and issuer-product. However, following the introduction of silver loading in 2018, there was an increase in the percentage of enrollees who changed their metal tier (from 4.5% in 2016-17 to 7.2% in 2017-18). Furthermore, when insurers included the cost of CSRs in their silver plan premiums in 2018, federal subsidy amounts became more generous, which led more enrollees to change their metal tier and more switchers to move into gold plans. In the 2017-18 open enrollment period, 40.9% of the consumers who were initially in silver

plans but switched their metal tier moved into gold plans, compared to 10-13% in earlier years (data not shown). Similarly, fewer enrollees initially in gold plans switched into silver plans in 2017-18 than was the case in previous years (51.6% compared to 80.8-82.5% in 2015-17), which suggests that enrollees responded to the changes to plan offerings and subsidy amounts brought on by silver loading.

The regression results also show that enrollees were responding to changes in the individual market by shopping and changing their coverage selections. Covered California enrollees who experienced a significant change in their premium had a higher probability of switching. These results support similar findings among federally facilitated marketplace enrollees in 2015-16 (ASPE, 2016). Furthermore, most Covered California enrollees (83% in 2016-17 and 76% in 2017-18) who chose to make changes to their individual market coverage moved into plans where they would spend less on premiums.

People who received enrollment assistance had a higher probability of making any type of switch than those who did not receive assistance. These enrollees may have been more motivated to compare available options, but they were also likely to receive valuable input from enrollment assisters to help them understand their options and select coverage that best fit their needs. Since its inception, Covered California has dedicated a significant portion of its budget for outreach and marketing efforts. For 2017-18, the agency budgeted \$33.5 million to cover the costs of enrollment assistance. This funding allows Covered California to partner with more than 15,000 certified insurance agents, 5,000 certified enrollers, and 300 community outreach network partners to provide enrollment assistance to consumers (Lee, Pegany, Scullary, & Stevens, 2017). By contrast, funding for outreach and enrollment assistance at the federal level has drastically decreased over recent years. The federal budget for enrollment navigators for the thirty-nine states with federally facilitated marketplaces was cut from \$62.5 million in 2016 to \$10.0 million in 2018 (Galewitz, 2018). Without adequate funding, consumers

may not be getting useful information and support to help them in their enrollment decision-making process.

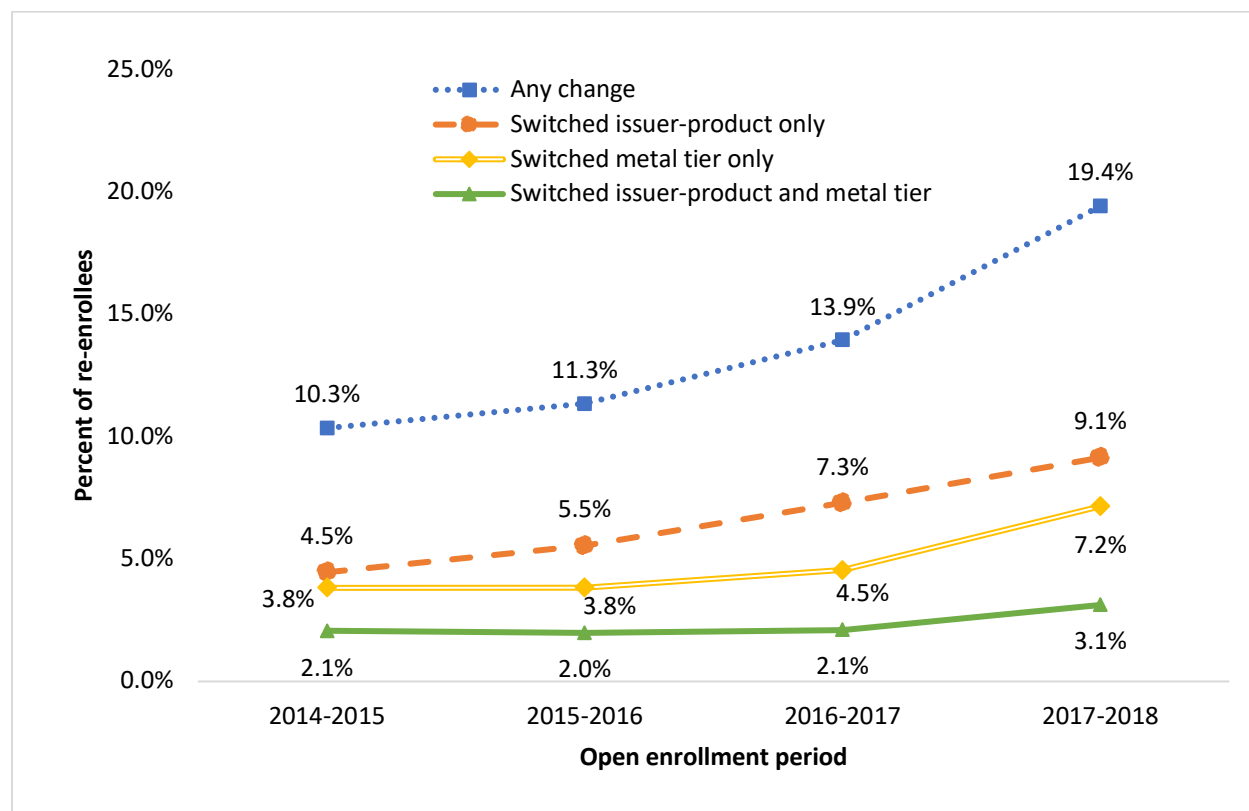
Finally, there were some differences in consumer behavior between the 2016-17 and 2017-18 open enrollment periods, following the implementation of silver loading. Compared to 2016-17, people initially enrolled in silver or bronze plans were more responsive to the availability of cheaper gold plans in 2017-18 and made the decision to move into more comprehensive coverage at the gold level at higher rates. While Covered California released data on the new enrollees who selected gold plans at higher rates in 2017-18, our analysis showed that incumbent enrollees also took advantage of the larger subsidies and lower comparative prices of gold plans, and many enrolled in more comprehensive coverage (Covered California, 2018c).

Conclusion

Our study provides evidence that enrollees in Covered California are sensitive to plan and market changes and respond by shopping and switching plans. Policy changes at the federal level (such as the cancellation of federal funding for CSRs) and subsequent state-level actions (such as silver loading) trickle down to the enrollees and can lead to substantial shifts in enrollment decisions. Covered California's switching rates have been lower than those in the federally facilitated marketplaces largely because there are far fewer choices as a result of policy standardization requirements. Nevertheless, the rates have steadily increased and in recent years have been higher than previously seen in employer-sponsored insurance and Medicare Part D. If these trends continue, we can expect to see many enrollees taking advantage of the opportunity to change plans for 2019 and beyond.

CHAPTER 4: EXHIBITS AND TABLES

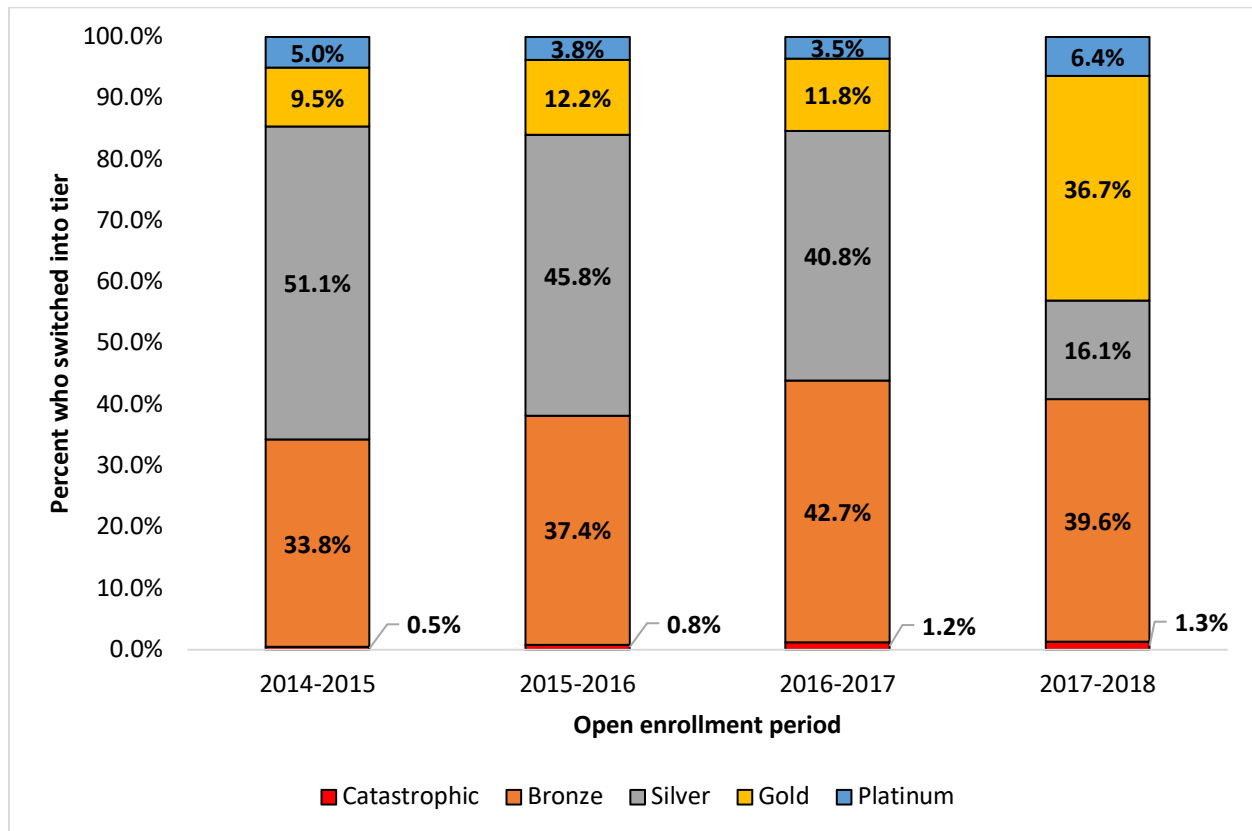
Exhibit 10. Percent of Covered California re-enrollees who made changes to their coverage during open enrollment, 2014-18



Source: Authors' analysis of Covered California enrollment data, 2014-18.

Notes: The percentages represent the ratio of the number of re-enrollees who made a change to their coverage to the total number of people who reenrolled in coverage during open enrollment. Participation in open enrollment periods was based on when enrollees selected their plan for the coming year. Coverage plan selection dates were identified in the data by the week number (1–52) in which the enrollee selected their plan. Plan selection dates for each open enrollment period were as follows: for 2014–15, before week 10 of 2015; 2015–16, before week 7 of 2016; 2016–17, before week 6 of 2017; and 2017–18, before week 6 of 2018.

Exhibit 11. Metal tier changes made by re-enrollees switching metal tier during open enrollment, 2014-18



Source: Authors' analysis of Covered California enrollment data, 2014-18.

Notes: Participation in open enrollment periods and coverage plan selection dates are explained in the notes to exhibit 1.

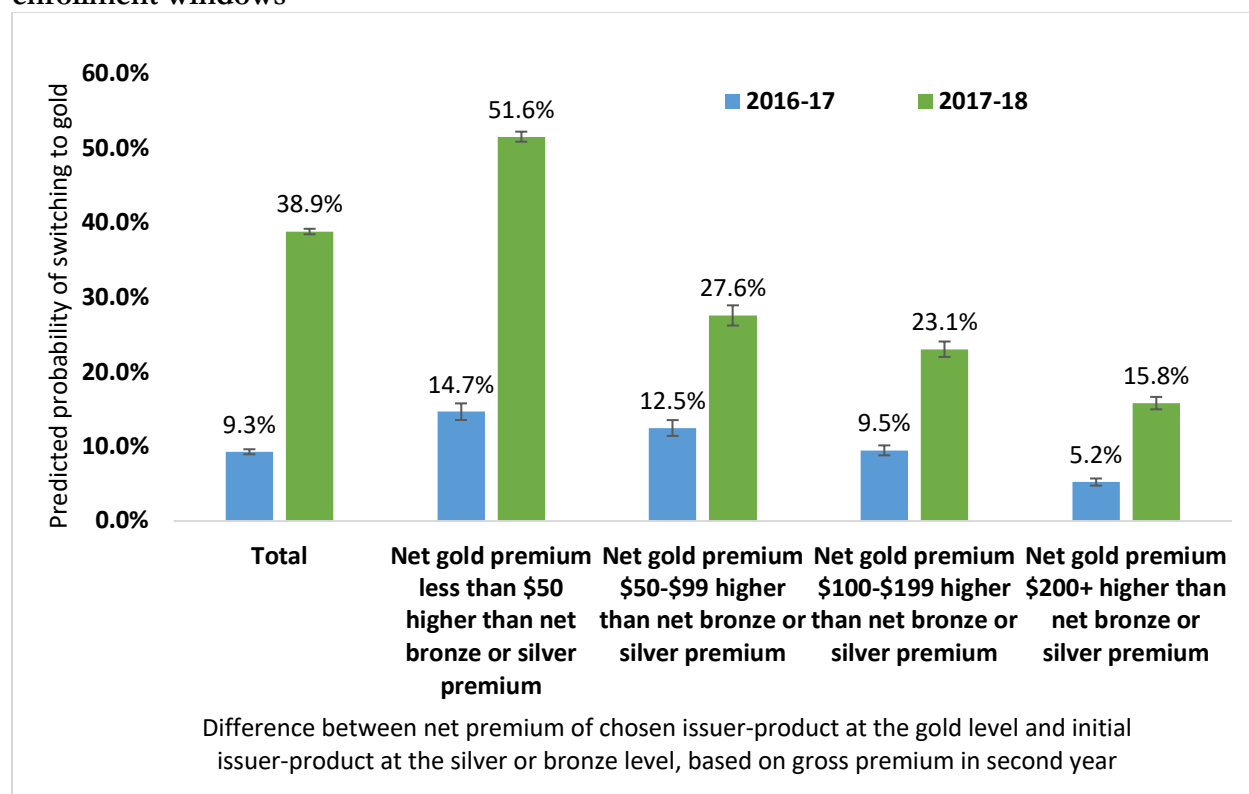
Table 5. Adjusted switching rates in Covered California during 2016-17 and 2017-18 open enrollment windows, among re-enrollees ages 18-64

	Any change		Switched issuer-product <u>only</u>		Switched metal tier <u>only</u>		Switched issuer-product <u>and</u> metal tier	
	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18	2016-17	2017-18
Total	13.6%	17.8%	7.4%	9.0%	4.3%	6.1%	1.9%	2.7%
Net premium change of initial plan selection								
Premium increased by less than \$10	6.8%	10.6%	2.9%	4.4%	2.7%	4.1%	1.1%	1.8%
\$10 - <\$50 increase	9.6%	14.1%	5.2%	8.5%	2.7%	3.9%	1.2%	1.5%
\$50 - <\$100 increase	15.7%	22.2%	8.5%	12.6%	4.7%	6.9%	2.0%	2.5%
\$100 - <\$200 increase	21.8%	31.3%	11.6%	15.9%	7.2%	10.1%	2.7%	4.4%
\$200 increase or more	28.4%	41.6%	14.2%	16.2%	10.2%	16.8%	4.4%	6.7%
Consumer assistance								
Unassisted	8.0%	12.1%	3.6%	4.9%	2.8%	4.6%	1.5%	2.1%
Received assistance	17.0%	21.4%	9.0%	10.7%	5.6%	7.5%	2.2%	3.0%
Number of issuer-products to choose between								
2	11.1%	10.8%	5.1%	4.2%	4.7%	7.3%	2.0%	1.0%
3	17.4%	18.9%	8.2%	11.9%	4.8%	5.4%	3.8%	3.7%
4+	13.4%	18.1%	7.4%	9.1%	4.2%	6.1%	1.9%	2.7%
Metal tier of initial issuer-product selection								
Catastrophic	38.6%	31.7%	13.5%	13.9%	15.3%	11.5%	5.2%	7.4%
Bronze	18.4%	14.7%	11.3%	7.9%	4.1%	3.7%	3.9%	4.6%
Silver	11.7%	18.7%	7.4%	9.5%	2.6%	6.7%	1.5%	2.2%
Gold	20.7%	17.6%	2.2%	5.9%	15.2%	7.9%	2.5%	3.0%
Platinum	19.5%	16.5%	1.9%	3.3%	12.2%	7.8%	2.1%	2.4%

Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.

Notes: The predicted probabilities were calculated after adjusting for all other factors in the model, including initial issuer-product selection, new issuer-product available in the market, sex, age, income as a percentage of the federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and family size.

Exhibit 12. Predicted probability of switching to a gold plan for those initially in bronze or silver plans, among those who switched metal tiers during the 2016-17 and 2017-18 open enrollment windows



Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.

Notes: The predicted probabilities were calculated after adjusting for all other factors in the model, including initial issuer-product selection, initial metal tier, number of issuer-products to choose from, receipt of consumer assistance, new issuer-product available in the market, sex, age, income as a percentage of the federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and family size. The premium differences were based on the gross premium in the second year of the enrollment period. The error bars indicate 95% confidence intervals.

CHAPTER 4: APPENDIX

Sample descriptions

Descriptive analyses

In the descriptive analyses, we included all individuals who were enrolled in a plan at the end of one year and re-enrolled in coverage during open enrollment for the next plan year for Covered California's second through fifth open enrollment windows (2014-15, 2015-16, 2016-17, and 2017-18). We excluded individuals enrolled in issuer-products that were cancelled or not available in their rating region in the second year (excluded 171,349 re-enrollees in 2017-18, 166,584 in 2016-17, 81,641 in 2015-16, and 13,025 in 2014-15) (Appendix Exhibit F). By excluding those whose issuer-products were no longer available, we were able to focus on those individuals who had a choice either to remain in their issuer-product or to switch issuer-products during open enrollment, rather than those who may have been defaulted into a new issuer-product following a cancellation. This allowed us to examine the potential motivations behind a consumer's active decision to switch coverage. We also excluded enrollees who moved rating regions between years or who had a zip code that did not fall into their stated rating region. This gave us a sample of 741,422 re-enrollees in 2014-15, 815,101 re-enrollees in 2015-16, 828,168 re-enrollees in 2016-17, and 878,205 re-enrollees in 2017-18.

Regression analyses

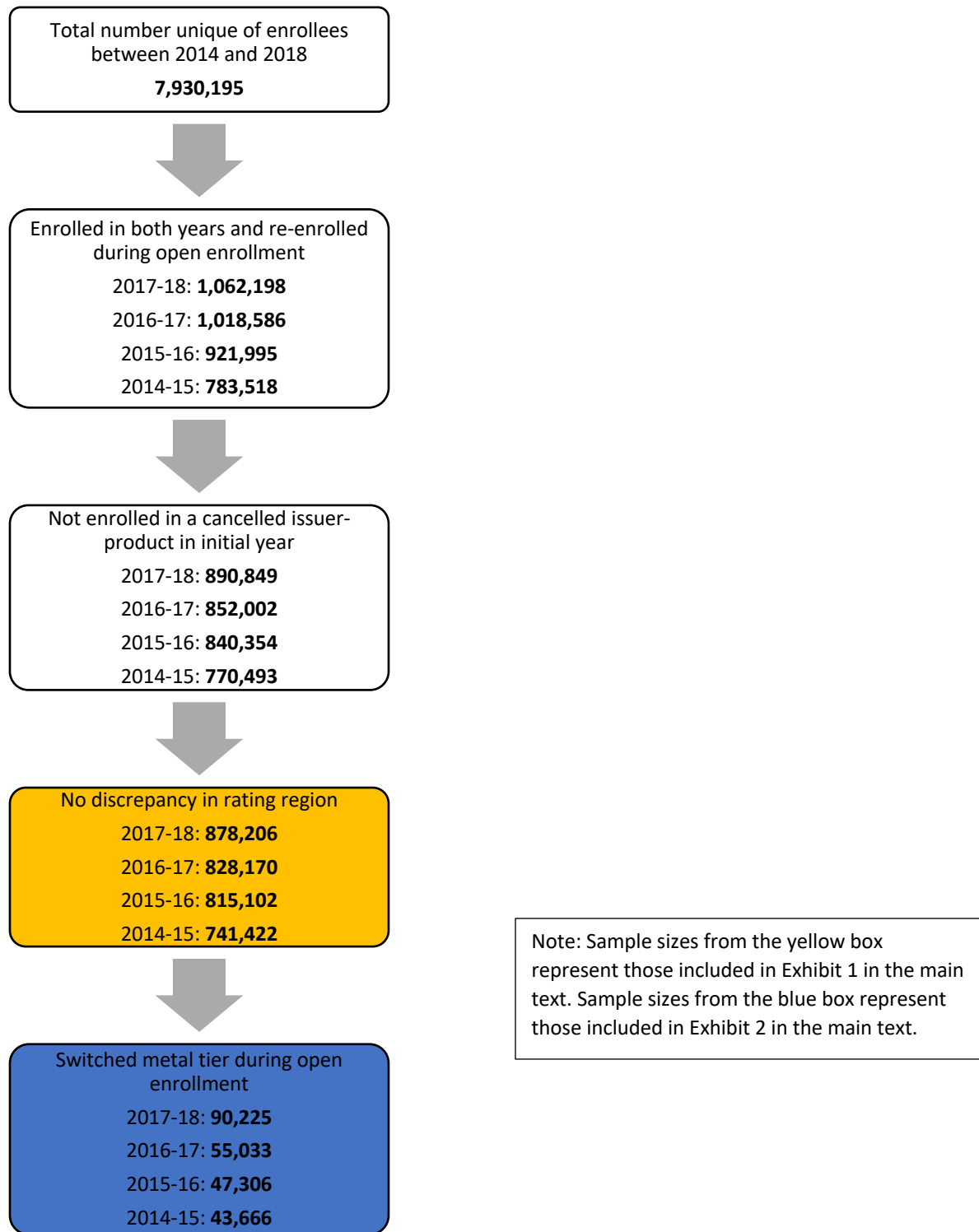
For the regression analyses, we further restricted our sample to re-enrollees ages 18 to 64 years old from the 2016-17 and 2017-18 open enrollment periods for whom the number of family members enrolled in the marketplace did not change between years and whose calculated family level premium using the available pricing data from Covered California's website did not vary greatly from the family level premium provided in the original data set. We then applied the same exclusions to this population as the descriptive analyses (Appendix Exhibit G).

To maintain consistency between years (2016-17 and 2017-18) we only included those originally enrolled in issuer-products available in both 2016 and 2017. This excluded individuals enrolled in Anthem coverage in 2016 and Blue Shield HMO plans in 2017. We also excluded those who had only 1 issuer-product available to them in 2017-18 as this was not a possibility in 2016-17 where 100% of the state had at least two issuer-products available in their market. This provided our final sample for the regression analyses examining the various types of switches enrollees could undertake during open enrollment (2016-17 n=631,436; 2017-18 n=704,143).

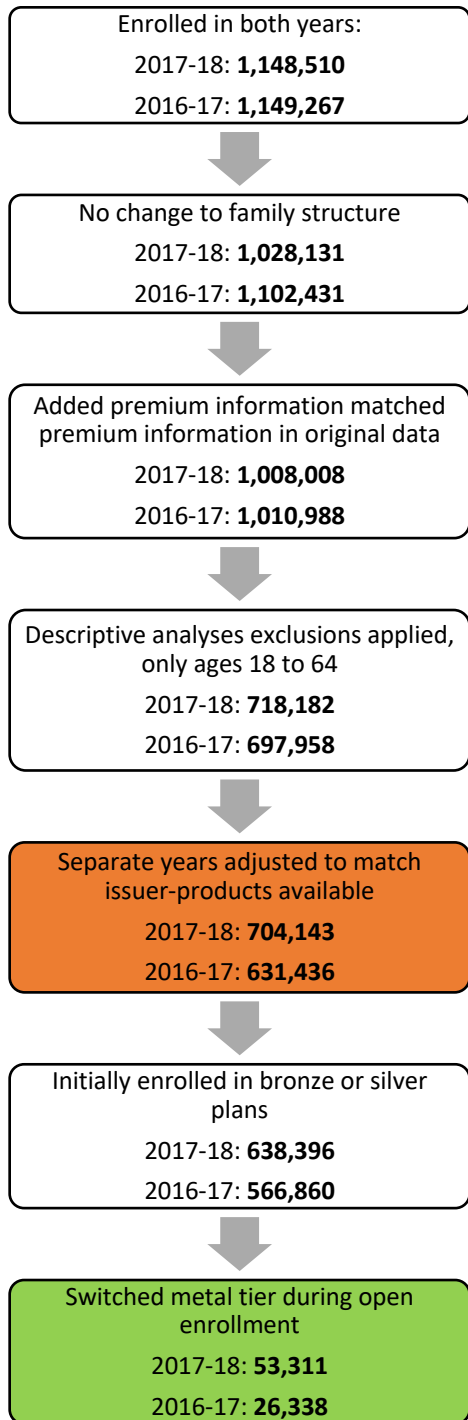
For the regression analyses examining enrollees' movement to gold plans we required further inclusion criteria. Enrollees had to be originally enrolled in bronze or silver plans in the baseline year (2016 or 2017) and had to have changed metal tiers for coverage in the second year (2017 or 2018). Our final sample sizes for these analyses were 26,338 in 2016-17 and 53,311 in 2017-18.

We were not able to include years before 2016-17 in the regression analyses because of the lack of availability in the detailed information on plan costs and issuer-product offerings at the zip code level. These data were only publicly available for plans starting in 2017 and were necessary for the creation of our main predictor variables. Finally, originally changes to issuer-product quality ratings were included in the model; however, this variable was dropped due to collinearity with issuer-product.

Appendix Exhibit F - Flowchart of sample exclusions for descriptive analyses



Appendix Exhibit G - Flowchart of sample exclusions for regression analyses



Note: Sample sizes from the orange box represent those included in Exhibit 3 in the main text. Sample sizes from the green box represent those included in Exhibit 4 in the main text.

Appendix Table E. Demographic characteristics of re-enrollees included in descriptive analyses, 2014-18

	2014-15		2015-16		2016-17		2017-18	
	n	%	n	%	n	%	n	%
Total	741,422	100%	815,102	100%	828,170	100%	878,206	100%
Gender								
Male	351,403	47.40	391,429	48.02	397,488	48	418,668	47.67
Female	390,019	52.60	423,673	51.98	430,681	52	459,538	52.33
Age								
Under 30	154,521	20.84	171,392	21.03	180,776	21.83	195,999	22.32
30-39	102,381	13.81	112,262	13.77	117,755	14.22	129,893	14.79
40-49	144,936	19.55	152,869	18.75	149,477	18.05	153,651	17.5
50-64	339,581	45.8	378,577	46.45	380,161	45.9	398,662	45.4
Race/ethnicity								
White	241,102	32.52	252,894	31.03	241,693	29.18	247,521	28.18
Black	12,170	1.64	11,944	1.47	12,844	1.55	13,622	1.55
Latino	155,681	21.00	174,007	21.35	183,356	22.14	186,283	21.21
Asian	142,913	19.28	148,066	18.17	148,117	17.88	167,861	19.11
Other	43,713	5.90	46,899	5.75	47,805	5.77	53,404	6.08
Non-respondent	145,843	19.67	181,292	22.24	194,355	23.47	209,515	23.86
Preferred spoken language								
English	551,250	74.35	603,993	74.1	607,716	73.38	643,160	73.24
Spanish	88,309	11.91	101,074	12.4	106,289	12.83	107,386	12.23
Other	61,778	8.33	63,158	7.75	64,139	7.74	75,795	8.63
Unknown	40,085	5.41	46,877	5.75	50,026	6.04	51,865	5.91
Federal poverty level over two years								
Under 200% FPL	278,031	37.5	423,216	51.92	436,586	52.72	436,715	49.73
200-249% FPL	65,926	8.89	101,494	12.45	100,518	12.14	93,950	10.7
250-299% FPL	44,378	5.99	71,706	8.8	73,797	8.91	68,601	7.81
300-399% FPL	46,602	6.29	76,457	9.38	76,300	9.21	76,753	8.74
400% FPL or more	10,850	1.46	21,163	2.6	24,783	2.99	28,613	3.26
FPL increased category	31,705	4.28	61,582	7.56	70,038	8.46	87,780	10
FPL decreased category	32,955	4.44	59,445	7.29	45,881	5.54	74,960	8.54
FPL unavailable	230,975	31.15	39	0.00	267	0.03	10,834	1.23
Subsidy eligibility over two years								
Subsidized both years	655,690	88.44	713,226	87.5	695,075	83.93	735,383	83.74
Unsubsidized both years	60,975	8.22	70,194	8.61	94,399	11.4	100,293	11.42
Change from subs. to unsubs.	20,362	2.75	19,302	2.37	25,231	3.05	18,620	2.12
Change from unsubs. to subs.	4,256	0.57	12,331	1.51	13,465	1.63	23,910	2.72

Missing subsidy info.	139	0.02	49	0.01		0.00		0.00
Customer assistance								
Unassisted	327,416	44.16	329,872	40.47	339,433	40.99	344,517	39.23
Received assistance	414,006	55.84	485,230	59.53	488,737	59.01	533,689	60.77
Metal tier (baseline)								
Catastrophic	3,049	0.41	4,030	0.49	4,495	0.54	6,594	0.75
Bronze	162,278	21.89	192,968	23.67	176,539	21.32	204,420	23.28
Silver	488,240	65.85	533,741	65.48	565,661	68.3	585,035	66.62
Gold	46,300	6.24	44,896	5.51	46,178	5.58	50,173	5.71
Platinum	41,555	5.60	39,466	4.84	35,297	4.26	31,984	3.64
Metal tier (after re-enrolling)								
Catastrophic	2,742	0.37	3,798	0.47	4,394	0.53	6,561	0.75
Bronze	164,683	22.21	197,759	24.26	188,176	22.72	224,637	25.58
Silver	494,125	66.65	536,510	65.82	562,370	67.91	537,829	61.24
Gold	41,951	5.66	42,873	5.26	42,642	5.15	76,399	8.70
Platinum	37,918	5.11	34,113	4.19	30,588	3.69	32,780	3.73
Source: Authors' analysis of Covered California enrollment data, 2014-18.								

Appendix Table F. Demographic characteristics of regression analysis sample, 2016-2017

	Total		Any change		Switched issuer-product <u>only</u>		Switched metal tier <u>only</u>		Switched issuer-product <u>and</u> metal tier	
	n	%	n	%	n	%	n	%	n	%
Total	631,436	100%	85,667	100%	46,461	100%	26,994	100%	12,212	100%
Gender										
Male	300,098	47.53	39,782	46.44	21,402	46.06	12,516	46.37	5,864	48.02
Female	331,338	52.47	45,885	53.56	25,059	53.94	14,478	53.63	6,348	51.98
Age										
18-29	107,678	17.05	13,451	15.70	6,741	14.51	4,515	16.73	2,195	17.97
30-39	100,174	15.86	12,679	14.80	5,378	11.58	5,093	18.87	2,208	18.08
40-49	122,124	19.34	16,479	19.24	8,889	19.13	5,177	19.18	2,413	19.76
50-64	301,460	47.74	43,058	50.26	25,453	54.78	12,209	45.23	5,396	44.19
Race/ethnicity										
White	186,099	29.47	22,650	26.44	8,931	19.22	9,957	36.89	3,762	30.81
Black	10,687	1.69	1,089	1.27	483	1.04	437	1.62	169	1.38
Latino	137,290	21.74	18,506	21.60	10,644	22.91	5,326	19.73	2,536	20.77
Asian	116,494	18.45	20,484	23.91	13,392	28.82	4,387	16.25	2,705	22.15
Other	35,014	5.55	4,557	5.32	2,335	5.03	1,619	6	603	4.94
Non-respondent	145,852	23.10	18,381	21.46	10,676	22.98	5,268	19.52	2,437	19.96
Preferred spoken language										
English	467,989	74.12	58,216	67.96	27,354	58.88	21,766	80.63	9,096	74.48
Spanish	80,193	12.70	12,044	14.06	8,098	17.43	2,641	9.78	1,305	10.69
Other	52,750	8.35	10,903	12.73	7,982	17.18	1,583	5.86	1,338	10.96
Unknown	30,504	4.83	4,504	5.26	3,027	6.52	1,004	3.72	473	3.87
Federal poverty level over two years										
Under 200% FPL	352,456	55.82	41,973	49	29,219	62.89	8,779	32.52	3,975	32.55
200-249% FPL	81,994	12.99	9,064	10.58	4,580	9.86	3,044	11.28	1,440	11.79
250-299% FPL	49,219	7.79	5,257	6.14	2,199	4.73	2,128	7.88	930	7.62
300-399% FPL	49,774	7.88	5,559	6.49	2,180	4.69	2,391	8.86	988	8.09
400% FPL or more	17,510	2.77	2,208	2.58	603	1.3	1,170	4.33	435	3.56
FPL increased	47,527	7.53	13,807	16.12	5,053	10.88	5,566	20.62	3,188	26.11
FPL decreased	32,956	5.22	7,799	9.1	2,627	5.65	3,916	14.51	1,256	10.28
Subsidy eligibility over two years										
Subsidized both years	540,043	85.53	72,087	84.15	43,066	92.69	19,583	72.55	9,438	77.28
Unsubsidized both years	65,413	10.36	8,448	9.86	2,138	4.6	4,732	17.53	1,578	12.92
Change from subs. to unsub.	16,771	2.66	2,960	3.46	686	1.48	1,480	5.48	794	6.5

Change from unsub. to subs.	9,209	1.46	2,172	2.54	571	1.23	1,199	4.44	402	3.29
Customer assistance										
Unassisted	264,428	41.88	19,047	22.23	6,618	14.24	8,737	32.37	3,692	30.23
Received assistance	367,008	58.12	66,620	77.77	39,843	85.76	18,257	67.63	8,520	69.77
Number of family members enrolled in marketplace										
1	320,635	50.78	38,762	45.25	18,498	39.81	14,043	52.02	6,221	50.94
2	211,896	33.56	32,387	37.81	19,774	42.56	8,494	31.47	4,119	33.73
3	59,673	9.45	9,021	10.53	5,737	12.35	2,288	8.48	996	8.16
4+	39,232	6.21	5,497	6.42	2,452	5.28	2,169	8.04	876	7.17
Source: Authors' analysis of Covered California enrollment data, 2016-17.										

Appendix Table G. Demographic characteristics of regression analysis sample, 2017-2018

	Total		Any change		Switched issuer-product <u>only</u>		Switched metal tier <u>only</u>		Switched issuer-product <u>and</u> metal tier	
	n	%	n	%	n	%	n	%	n	%
Total	704,143	100%	25,148	100%	63,449	100%	42,908	100%	18,791	100%
Gender										
Male	334,773	47.54	57,508	45.95	29,108	45.88	19,502	45.45	8,898	47.35
Female	369,370	52.46	67,640	54.05	34,341	54.12	23,406	54.55	9,893	52.65
Age										
18-29	121,101	17.20	20,052	16.02	9,327	14.70	7,248	16.89	3,477	18.5
30-39	115,963	16.47	19,804	15.82	7,956	12.54	8,318	19.39	3,530	18.79
40-49	131,687	18.70	23,448	18.74	11,894	18.75	7,956	18.54	3,598	19.15
50-64	335,392	47.63	61,844	49.42	34,272	54.02	19,386	45.18	8,186	43.56
Race/ethnicity										
White	200,557	28.48	31,184	24.92	10,507	16.56	15,603	36.36	5,074	27
Black	11,756	1.67	1,797	1.44	802	1.26	721	1.68	274	1.46
Latino	150,248	21.34	32,123	25.67	19,653	30.97	8,038	18.73	4,432	23.59
Asian	132,891	18.87	26,117	20.87	14,814	23.35	7,194	16.77	4,109	21.87
Other	40,664	5.77	6,829	5.46	2,989	4.71	2,795	6.51	1,045	5.56
Non-respondent	168,027	23.86	27,098	21.65	14,684	23.14	8,557	19.94	3,857	20.53
Preferred spoken language										
English	521,370	74.04	82,634	66.03	34,485	54.35	34,846	81.21	13,303	70.79
Spanish	87,960	12.49	22,811	18.23	16,276	25.65	3,936	9.17	2,599	13.83
Other	61,236	8.70	13,467	10.76	8,957	14.12	2,445	5.7	2,065	10.99
Unknown	33,577	4.77	6,236	4.98	3,731	5.88	1,681	3.92	824	4.39
Federal poverty level over two years										
Under 200% FPL	376,784	53.51	57,804	46.19	40,622	64.02	11,450	26.69	5,732	30.5
200-249% FPL	82,483	11.71	12,412	9.92	5,609	8.84	4,662	10.87	2,141	11.39
250-299% FPL	48,570	6.9	6,808	5.44	2,511	3.96	3,095	7.21	1,202	6.4
300-399% FPL	53,507	7.6	7,474	5.97	2,317	3.65	3,907	9.11	1,250	6.65
400% FPL or more	20,878	2.97	3,654	2.92	870	1.37	2,000	4.66	784	4.17
FPL increased category	61,579	8.75	23,862	19.07	6,848	10.79	11,954	27.86	5,060	26.93
FPL decreased category	60,342	8.57	13,134	10.49	4,672	7.36	5,840	13.61	2,622	13.95
Subsidy eligibility over two years										
Subsidized both years	604,925	85.91	105,771	84.52	58,904	92.84	32,310	75.30	14,557	77.47
Unsubsidized both years	70,470	10.01	12,047	9.63	2,880	4.54	6,701	15.62	2,466	13.12

Change from subsidized to unsubsidized	12,761	1.81	3,110	2.49	502	0.79	1,801	4.20	807	4.29
Change from unsubsidized to subsidized	15,987	2.27	4,220	3.37	1,163	1.83	2,096	4.88	961	5.11
Customer assistance										
Unassisted	283,925	40.32	29,556	23.62	8,427	13.28	15,709	36.61	5,420	28.84
Received assistance	420,218	59.68	95,592	76.38	55,022	86.72	27,199	63.39	13,371	71.16
Number of family members enrolled in marketplace										
1	362,817	51.53	58,331	46.61	27,269	42.98	21,625	50.4	9,437	50.22
2	233,857	33.21	46,943	37.51	26,706	42.09	13,696	31.92	6,541	34.81
3	64,325	9.14	12,441	9.94	6,811	10.73	4,007	9.34	1,623	8.64
4+	43,144	6.13	7,433	5.94	2,663	4.20	3,580	8.34	1,190	6.33
Source: Authors' analysis of Covered California enrollment data, 2017-18.										

Appendix Table H. Demographic characteristics of switching to Gold regression analysis sample, 2016-2017 and 2017-18

	2016-17				2017-18			
	Total		Switched to Gold		Total		Switched to Gold	
	n	%	n	%	n	%	n	%
Total	26,716	100%	2,460	100%	53,311	100%	20,735	100%
Gender								
Male	12,471	46.68	1,141	46.38	24,485	45.93	9,253	44.63
Female	14,245	53.32	1,319	53.62	28,826	54.07	11,482	55.37
Age								
18-29	4,736	17.73	410	16.67	8,997	16.88	2,954	14.25
30-39	4,730	17.7	551	22.4	9,688	18.17	3,544	17.09
40-49	5,066	18.96	539	21.91	9,980	18.72	3,805	18.35
50-64	12,184	45.61	960	39.02	24,646	46.23	10,432	50.31
Race/ethnicity								
White	8,536	31.95	931	37.85	17,339	32.52	7,209	34.77
Black	420	1.57	39	1.59	878	1.65	388	1.87
Latino	5,486	20.53	512	20.81	10,876	20.4	4,207	20.29
Asian	5,483	20.52	330	13.41	10,135	19.01	3,508	16.92
Other	1,451	5.43	156	6.34	3,284	6.16	1,321	6.37
Non-respondent	5,340	19.99	492	20	10,799	20.26	4,102	19.78
Preferred spoken language								
English	20,381	76.29	2,061	83.78	40,977	76.86	16,636	80.23
Spanish	2,785	10.42	228	9.27	5,875	11.02	2,152	10.38
Other	2,538	9.5	71	2.89	4,266	8	1,090	5.26
Unknown	1,012	3.79	100	4.07	2,193	4.11	857	4.13
Federal poverty level over two years								
Under 200% FPL	8,654	32.39	456	18.54	14,442	27.09	3,563	17.18
200-249% FPL	3,071	11.49	342	13.9	6,133	11.5	3,313	15.98
250-299% FPL	1,921	7.19	298	12.11	3,695	6.93	2,041	9.84
300-399% FPL	2,107	7.89	261	10.61	4,461	8.37	2,372	11.44
400% FPL or more	845	3.16	102	4.15	2,080	3.9	632	3.05
FPL increased category	6,941	25.98	652	26.5	15,642	29.34	6,166	29.74
FPL decreased category	3,177	11.89	349	14.19	6,858	12.86	2,648	12.77
Subsidy eligibility over two years								
Subsidized both years	21,119	79.05	1,763	71.67	42,499	79.72	17,497	84.38
Unsubsidized both years	2,976	11.14	385	15.65	6,485	12.16	1,821	8.78
Change from subsidized to unsubsidized	1,702	6.37	170	6.91	2,257	4.23	515	2.48

Change from unsubsidized to subsidized	919	3.44	142	5.77	2,070	3.88	902	4.35
Customer assistance								
Unassisted	8,448	31.62	947	38.5	17,731	33.26	7,211	34.78
Received assistance	18,268	68.38	1,513	61.5	35,580	66.74	13,524	65.22
Number of family members enrolled in marketplace								
1	13,757	51.49	1,192	48.46	26,304	49.34	9,450	45.58
2	9,034	33.81	782	31.79	18,249	34.23	7,636	36.83
3	2,174	8.14	225	9.15	4,877	9.15	2,097	10.11
4+	1,751	6.55	261	10.61	3,881	7.28	1,552	7.48
Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.								

Sensitivity Analyses

We conducted several sensitivity analyses to test the robustness of our model. First, we reduced our sample to only include single enrollees. For most family enrollees, premiums and advanced premium tax credits were aggregated at the family level. We therefore calculated net premium change for these enrollees at the family level, meaning that everyone in the family would need to stay in the same plan to see the expected net premium change to their original plan. By including single enrollees only, there is a one-to-one match on enrollee plan selection and net premium change. Second, we re-ran the analyses excluding individuals originally enrolled in two issuer-products, Molina HMO and Western HMO. While the switching rates for other issuer-products were fairly consistent across years, these plans saw drastically higher switching rates in 2017-18 compared to the previous three open enrollment periods. Excluding these issuer-products in the sensitivity analysis allowed us to see how much they were influencing the results. Another sensitivity analysis excluded individuals with Catastrophic coverage as only those below age 30 are eligible for this type of coverage and premium subsidies cannot be used to help pay for Catastrophic plans. Fourth, we conducted a stratified analysis by rating regions to see if there were certain regions driving the main results.

Finally, the dataset did not include enough geographic detail to accurately determine all individual choice sets. While an individual's choice set is determined by their zip code and rating region, due to privacy restrictions, the data only included rating region and the first three digits of an individual's zip code. Some rating region/three-digit zip code combinations allowed for more than one possible choice set of issuer-products. We developed assumptions about the choices available to those whose provided information was not enough to be certain about their choice set. As certain key predictors are calculated based on knowing the issuer-products an individual had to choose between (number of

choices, new issuer-product available in market), we re-ran the regression analyses to only include those whose choice sets were identified with 100 percent accuracy.

Appendix Tables I – W show the results of the various sensitivity analyses. Appendix Tables I – L and W show the odds ratios for the key predictors included in the models looking at single enrollees only, the models excluding Molina and Western issuer-product, and the models excluding enrollees with Catastrophic coverage. The results of the sensitivity analyses looking at enrollees whose choice sets we can identify with 100 percent certainty are available in Appendix Tables U, V, and W.

For the analyses stratified by rating region we looked at Northern California and the Sacramento Valley (rating regions 1 and 3), the Greater Bay Area (rating regions 2, 4, 5, 6, 7, 8), the Central Coast (rating regions 9 and 12), the Central Valley and Southern Desert (rating regions 10, 11, 13, and 14), Los Angeles county (rating regions 15 and 16), and other Southern California counties (rating regions 17, 18, and 19) separately. The results for these models are shown in Appendix Tables M – T and W. Across the sensitivity analyses the results were consistent with the main models' results for the key predictors. However, the inconsistency in the significance of the variable indicating whether a new issuer-product had entered the market led us to remove this from our list of key predictors while still keeping it as a control variable in our models.

Identifying choice sets

Because the data only included the first three digits of an individual's zip code rather than their full five-digit zip code, in some instances the set of issuer-products available to an enrollee could not be determined with 100 percent certainty. For the main regression analysis, individuals whose choice sets were uncertain were defaulted into the group that covered a majority of zip codes in their rating region. For example, in 2018, in rating region 2, individuals in the majority of zip codes that start with 945 (21 out of 25) have four issuer-products to choose between (Blue Shield PPO, HealthNet EPO, Kaiser

Permanente HMO, or Western Health Advantage HMO). However, individuals living in the other four 945 zip codes have a choice of five plans (Blue Shield HMO, Blue Shield PPO, HealthNet EPO, Kaiser Permanente HMO, or Western Health Advantage HMO). In creating the count variable of the number of issuer-products an individual could choose between for 2018 coverage for the main regression analyses, individuals in rating region 2 with a three-digit zip code of 945 were defaulted into having four options and those individuals enrolled in Blue Shield HMO (the only issuer-product included in the 5 issuer-product offering zip codes that was not offered in the 4 issuer-product offering zip codes) were coded as having a choice of 5 issuer-products. This system was repeated for every rating region-three-digit zip code combination.

To determine the arrival of a new issuer-product into the market, a similar system was employed. For the creation of this variable we defaulted individuals into the situation that applied to the majority of zip codes that began with their particular three-digit set.

To test the robustness of our results we did a sensitivity analysis looking only at those enrollees whose choice sets could be identified with 100% certainty. Only individuals whose zip-code-three-digit combination had one clear choice set were coded as having a "certain choice set." All others were considered to have an ambiguous choice set. No edits were made based on enrollee issuer-product selection. For 2017-18, 52% of the regression analysis sample (n=365,554) had a certain choice set for 2018. Due to sample size issues, enrollees in HealthNet EPO and Western HMO were excluded from these analyses in this year. For 2016-17, 39% of the regression analysis sample (n=249,104) had a certain choice set for 2017. Appendix Tables U, V, and W show that, overall, the analyses looking at only those with certain choice sets produced similar results to that of the main model.

Appendix Table I. Sensitivity analyses, any switch, 2016-17 and 2017-18

	2016-17				2017-18			
	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage
Total sample (n)	631,436	320,635	579,655	627,351	704,143	362,817	602,792	698,012
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)								
\$10 - <\$50 increase	1.494***	1.702***	1.502***	1.490***	1.438***	1.598***	1.334***	1.456***
\$50 - <\$100 increase	2.738***	3.212***	2.675***	2.733***	2.695***	3.251***	2.460***	2.688***
\$100 - <\$200 increase	4.274***	4.673***	4.147***	4.244***	4.656***	5.724***	3.886***	4.621***
\$200 increase or more	6.312***	5.639***	6.140***	6.365***	7.882***	7.979***	6.722***	7.914***
Consumer assistance (ref: unassisted)								
Received assistance	2.580***	2.670***	2.558***	2.564***	2.374***	2.368***	2.064***	2.380***
Number of issuer-product choices (ref: 2 issuer-products)								
3	1.824***	1.908***	1.672***	1.821***	2.344***	2.156***	1.995***	2.349***
4+	1.277***	1.357***	1.285***	1.278***	2.186***	1.949***	1.846***	2.190***
Initial metal tier (ref: Catastrophic)								
Bronze	0.284***	0.295***	0.291***	ref.	0.271***	0.296***	0.314***	ref.
Silver	0.155***	0.172***	0.156***	0.543***	0.397***	0.443***	0.401***	1.469***
Gold	0.338***	0.390***	0.332***	1.199***	0.359***	0.419***	0.368***	1.332***
Platinum	0.311***	0.326***	0.309***	1.106***	0.324***	0.364***	0.344***	1.207***

Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.

Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.

* Statistically significant difference from reference category at the p<0.05 level.

** Statistically significant difference from reference category at the p<0.01 level.

*** Statistically significant difference from reference category at the p<0.001 level.

Appendix Table J. Sensitivity analyses, changed issuer-product only, 2016-17 and 2017-18

	2016-17				2017-18			
	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage
Total sample (n)	631,436	320,635	579,655	627,351	704,143	362,817	602,792	698,012
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)								
\$10 - <\$50 increase	1.920***	2.141***	1.994***	1.908***	2.274***	2.657***	2.083***	2.249***
\$50 - <\$100 increase	3.336***	3.672***	3.487***	3.333***	3.966***	4.240***	3.396***	3.941***
\$100 - <\$200 increase	4.919***	5.091***	5.176***	4.910***	5.653***	4.953***	4.522***	5.643***
\$200 increase or more	6.410***	5.057***	6.786***	6.397***	5.775***	3.319***	4.895***	5.745***
Consumer assistance (ref: unassisted)								
Received assistance	2.925***	2.842***	2.972***	2.937***	3.054***	2.843***	2.459***	3.082***
Number of issuer-product choices (ref: 2 issuer-products)								
3	1.792***	2.167***	1.777***	1.792***	4.695***	3.868***	3.644***	4.720***
4+	1.568***	1.956***	1.519***	1.571***	3.032***	2.723***	2.419***	3.054***
Initial metal tier (ref: Catastrophic)								
Bronze	0.786*	0.9	0.798*	ref.	0.406***	0.482***	0.489***	ref.
Silver	0.459***	0.518***	0.449***	0.584***	0.540***	0.622***	0.459***	1.336***
Gold	0.119***	0.142***	0.116***	0.151***	0.264***	0.292***	0.243***	0.652***
Platinum	0.100***	0.115***	0.099***	0.127***	0.123***	0.175***	0.120***	0.305***
Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.								
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.								
* Statistically significant difference from reference category at the p<0.05 level.								
** Statistically significant difference from reference category at the p<0.01 level.								
*** Statistically significant difference from reference category at the p<0.001 level.								

Appendix Table K. Sensitivity analyses, changed metal tier only, 2016-17 and 2017-18

	<u>2016-17</u>				<u>2017-18</u>			
	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage
Total sample (n)	631,436	320,635	579,655	627,351	704,143	362,817	602,792	698,012
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)								
\$10 - <\$50 increase	1.007	1.204***	0.947*	0.975	0.932***	0.991	0.936**	0.97
\$50 - <\$100 increase	1.885***	2.476***	1.625***	1.873***	1.803***	2.311***	1.897***	1.789***
\$100 - <\$200 increase	3.075***	3.867***	2.620***	3.024***	2.828***	4.447***	2.971***	2.795***
\$200 increase or more	4.748***	4.441***	4.053***	4.750***	5.512***	7.733***	5.802***	5.454***
Consumer assistance (ref: unassisted)								
Received assistance	2.181***	2.469***	2.112***	2.115***	1.781***	1.897***	1.776***	1.768***
Number of issuer-product choices (ref: 2 issuer-products)								
3	1.024	0.984	0.979	1.018	0.700***	0.732***	0.971	0.696***
4+	0.869**	0.800**	0.921	0.868**	0.802***	0.768***	1.139***	0.801***
Initial metal tier (ref: Catastrophic)								
Bronze	0.215***	0.199***	0.223***	ref.	0.261***	0.254***	0.267***	ref.
Silver	0.131***	0.130***	0.138***	0.611***	0.508***	0.481***	0.499***	1.960***
Gold	0.99	0.912	1.058	4.661***	0.623***	0.649***	0.568***	2.400***
Platinum	0.747***	0.676***	0.788***	3.535***	0.615***	0.609***	0.577***	2.377***
Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.								
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.								
* Statistically significant difference from reference category at the p<0.05 level.								
** Statistically significant difference from reference category at the p<0.01 level.								
*** Statistically significant difference from reference category at the p<0.001 level.								

Appendix Table L. Sensitivity analyses, changed both issuer-product and metal tier, 2016-17 and 2017-18

	2016-17				2017-18			
	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage	Main model	Single enrollees only	Excluded Molina and Western	Excluded catastrophic coverage
Total sample (n)	631,436	320,635	579,655	627,351	704,143	362,817	602,792	698,012
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)								
\$10 - <\$50 increase	1.077*	1.172***	1.055	1.064	0.853***	0.956	1.043	0.866***
\$50 - <\$100 increase	1.803***	2.319***	1.821***	1.769***	1.459***	1.688***	2.091***	1.469***
\$100 - <\$200 increase	2.518***	2.980***	2.585***	2.475***	2.639***	3.615***	3.757***	2.627***
\$200 increase or more	4.232***	4.698***	4.404***	4.297***	4.285***	5.545***	6.184***	4.433***
Consumer assistance (ref: unassisted)								
Received assistance	1.510***	1.556***	1.495***	1.532***	1.509***	1.464***	1.567***	1.527***
Number of issuer-product choices (ref: 2 issuer-products)								
3	2.018***	1.845***	2.180***	2.038***	3.963***	3.584***	3.249***	4.017***
4+	0.921	0.903	0.892	0.923	2.802***	2.682***	2.308***	2.817***
Initial metal tier (ref: Catastrophic)								
Bronze	0.731**	0.758**	0.738**	ref.	0.564***	0.567***	0.554***	ref.
Silver	0.266***	0.331***	0.269***	0.360***	0.256***	0.338***	0.193***	0.447***
Gold	0.441***	0.546***	0.441***	0.612***	0.347***	0.438***	0.200***	0.620***
Platinum	0.372***	0.405***	0.377***	0.518***	0.279***	0.294***	0.142***	0.505***
Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.								
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.								
* Statistically significant difference from reference category at the p<0.05 level.								
** Statistically significant difference from reference category at the p<0.01 level.								
*** Statistically significant difference from reference category at the p<0.001 level.								

Appendix Table M. Sensitivity analyses, regional subsamples, any switch, 2016-17						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	39,403	135,590	30,711	38,734	189,253	194,173
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	1.449***	1.262***	1.371***	2.090***	1.113***	1.530***
\$50 - <\$100 increase	2.648***	2.114***	2.512***	5.825***	1.820***	2.738***
\$100 - <\$200 increase	4.089***	3.448***	6.252***	9.441***	2.605***	3.883***
\$200 increase or more	6.510***	5.394***	13.913***	13.601***	2.585***	5.380***
Consumer assistance (ref: unassisted)						
Received assistance	2.237***	2.419***	2.434***	2.571***	2.779***	2.434***
Number of issuer-product choices (ref: 2 issuer-products)						
3	2.751***	ref.	38.971***	0.720*	NA	ref.
4+	2.352*	1.336***	0.735***	0.250***	NA	1.293
Initial metal tier (ref: Bronze)						
Silver	0.515***	0.653***	0.466***	0.355***	0.549***	0.551***
Gold	1.245**	1.416***	1.16	0.828*	1.233***	1.235***
Platinum	1.057	1.323***	0.954	0.701***	1.161***	1.180***
Source: Authors' analysis of Covered California enrollment data, 2016-17.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table N. Sensitivity analyses, regional subsamples, switching issuer-product only, 2016-17						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	39,278	135,590	30,711	38,734	189,253	194,173
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	1.862***	1.558***	1.702***	1.644***	1.206***	1.805***
\$50 - <\$100 increase	3.445***	2.539***	2.804***	4.391***	1.867***	3.211***
\$100 - <\$200 increase	5.503***	3.755***	5.307***	6.548***	2.613***	4.305***
\$200 increase or more	7.309***	4.079***	11.690***	7.468***	2.274***	5.475***
Consumer assistance (ref: unassisted)						
Received assistance	2.792***	2.433***	2.223***	2.884***	3.445***	2.891***
Number of issuer-product choices (ref: 2 issuer-products)						
3	9.391***	ref.	26.259***	0.535***	NA	NA
4+	4.850**	2.614***	1.415**	0.126***	NA	NA
Initial metal tier (ref: Bronze)						
Silver	0.692***	0.564***	0.474***	0.526***	0.693***	0.589***
Gold	0.214***	0.180***	0.146***	0.109***	0.208***	0.143***
Platinum	0.139***	0.155***	0.033***	0.077***	0.177***	0.151***
Source: Authors' analysis of Covered California enrollment data, 2016-17.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table O. Sensitivity analyses, regional subsamples, metal tier only, 2016-17						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	39,403	135,590	30,711	38,734	189,253	194,173
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	1.272*	0.959	0.723*	2.259***	0.801***	1.066
\$50 - <\$100 increase	1.861***	1.690***	1.288*	5.925***	1.472***	1.824***
\$100 - <\$200 increase	2.662***	2.927***	2.757***	9.234***	2.358***	2.741***
\$200 increase or more	4.642***	5.347***	4.198***	12.804***	3.291***	3.884***
Consumer assistance (ref: unassisted)						
Received assistance	1.780***	2.249***	2.215***	2.171***	2.178***	1.953***
Number of issuer-product choices (ref: 2 issuer-products)						
3	0.85	ref.	0.514***	1.216	NA	ref.
4+	1.747	0.871***	0.919	2.203	NA	0.869
Initial metal tier (ref: Bronze)						
Silver	0.516***	0.714***	0.572***	0.334***	0.519***	0.755***
Gold	3.201***	3.151***	4.159***	1.587***	5.895***	6.115***
Platinum	1.888***	2.283***	4.227***	1.154	4.743***	4.805***
Source: Authors' analysis of Covered California enrollment data, 2016-17.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table P. Sensitivity analyses, regional subsamples, switching issuer-product and metal tier, 2016-17						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	48,901	154,147	30,540	43,317	214,568	207,307
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	0.723	0.740**	1.770***	1.137	0.775***	1.240***
\$50 - <\$100 increase	1.832***	1.204	2.443***	3.857***	1.258***	1.936***
\$100 - <\$200 increase	1.621**	1.821***	6.046***	5.055***	1.908***	2.184***
\$200 increase or more	3.009***	3.985***	8.307***	9.446***	2.701***	3.377***
Consumer assistance (ref: unassisted)						
Received assistance	1.346**	1.713***	1.332***	1.748***	1.494***	1.540***
Number of issuer-product choices (ref: 2 issuer-products)						
3	1.713	ref.	17.332***	1.213	NA	ref.
4+	NA	0.968	0.221***	0.493**	NA	0.694
Initial metal tier (ref: Bronze)						
Silver	0.384***	0.636***	0.754**	0.301***	0.283***	0.337***
Gold	0.525**	0.576***	1.299	0.567**	0.611***	0.567***
Platinum	0.611	0.555***	0.73	0.537**	0.491***	0.490***
Source: Authors' analysis of Covered California enrollment data, 2016-17.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table Q. Sensitivity analyses, regional subsamples, any switch, 2017-18						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	48,901	154,147	30,540	43,317	214,568	207,307
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	1.012	1.284***	1.255***	1.526***	1.540***	1.785***
\$50 - <\$100 increase	1.924***	2.388***	2.566***	2.126***	2.718***	3.024***
\$100 - <\$200 increase	4.278***	3.644***	5.418***	4.244***	4.486***	4.581***
\$200 increase or more	8.495***	6.753***	17.682***	6.488***	6.893***	5.763***
Consumer assistance (ref: unassisted)						
Received assistance	2.425***	2.126***	2.106***	2.566***	2.663***	2.337***
Number of issuer-product choices (ref: 2 issuer-products)						
3	4.010***	ref.	1.740***	1.577**	NA	ref.
4+	3.152***	0.897***	1.234***	1.682***	NA	2.668*
Initial metal tier (ref: Bronze)						
Silver	1.627***	1.386***	0.929	0.614***	1.765***	1.645***
Gold	1.09	1.027	1.142	0.743***	1.717***	1.526***
Platinum	1.277**	0.927	0.86	0.402***	1.806***	1.370***
Source: Authors' analysis of Covered California enrollment data, 2017-18.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace. The variable representing new issuer-products available in the market was dropped for this analysis due to sample size.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table R. Sensitivity analyses, regional subsamples, switching issuer-product only, 2017-18						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	48,901	154,147	30,540	43,317	214,568	207,307
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	3.304***	2.851***	2.631***	3.342***	2.085***	2.322***
\$50 - <\$100 increase	5.481***	5.421***	5.865***	3.974***	3.569***	3.384***
\$100 - <\$200 increase	8.860***	7.060***	14.730***	4.874***	4.927***	4.099***
\$200 increase or more	9.272***	5.991***	39.312***	3.099***	5.390***	2.025***
Consumer assistance (ref: unassisted)						
Received assistance	3.565***	2.563***	2.086***	4.005***	3.604***	2.946***
Number of issuer-product choices (ref: 2 issuer-products)						
3	2.194	ref.	3.100***	3.357***	NA	ref.
4+	12.549***	0.679***	0.981	1.725***	NA	2.227
Initial metal tier (ref: Bronze)						
Silver	1.862***	0.483***	1.600***	0.898	1.515***	1.737***
Gold	0.714	0.341***	0.948	0.569	0.843**	0.676***
Platinum	0.397***	0.235***	0.108***	0.412*	0.366***	0.362***
Source: Authors' analysis of Covered California enrollment data, 2017-18.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace. The variable representing new issuer-products available in the market was dropped for this analysis due to sample size.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table S. Sensitivity analyses, regional subsamples, metal tier only, 2017-18						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	48,901	154,147	30,540	43,317	214,568	207,307
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	0.741***	1.103*	0.839	1.321***	0.97	1.328***
\$50 - <\$100 increase	1.341***	1.875***	1.466***	1.824***	2.075***	2.269***
\$100 - <\$200 increase	2.992***	2.790***	2.239***	3.799***	2.944***	3.632***
\$200 increase or more	6.966***	6.670***	6.008***	6.061***	4.832***	7.405***
Consumer assistance (ref: unassisted)						
Received assistance	1.778***	1.905***	1.587***	2.352***	1.531***	1.541***
Number of issuer-product choices (ref: 2 issuer-products)						
3	0.741	ref.	0.539***	0.994	NA	ref.
4+	0.550***	1.106***	0.927	1.713***	NA	3.307
Initial metal tier (ref: Bronze)						
Silver	1.916***	1.725***	3.113***	0.637***	2.628***	2.772***
Gold	1.507***	1.387***	4.512***	0.768***	3.552***	3.882***
Platinum	1.875***	1.273***	5.736***	0.401***	4.229***	3.518***
Source: Authors' analysis of Covered California enrollment data, 2017-18.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace. The variable representing new issuer-products available in the market was dropped for this analysis due to sample size.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table T. Sensitivity analyses, regional subsamples, switching issuer-product and metal tier, 2017-18						
	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	48,901	154,147	30,540	43,317	214,568	207,307
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)						
\$10 - <\$50 increase	0.779	0.799**	0.641**	0.537*	0.807***	0.955
\$50 - <\$100 increase	0.607**	1.187*	1.191	1.675*	1.253***	1.629***
\$100 - <\$200 increase	1.071	2.104***	1.876***	4.339***	2.201***	2.861***
\$200 increase or more	2.373***	3.213***	2.559***	8.047***	3.235***	6.179***
Consumer assistance (ref: unassisted)						
Received assistance	1.401***	1.715***	2.030***	2.004***	1.394***	1.558***
Number of issuer-product choices (ref: 2 issuer-products)						
3	19.216***	ref.	2.145***	0.363*	NA	ref.
4+	7.756***	0.771***	1.497***	1.089	NA	2.281
Initial metal tier (ref: Bronze)						
Silver	0.413***	1.005	0.139***	0.262***	0.591***	0.382***
Gold	0.575**	0.659***	0.310***	0.583*	0.795***	0.627***
Platinum	0.89	0.437***	0.170***	0.450*	0.685***	0.444***
Source: Authors' analysis of Covered California enrollment data, 2017-18.						
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace. The variable representing new issuer-products available in the market was dropped for this analysis due to sample size.						
* Statistically significant difference from reference category at the p<0.05 level.						
** Statistically significant difference from reference category at the p<0.01 level.						
*** Statistically significant difference from reference category at the p<0.001 level.						

Appendix Table U. Sensitivity analyses, certain choice set, 2016-17

	<u>Switched issuer-product</u>				<u>Switched metal only</u>		<u>Switched both issuer-product and metal tier</u>	
	<u>Any switch</u>		<u>only</u>					
	Main model	Certain choice set	Main model	Certain choice set	Main model	Certain choice set	Main model	Certain choice set
Total sample (n)	631,436	249,104	631,436	249,104	631,436	249,104	631,436	249,104
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)								
\$10 - <\$50 increase	1.494***	1.446***	1.920***	1.904***	1.007	0.985	1.077*	1.01
\$50 - <\$100 increase	2.738***	2.711***	3.336***	3.476***	1.885***	1.680***	1.803***	2.043***
\$100 - <\$200 increase	4.274***	3.965***	4.919***	4.809***	3.075***	2.732***	2.518***	2.498***
\$200 increase or more	6.312***	5.866***	6.410***	6.374***	4.748***	4.015***	4.232***	4.388***
Consumer assistance (ref: unassisted)								
Received assistance	2.580***	2.427***	2.925***	2.889***	2.181***	2.078***	1.510***	1.362***
Number of issuer-product choices (ref: 2 issuer-products)								
3	1.824***	1.093	1.792***	0.913	1.024	1.241*	2.018***	0.825
4+	1.277***	1.253**	1.568***	1.477***	0.869**	1.173	0.921	0.756
Initial metal tier (ref: Catastrophic)								
Bronze	0.284***	0.291***	0.786*	0.859	0.215***	0.224***	0.731**	0.564***
Silver	0.155***	0.154***	0.459***	0.423***	0.131***	0.138***	0.266***	0.272***
Gold	0.338***	0.342***	0.119***	0.123***	0.99	1.037	0.441***	0.378***
Platinum	0.311***	0.321***	0.100***	0.099***	0.747***	0.804*	0.372***	0.350***
Source: Authors' analysis of Covered California enrollment data, 2016-17.								
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.								
* Statistically significant difference from reference category at the p<0.05 level.								
** Statistically significant difference from reference category at the p<0.01 level.								
*** Statistically significant difference from reference category at the p<0.001 level.								

Appendix Table V. Sensitivity analyses, certain choice set, 2017-18

	<u>Any switch</u>		<u>Switched issuer-product only</u>		<u>Switched metal only</u>		<u>Switched both issuer-product and metal tier</u>	
	Main model	Certain choice set	Main model	Certain choice set	Main model	Certain choice set	Main model	Certain choice set
Total sample (n)	694,802	364,185	694,802	364,185	694,802	364,185	694,802	364,185
Net premium change of baseline plan (ref: premium decreased or increased by less than \$10)								
\$10 - <\$50 increase	1.457***	1.418***	2.284***	2.271***	0.929***	0.932*	0.842***	0.850***
\$50 - <\$100 increase	2.726***	2.681***	3.969***	3.760***	1.812***	1.922***	1.455***	1.420***
\$100 - <\$200 increase	4.657***	4.594***	5.616***	5.103***	2.831***	3.101***	2.675***	2.627***
\$200 increase or more	7.817***	7.228***	5.673***	4.719***	5.507***	6.135***	4.398***	3.805***
Consumer assistance (ref: unassisted)								
Received assistance	2.373***	2.266***	3.061***	2.905***	1.784***	1.758***	1.522***	1.418***
Number of issuer-product choices (ref: 2 issuer-products)								
3	2.265***	1.630***	4.343***	8.663***	0.709***	0.693***	3.861***	4.036***
4+	2.157***	1.564***	3.013***	5.419***	0.806***	0.814***	2.743***	2.672***
Initial metal tier (ref: Catastrophic)								
Bronze	0.274***	0.250***	0.403***	0.400***	0.260***	0.242***	0.577***	0.487***
Silver	0.398***	0.402***	0.538***	0.572***	0.503***	0.486***	0.252***	0.269***
Gold	0.360***	0.367***	0.260***	0.293***	0.620***	0.560***	0.342***	0.347***
Platinum	0.325***	0.349***	0.120***	0.132***	0.613***	0.587***	0.264***	0.277***
Source: Authors' analysis of Covered California enrollment data, 2017-18.								
Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, whether a new issuer-product was available in the market, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace.								
* Statistically significant difference from reference category at the p<0.05 level.								
** Statistically significant difference from reference category at the p<0.01 level.								
*** Statistically significant difference from reference category at the p<0.001 level.								

Appendix Table W. Sensitivity analyses, switched to Gold, 2016-17 and 2017-18

	<u>2016-17</u>			<u>2017-18</u>		
	Main model	Single enrollees only	Excluded Molina and Western	Main model	Single enrollees only	Excluded Molina and Western
Total sample (n)	26,338	13,595	23,944	53,311	26,304	44,482
Net premium difference between Gold and Bronze/Silver plans (ref: <\$50)						
\$50 - <\$100 increase	0.819**	0.882	0.937	0.316***	0.309***	0.358***
\$100 - <\$200 increase	0.591***	0.651***	0.675***	0.243***	0.277***	0.261***
\$200 increase or more	0.303***	0.410***	0.341***	0.147***	0.235***	0.155***
<u>2016-17</u>	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	1,752	6,601	1,696	1,450	6,785	7,875
Net premium difference between Gold and Bronze/Silver plans (ref: <\$50)						
\$50 - <\$100 increase	0.414**	0.698*	0.654	0.325***	1.295*	1.036
\$100 - <\$200 increase	0.230***	0.583***	0.350**	0.154***	0.965	0.787
\$200 increase or more	0.113***	0.251***	0.059***	0.067***	0.574***	0.517***
<u>2017-18</u>	Northern CA	Bay Area	Central Coast	Central Valley	Los Angeles	Southern CA
Total sample (n)	4,819	15,266	2,442	3,667	13,823	13,294
Net premium difference between Gold and Bronze/Silver plans (ref: <\$50)						
\$50 - <\$100 increase	0.186***	0.310***	0.047***	1.014	0.261***	0.480***
\$100 - <\$200 increase	0.134***	0.349***	0.034***	0.658**	0.183***	0.330***
\$200 increase or more	0.063***	0.221***	0.017***	0.665*	0.135***	0.179***
	<u>2016-17</u>		<u>2017-18</u>			
	Certain choice		Certain choice			
	Main model	set	Main model	set		
Total sample (n)	26,338	10,549	53,311	27,751		
Net premium difference between Gold and Bronze/Silver plans (ref: <\$50)						
\$50 - <\$100 increase	0.819**	1.088	0.316***	0.356***		
\$100 - <\$200 increase	0.591***	0.902	0.243***	0.287***		
\$200 increase or more	0.303***	0.531***	0.147***	0.172***		

Source: Authors' analysis of Covered California enrollment data, 2016-17 and 2017-18.

Notes: All analyses also controlled for other factors in the model, including baseline issuer-product selection, baseline metal tier, number of issuer-products available in market, whether a new issuer-product was available in the market, consumer assistance, gender, age, federal poverty level over two years, receipt of a subsidy over two years, race/ethnicity, preferred spoken language, rating region, years enrolled in Covered California, and the number of family members enrolled in the marketplace. * Statistically significant difference from reference category at the p<0.05 level. ** Statistically significant difference from reference category at the p<0.01 level. *** Statistically significant difference from reference category at the p<0.001 level.

CHAPTER 5: CONCLUSION

The ACA has changed the health insurance landscape in the United States, including, for many on the individual market, the plan selection process. The results from this dissertation add to the evidence base that health plan, choice environment, and consumer characteristics all play a role in the decisions that individuals make when comparing plans and enrolling in coverage.

Key findings

Health plan characteristics

All three papers found evidence that consumers pay attention to health plan characteristics, although the level of attention can differ between consumers. As discussed in chapter 4, for re-enrollees, annual changes to their premiums was a driving factor in switching coverage during open enrollment periods, with those who saw larger changes to their premiums having higher predicted probabilities of switching than those whose premiums decreased or increased only slightly. The results from chapter 3 also suggest that the labeling of health plans by metal tier is a consideration for consumers. Even as the underlying details of silver plans changed making them dominated in 2018, Covered California consumers who had been enrolled in the silver plans in the prior year continued to have the highest predicted probabilities of selecting silver coverage.

Choice environment characteristics

The choice environments in which consumers are making their decisions were also seen to be a contributing factor in my analyses. One aspect of the choice environment is the availability of other coverage. In chapter 2, the findings from my hypothetical choice experiments showed that as the relative health plan quality ratings and costs of available options changed, consumers' decisions also changed. Across choice scenarios, consumers were more likely to choose higher quality, more expensive plans when the quality ratings of all plans were lower, when the price differential between

plans was lower, and when the difference in quality ratings between plans was two stars rather than one star. After modifying the plan quality ratings in the second hypothetical choice experiment, I also found that consumer choice of dominated plans increased when the quality star ratings were similar across all available plans.

The results in chapter 4 also highlighted how the relative cost of plans can affect consumer decision-making. When the premium difference between gold and silver plans decreased following the implementation of silver loading in California, consumers responded by switching to gold coverage. Chapter 4 also showed that the number of plans available for consumers to choose between was associated with consumers switching plans. The probability of enrollees changing their health plans increased as the number of plans from which they could choose increased.

Additionally, the choice environment includes a consumer's decision to receive assistance when enrolling. In chapter 4, receipt of consumer assistance was associated with increased switching between plans during open enrollment.

Consumer characteristics

Consumer characteristics also play a role in the decisions that individuals make when enrolling in coverage, including how they weigh health plan characteristics. From the results of my hypothetical choice experiments discussed in chapter 2, we saw that those who are risk averse consistently chose the higher quality, more expensive plans at higher rates than those who are less risk averse. This indicates that more risk averse individuals put a greater weight on health plan quality than those who are less risk averse. The results from the experiments also highlighted the differences in the selection of inferior, dominated plans by consumers' numeracy, health insurance literacy, and risk preferences. Those with poor numeracy, low health insurance literacy, and greater risk-seeking tendencies had the highest predicted probabilities of choosing dominated plans.

In chapter 3, I explored the role of status quo bias in consumer enrollment in dominated plans. In this situation, the tendency for consumers to stay with their previous plans had different ramifications depending on where the consumer started because of the form that plan dominance took. For incumbent enrollees who had been enrolled in silver plans in 2017, their status quo bias and previously expressed preference for silver coverage were associated with enrollment in one of the dominated silver plans in 2018. On the other hand, incumbent enrollees who had been in non-silver plans in 2017 had a lower probability of enrolling in one of the dominated silver plans, likely in part due to their status quo bias and preference for non-silver coverage. The probability that enrollees who were new to the marketplace in 2018 enrolled in a dominated plan fell in between the silver and non-silver incumbent enrollees, although it was closer to that of the non-silver incumbent enrollees. This group had enrolled in the examined silver coverage at higher rates in the years before those plans became dominated, indicating that there was a high level of attention among this group to the differences between the dominated silver plans and other available options in 2018.

Policy implications

There are several policy implications for the results of this dissertation. One of the ways that marketplace regulators can influence consumer insurance decision-making behavior is to initiate the need recognition phase identified in the conceptual framework for this dissertation in chapter 1. In the health insurance marketplaces, re-enrollees are eligible to be automatically re-enrolled in their coverage without taking action if their plan continues to be offered. While this policy reduces the administrative burden of going through the re-enrollment process, the way it has been implemented may lead some consumers to enroll in inferior coverage. In 2018, for example, 56.4% of the individuals that were enrolled in a dominated plan in Covered California used automatic renewal, compared to only 34.6% who were not in a dominated plan. Although marketplaces send letters to enrollees at the beginning of open enrollment periods letting them know that they can switch coverage during that

time, efforts to further encourage shopping and plan comparison should be undertaken. Researchers worked with Covered California to conduct an experiment in 2016 where they sent letters to potential Covered California consumers and varied the information provided to see how consumers responded to the different letters. This work found that these letters increased enrollment by 16% and increased the valuation of marketplace coverage by enrollees (Domurat, Menashe, & Yin, 2019). Marketplaces should continue sending letters with personalized information to consumers about their re-enrollment opportunities and invest in additional marketing and outreach efforts to remind consumers about the value of shopping. For cases where consumers continue to rely on automatic renewal, marketplace regulators can institute policies that automatically renew individuals into plans that better fit the consumers' needs and, in instances of strict financial dominance, avoid placing them in clearly inferior plans. The design of these policies and decisions around how to default consumers into plans are potential policy levers that can be used to combat low consumer attention and choice inertia and help get consumers into the coverage that best fits their needs.

There are also changes that can be made to the plan comparison and shopping experience that could help consumers avoid making costly decisions when enrolling. Over the first six years of operation, the marketplace websites have evolved so that they now provide more plan information to consumers than they previously had, including personalized information about providers included in plans' networks and specific prescription drug coverage, and allowing for filtering and sorting plans by a range of factors. Some of these website design and choice architecture decisions, however, may be encouraging consumers to overly rely on heuristics and biases during the plan selection process to the point where they don't realize their selected coverage is inferior. This was highlighted in the findings in chapter 3 of this dissertation where incumbent enrollees who were in silver plans in 2017 had the highest predicted probabilities of enrolling in one of the silver dominated plans in 2018. Marketplace

administrators should consider implementing an alert system that is triggered when a consumer selects a plan that is either clearly inferior to another plan or is potentially inferior for that specific enrollee.

Additionally, the results from chapter 2 showing that consumers chose a dominated plan at higher rates when quality ratings were similar across all plans draws attention to the importance of marketplace regulators continuing to evaluate the use of quality star ratings and the methodologies underlying the calculation of those ratings to ensure that these ratings are useful to consumers.

Finally, the findings from this dissertation around the role of health insurance literacy and numeracy highlight the need for continued education of consumers about health insurance and suggests a need for more innovative tools at the point of enrollment that help consumers better understand the differences between the available options.

Future research

There is more work that can and should be done to further explore consumer health insurance decision-making and I plan to continue working in this area in the years to come. The findings in chapter 2 that those with more risk-seeking tendencies had a higher probability of selecting a dominated plan warrant greater exploration, and I plan on doing this in a third hypothetical choice experiment. In addition, I am interested in examining if these findings are unique to health insurance decision-making or also exist in other consumer decision-making situations.

There is also a need to hear directly from consumers about their stated preferences regarding plan design and the challenges they knowingly face when enrolling in coverage. Conducting this qualitative research is something I hope to do moving forward in order to provide policymakers with more information about consumers preferences and enrollment experiences and to explore potential considerations that quantitative research has yet to identify as integral to consumer decision-making.

The unique design and standardization of plans in Covered California may mean that these findings are not generalizable to the rest of the United States. However, dominated plans have been sold in other marketplaces, including in Georgia and Colorado, and I plan to continue to expand my research portfolio in this area by studying those states. The data out of Georgia also include health care utilization information, which would allow me to examine the association of health care status and use with consumers' health insurance decisions, an analysis that was not possible using the Covered California data.

In 2020, California also passed legislation aimed at expanding Medicaid coverage and improving marketplace affordability. In addition to establishing a state-level individual mandate and providing Medicaid coverage to undocumented young adults, this legislation expanded premium tax credits to three types of enrollee households in 2020. These included households with incomes below 138% of the federal poverty level who are not eligible for Medi-Cal, households with incomes between 200-400% of the federal poverty level, and households with incomes from 401-600% of the federal poverty level, who became eligible for premium tax credits for the first time. Early descriptive estimates of 2020 enrollment have found that, while new enrollment was much higher in 2019, fewer enrollees renewed their coverage (Covered California, 2020). I would like to examine this more closely to explore whether increased premium tax credits can be used to retain enrollees from year to year, particularly “young invincibles” who are the most likely to leave the market when facing premium increases and to simulate how future changes to premium tax credits might be used to maximize enrollment among various age and income groups.

Additionally, the COVID-19 pandemic has left millions of Americans without access to employer-sponsored insurance and potentially newly eligible for subsidized coverage through the health insurance marketplaces or Medicaid. Covered California and other state-based marketplaces have held

a special open enrollment period during the pandemic, and individuals who have recently lost their job-based coverage are eligible in both state-based and federally facilitated marketplaces to enroll in coverage outside of the regular annual open enrollment period. I would like to examine the effects of COVID-19 on short-term and long-term enrollment in the marketplaces, including any changes to the generosity of coverage that the newly enrolling are choosing during a time when the health care system and extensive health care use is on the minds of most individuals.

Finally, I would like to expand my analyses beyond the individual market to look at individuals who transition between sources of coverage, or health insurance churn. There are many different types of health insurance transitions that can be made in the United States and these transitions can be triggered for several reasons. Depending on the type of transition, health insurance churn can be a positive, negative, or neutral change for consumers. I would like to develop this classification of health insurance churn further and explore the potential effects of health insurance transitions on consumers' health care use and overall health.

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