Sources of Inertia in Health Plan Choice in the Individual Health Insurance Market*

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We decompose inertia in health plan choice in the individual health insurance market into three sources: inattention to alternatives, hassle costs related to switching, and tastes for provider continuity. Administrative 2014-2018 data from California's Health Insurance Marketplace show that 83% of returning households select their default health plans. Using a default-consideration framework, we find that roughly three quarters of default plan selections are due to inertia, nearly 90% of which are due to inattention, hassle costs, and their interaction with one another. We validate our identification of inattention using information on whether households made active plan selections. (*JEL* D12, I11, I13)

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I. INTRODUCTION

The Patient Protection and Affordable Care Act of 2010 (ACA) facilitated the largest expansion of health insurance coverage in the United States since the creation of Medicare in 1965. One of the vehicles through which it did so was the creation of state-based Health Insurance Marketplaces in 2014. The Marketplaces, which insured 11.4 million Americans in 2019 (Centers for Medicare and Medicaid Services 2019), provide eligible households with price-linked subsidies to purchase private health insurance plans. The Marketplaces rely on insurer competition to provide enrollees with affordable, quality health plans, as well as to reduce federal outlays for price-linked premium subsidies (Obama 2016). While many states' Marketplaces experienced instability and insurer exit in 2017

and 2018, insurer re-entry in 2019 and 2020 has resulted in increasingly robust, competitive Marketplaces (Fehr, Kamal, and Cox 2020).

Yet it is not clear that insurer competition in the Marketplaces is having the desired effects. Marketplace premiums have increased substantially over time (Anderson, Abraham, and Drake 2019), and concerns over the quality of plans' provider networks persist (Haeder, Weimer, and Mukamel 2019). A potential contributor to these phenomena is *inertia*, or persistence in health plan choice over time despite changes in health plan offerings (Dubé, Hitsch, and Rossi 2010). A consumer is inertial, or has inertia in plan choice, if being enrolled in a plan during the previous year increases the probability that the consumer will select that same plan in the current year. In markets with a high share of inertial consumers, firms may rely on inertia rather than competition on price or quality to retain market share (Farrell and Klemperer 2007). Inertia plays a large role in health plan choice in other health insurance markets, including employer-sponsored insurance (Handel 2013b), Medicare Part D (Polyakova 2016; Abaluck and Gruber 2011; Ketcham et al. 2012), Medicaid managed care (Marton, Yelowitz, and Talbert 2017), and the pre-ACA Massachusetts Marketplace (Shepard 2016), but little is known about its role in the Marketplaces.

In this article we provide the first evidence of inertia in the post-ACA Health Insurance Marketplaces. We do so using data on over 5 million household health plan selections in California's Marketplace, Covered California, from 2014-2018. Covered California has enjoyed robust participation from enrollees and insurers since its creation. In 2019, it had 1.5 million enrollees serviced by 16 competing insurers (Covered California 2019), covering 12% of Marketplace enrollees nationwide. Aside from its size, several features of Covered California make it well-suited to study inertia. First, households churn in and out of Covered California over time, allowing us to observe similar households choosing from the same choice set with and without inertia. The exit of a large insurer in 2018,

Anthem, also forced many returning households to select new plans and caused additional variation in the available choices. Second, Covered California mandates insurers provide four standardized health plans for each network (e.g., PPO, HMO) they offer, meaning that we can easily control for all plan benefit characteristics and that we can distinguish between inertia at the network and plan levels. Third, we can observe whether returning households automatically renewed their previous plan, actively selected their plan.

We make three contributions to the inertia literature in this manuscript. First, we provide descriptive evidence of inertia in the Marketplaces, complementing the previous literature on other major health insurance markets. Returning households reenroll in their default plan—typically their plan from the previous year—83% of the time. Roughly 60% of these households automatically reenrolled in their default plan. These repeated plan selections occurred despite significant year-over-year changes in plans' post-subsidy premiums. We also find that new households compose an increasingly small share of Covered California enrollees over time, declining from a high of 47% to 25% from 2015 to 2018. Together, these findings suggest an increasingly large share of households may be inattentive and inertial in their health plan choices. We also find that returning households enroll in plans with higher premiums than new households, that the share of returning households enrolled in the plan with the lowest premium declines over time (conditional on cost-sharing), and that the brand (i.e., insurer) selections of new and returning households differ markedly in all years.

While these findings are suggestive of inertia, they are not causal, nor do they clarify *why* Marketplace households may be inertial. A growing literature has begun to identify and disentangle different sources of inertia in health plan choice. Three studies separate inertia into inattention and other switching costs in Medicare Part D (Heiss et al. 2016; Ho, Hogan, and Scott Morton 2017; Abaluck and Adams 2017). All three found that inattention plays a large role in plan

choice, though they do not separate switching costs into other components. Higuera, Carlin, and Dowd (2018) found strong tastes for continuity of care by examining enrollees' preferences for health plans that contained their regular sources of care in an employer-based health insurance exchange.

Our second and primary contribution is to identify the relative contribution of three different sources of inertia in Covered California health plan choice: (1) *inattention*, which occurs when enrollees implicitly choose to stay with the same plan by continuing to pay their premium without considering alternative plans, typically via automatic reenrollment; (2) *tastes for provider continuity*, which reflect enrollees' utility derived from continuing to receive care over time from the same set of medical providers, and; (3) *hassle costs*, the remainder of inertia not explained by inattention and tastes for provider continuity, which consists of the remaining psychological and time costs of switching health plans.[1] Identifying these different sources of inertia allows us to determine which policy interventions would be the most effective at reducing inertia in health plan choice.

We use a combination of a random parameters mixed logit model (Train 2003) and a default-specific consideration model (Goeree 2008; Abaluck and Adams 2017) to separately identify inattention, tastes for provider continuity, and hassle costs. Attention, which we define as deciding to consider available plans and subsequently making a choice among available plans, is difficult to identify as it cannot be observed. The default-specific consideration model addresses this issue by using demand asymmetry and an exclusion restriction to estimate whether households behave as if they have full information about the choices available to them. We combine this model with a mixed logit model, which allows for unobserved preference heterogeneity in the household's plan choice

[1] The terminology in the inertia literature varies widely. Hassle costs are sometimes referred to as adjustment costs (e.g., Abaluck and Adams (2017)). Alternatively, they are referred to as switching costs, though switching costs often broadly refer to all inertia that arises from the consumer's health plan choice problem after controlling for inattention. In this paper, we follow this latter definition and use switching costs to refer to the combination of tastes for continuity and hassle costs.

problem. This is useful for the identification of *switching costs*—remaining inertia that occurs in an attentive household's plan choice problem—related to tastes for provider continuity and hassle costs. Covered California regulations that insurers offer four health plans for each offered network[2] allow us to separate network-level and plan-level switching costs. We capture households' tastes for provider continuity with a network-level switching cost parameter, and we capture households' hassle costs with a plan-level switching cost parameter. The network-level switching cost parameter isolates inertia related to health plans' provider networks, conditional on attention, while the plan-level switching cost parameter captures remaining inertia resulting from the time, psychological, and administrative costs of selecting a health plan. We rely on standard assumptions to identify these switching costs (Handel 2013; Polyakova 2016) and premium sensitivity (Geruso 2016; Tebaldi 2017; Drake 2019; Saltzman 2019).

A key finding is that monthly mean switching costs are $146, which is equivalent to 58% of the $252 median monthly premium paid by Covered California households in 2018. This $146 switching cost is similar in magnitude to estimates from other health insurance markets. For instance, Handel's (2013) estimate of switching costs was $169. Although the Marketplaces have more churn than other insurance markets, our results indicate that Marketplace enrollees are roughly as affected by inertia as enrollees in other health insurance markets. When we separate the three sources of inertia, we find that overall switching costs are reduced to $113 when we account for inattention. Of that $113, $78 are due to hassle costs and $35 are due to tastes for provider continuity, indicating that the hassle of changing health plans is twice as strong in magnitude as households' preferences to stay within their previous provider network. Hassle costs increase substantially with household age—by as much as 250% ($85) for

[2] Specifically, each insurer must offer four plans with different premiums and standardized cost-sharing levels for each network it offers. Networks are either HMOs, PPOs, or EPOs.

non-single households with premium tax credits relative to their younger counterparts—as well as income; lower-income older households' hassle costs are twice as large as their younger counterparts ($47). These findings complement other studies suggesting that health insurance literacy and poor numeracy contribute to difficulties selecting health plans (Hero et al. 2019; Heiss et al. 2016). They also likely mitigate our finding that lower income, older households are more likely to pay attention to their plan choices by 13 and 4 percentage points, respectively. Even when these households pay attention to their choice set, high hassle costs are more likely to cause them to stay with their default plan.

We use our estimates to simulate the percentage of households that would select their default plan with and without each source of inertia. We estimate that eliminating all inertia would reduce the percentage of households selecting their default plan by 63 percentage points, from 83% to 20%. Over three quarters of default plan selection is thus due to inertia; the remainder is due to standard preferences for plan characteristics. Our model also allows us to simulate how eliminating individual sources of inertia would reduce rates of default plan selection. We estimate that eliminating inattention, hassle costs, and tastes for provider continuity would reduce rates of default plan selection by 22, 16, and 5 percentage points, respectively. Perhaps our most policy-relevant finding is that there is an interaction effect that occurs when inattention and hassle costs are reduced. Eliminating inattention reduces default plan selection by 22 percentage points to 61%; eliminating hassle costs reduces it by 16 percentage points to 66%. Eliminating both, however, reduces default plan selection by 56 percentage points to 27%. Default plan selection is thus reduced by an additional 17 points when both inattention and hassle costs are eliminated. A two-pronged strategy to reduce both sources of inertia is thus the most effective means of reducing default plan selection and inertia. Tastes for provider continuity play a significantly smaller role. Eliminating them reduces default plan selection by 4 to 7 percentage points.

Our finding that inattention plays a large role in inertia is consistent with Ho, Hogan, and Scott Morton (2017), Heiss et al. (2017), and Abaluck and Adams (2017). It also helps to explain the findings of a randomized intervention in Colorado's Marketplace, in which Ericson et al. (2017) sent mailers to returning households to prompt them to consider their plan choices. The intervention reduced inattention by 23% but did not cause households to switch plans. Our results suggest that, although inattention was eliminated for the treated Colorado households, hassle costs were not sufficiently addressed. While another randomized intervention from California (Domurat, Menashe, and Yin 2019) suggests interventions' like Ericson et al.'s (2017) can increase enrollment on the extensive margin, interventions to encourage active, intensive margin-focused interventions will require attention to both inattention and hassle costs.

Our third contribution is to validate the ability of models of latent attention, such as Abaluck and Adams' (2019) default-specification consideration model, to accurately predict whether households are attentive. Recall that we can observe whether returning households actively selected a health plan on the Covered California website or automatically reenrolled in their default plan. This variable is not synonymous with attention because households that did not select a plan could have browsed the website and chosen to automatically reenroll in their previous plan. However, we still use this information on active plan selection to determine whether households with a higher predicted attention probability are more likely to have actively selected a health plan. We thus provide researchers with a tool to test the validity of consideration models.

Our paper proceeds as follows. Section II describes the regulatory structure of the Health Insurance Marketplaces and Covered California. Section III describes the data used in the analyses and presents descriptive evidence of inertia. Section IV develops a model of health plan choice that separately identifies distinct sources of inertia. Section V discusses results and simulates the

elimination of each of these sources of inertia on the probability that households switch plans. Section VI discusses policy implications. Section VII concludes.

II. BACKGROUND

A. The Affordable Care Act and Health Insurance Marketplaces

The Affordable Care Act of 2010 (ACA) significantly altered the individual health insurance market. The law prevented insurers from denying or rescinding coverage for pre-existing conditions. It also required all plans to cover a set of essential health benefits, eliminated annual and lifetime caps on coverage, and capped out-of-pocket payments. The ACA requires that each plan have a "metal" level with a corresponding actuarial value (e.g., 70% for silver, 60% for bronze, etc.). Minimum coverage "catastrophic" plans are available to those under age 30. To encourage health plan enrollment, the ACA had an individual mandate that penalized the uninsured for not carrying insurance on a sliding scale. The mandate penalty was reduced to zero in 2019.

Individual market insurers are subject to modified community rating, which limits plan premium variation to fixed bands based on age, family size, smoking status, and geography. Individuals are assigned an age-adjustment factor that ranges from one for 21-year-olds to three for 64-year-olds. Age-adjustment factors are summed together for covered household members and multiplied by a plan's base premium. Most states increase premiums by 50% for smokers, though California does not. States also design their own rating areas, typically clusters of counties. Insurers may vary their plans' base premiums within rating areas.

Health Insurance Marketplaces where households can shop for individual health plans were implemented under the ACA in 2014. Consumers can use the Marketplaces to compare health plans in a standardized format. Households with incomes less than or equal to 400% of the federal poverty level (FPL) without affordable offers of insurance from an employer or a public insurance program (e.g., Medicaid) qualify for advanced premium tax credits to purchase

Marketplace plans. The size of the tax credit is based on a household's FPL and the premium of the second-lowest cost silver plan available to that household. Premium tax credits may be applied towards the premium of any non-catastrophic plan. Households purchasing Marketplace coverage with incomes below 250% of the FPL also qualify for cost-sharing reduction subsidies. These subsidies reduce cost-sharing in silver plans (e.g., deductibles, copays), and they are applicable only to silver plans. Each state can operate its own Marketplace or use the federal platform, HealthCare.gov. In 2019, 39 states used HealthCare.gov. The remaining 12 states, including California, operated state-based Marketplaces.

B. The Covered California Marketplace

California has managed its state-based Marketplace, Covered California, since 2014. It insured 1.36 million individuals in 2018, and is divided into 19 rating areas. All Covered California's rating areas are sets of counties, except for Los Angeles County, which is split into two rating areas.

Each Covered California plan is associated with a network and an insurer. Covered California insurers offer between one and three networks. All plan characteristics besides premiums and cost-sharing (e.g., deductibles) are set at the plan level. California requires insurers offer exactly one plan of each metal level for each network they offer. Thus, for each network, there is one corresponding plan for each metal level, the three silver CSR variants, and a high-deductible bronze option that is also mandated. Covered California also standardizes cost-sharing for each metal level (Covered California 2018). For example, all silver plans must have a $35 primary care copay and a $2,500 individual deductible.

An example of the relationship between an insurer and its networks and plans is shown in Figure 1. Blue Shield of California (BSC) offers two networks, an HMO and a PPO. BSC may vary its networks, plan types, and formularies across the HMO and the PPO, but not within them. The only characteristics that

vary for plans within BSC's networks are their metal levels, which BSC must offer according to Covered California regulations, and their premiums.

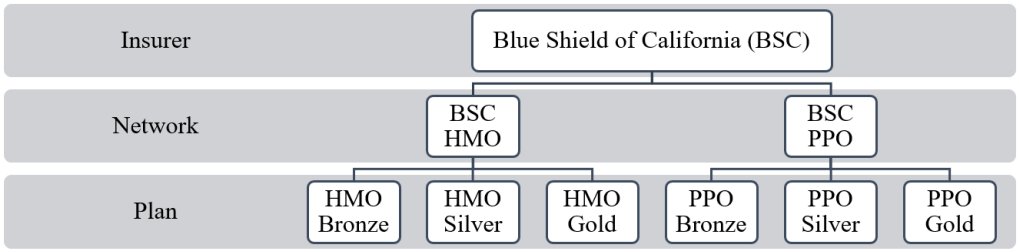

FIGURE 1. EXAMPLE INSURER-NETWORK-PLAN HIERARCHY

Notes: Other metal levels excluded for illustrative simplicity. This hierarchy exists for all Covered California insurers, though they may vary the number of networks offered.

Consumers can view available plan options, check their subsidy eligibility, and enroll in an insurance plan on CoveredCA.com. This website is also where households input the income, age, and family size information that determines their premium tax credits. Households must enroll in Covered California during an open enrollment period that typically runs from mid-October through January; exceptions are allowed for qualifying life events, such as changes in employment.

All households that remain insured in Covered California as of December 31 have the option to automatically reenroll in Covered California in their *default plan*. Specifically, returning households do not have to actively select a plan to remain insured in the following year; instead, they can simply continue to pay the premium for their default plan. Households receive a renewal notice by mail that alerts them to premium changes and whether their default plan has changed. If they take no action, they are automatically reenrolled.

The *default plan* is generally the plan in which the household was enrolled during the prior year. If a household's previous plan is no longer available, the default plan is determined by a simple algorithm (California 2017). First, if the household's previous plan was discontinued by its insurer and its insurer did not

exit the household's rating area, then the household's default plan is the lowest-cost plan offered by its insurer for the metal level of the previous plan. If the household's insurer exited the household's rating area, then the household's default plan is the lowest-cost plan available for the metal level of the previous plan. Households that discontinue their Covered California coverage prior to December 31 cannot automatically renew their coverage in the subsequent year; instead, they must return to the website and actively select a plan.

TABLE 1—ENROLLMENT, MARKET SHARES, AND CHOICE SETS

Characteristic	2014	2015	2016	2017	2018
Enrollment (Millions)					
Individuals	1.36	1.64	1.70	1.70	1.65
Households	0.89	1.08	1.13	1.12	1.09
Enrollment Types (%)					
New	100	47	35	29	28
Default Plan	-	42	46	46	46
Switched Plan	-	8	14	20	21
Choice Characteristics of Returning Households (%)					
Auto Reenrolled	-	60	60	59	53
Selected Default	-	24	25	20	20
Selected Other	-	14	13	17	23
Market Share (%)					
Anthem	29	28	25	18	5
Blue Shield	27	25	28	25	31
HealthNet	19	17	12	10	14
Kaiser	18	25	25	29	34
Other Insurers	6	6	11	18	16
Median Monthly Premiums ($, Median (Interquartile Range))					
Offered Plans	236 (198-299)	246 (203-308)	256 (207-319)	294 (234-370)	331 (265-405)
Selected Plans	193 (85-340)	207 (97-364)	228 (112-404)	279 (146-492)	252 (105-466)
Tax Credits	295 (147-517)	287 (142-521)	275 (124-523)	303 (130-565)	407 (199-735)

Covered California, unlike many other states' Marketplaces, has enjoyed relatively stable enrollment and insurer participation over time. Table 1, using data discussed below, shows that enrollment has varied only between 1.64 to 1.70

million from 2015 to 2018 after beginning at 1.36 million in 2014. Since 2016, about 60% of all participating households are returning from the prior year. Four insurers—Anthem, Blue Shield, HealthNet, and Kaiser—have enrolled over 80% of Covered California enrollees since 2014. All four insurers have participated in Covered California since 2014, though Anthem drastically reduced its presence in Covered California in 2018. Other insurers have entered and exited the market since 2014 (e.g., Oscar, United), but the total number of competing insurers always has ranged from 10 to 12. Post-subsidy premiums of plans selected by enrollees have remained relatively stable over time as well. The median selected post-subsidy monthly premium had a low of $193 in 2014, which gradually increased to $279 in 2017 and decreased to $252 in 2018.

III. DATA AND DESCRIPTIVE EVIDENCE OF INERTIA

A. Data

We obtained individual-level Covered California enrollment data for 2014 to 2018 through a California Public Records Act request. These data contain individual and household identifiers, rating area, age, and household income as percentages of the FPL for 8,058,217 enrollee-years. Covered California asks households to select their health plans jointly; 98.4% of them do so. We thus collapse the enrollment data to the household level, leaving 5,464,510 households. The data also contain the name of the health plan each household is enrolled in, the premium paid for the plan, and an indicator for whether households actively selected their plan on the Covered California website. We augment enrollment data with publicly available information on Covered California plans' premiums.[3]

We limit our sample to households that did not violate any of the following non-exclusive conditions: split plans within households (88,309); had a missing rating area (17,647); had a maximum age under 18 (41,994); received

[3] Covered California's public data repository is located at https://hbex.coveredca.com/data-research/.

CSR subsidies but not advanced premium tax credits (12,197); or had a plan ID that did not match plans listed by Covered California (6,149). After these adjustments, the sample consists of 5,299,255 households.

B. Descriptive Evidence of Inertia

We begin our analysis by documenting descriptive patterns of inertia in the spirit of Polyakova (2016) and Handel (2013). As they note, descriptive evidence of inertia is insufficient to conclude that inertia exists, since descriptive statistics cannot by themselves distinguish between "true" inertia and unobserved, serially correlated characteristics that may cause households to behave as if they are inertial (Dubé, Hitsch, and Rossi 2010). However, descriptive analyses of Covered California plan choices can be suggestive of the presence of inertia.

We observe three patterns in the data consistent with the presence of inertia. First, 83% of returning households remained enrolled in their default plan. This high choice persistence suggests that some form of inertia may be present.

Our second piece of evidence is that household cohorts exhibit diminishing premium sensitivity over time. A household's cohort is the year it enrolled. Table 2 shows that the mean household's base monthly premium—premiums before age adjustment and subsidies are applied—are lowest for the youngest cohort and increase over time. For example, in 2018, the mean base premium of plans chosen by households new to the market was $308 per month. In the same year, the average base premium of plans chosen by households that entered the market in 2016 was $316, and the average base premium among plans chosen by households that entered in 2014 was $326. This pattern suggests that, perhaps due to inertia, older cohorts are not as sensitive to premiums.

We observe a similar pattern when we account for premium trends and metal-level selections across each cohort. In Table 2, we examine the mean difference between the monthly base premiums of selected plans and the lowest-premium plans within the metal level of the selected plan. In 2018, the mean

difference between the plans selected by the 2018 cohort and the lowest premium plan was $27, but was $37 among the 2014 cohort. We see the same pattern in the percentage of households that selected the lowest-premium plan, conditional on metal level. Roughly 40% of each cohort selects the lowest-premium plan when it first enrolls, but this percentage declines over time. These findings suggest that inertia may explain the decline in selections of lowest-premium plans over time.

TABLE 2—PLAN SELECTIONS ACROSS ENROLLMENT COHORTS

	Enrollment Year				
	2014	2015	2016	2017	2018
Mean Base Monthly Premiums ($)					
2014 Cohort	257	262	264	282	326
2015 Cohort		255	258	275	317
2016 Cohort			253	272	316
2017 Cohort				265	312
2018 Cohort					308
All Cohorts	257	258	258	274	316
Mean Difference, Base Monthly Premiums of Selected to Lowest-Premium Plans ($)					
2014 Cohort	19	17	21	36	37
2015 Cohort		15	21	34	34
2016 Cohort			17	31	33
2017 Cohort				25	30
2018 Cohort					27
All Cohorts	19	16	20	31	32
Enrollment in Lowest-Premium Plan (%)					
2014 Cohort	40	39	229	24	31
2015 Cohort		42	30	26	34
2016 Cohort			39	33	33
2017 Cohort				41	37
2018 Cohort					42
All Cohorts	40	40	33	31	35

Notes: Base monthly premiums are premiums before age adjustment and premium tax credits are applied. They are inflated to 2018 dollars using the medical CPI. Lowest-premium plans are plans with the lowest premiums within their metal levels.

Our last piece of evidence is that enrollment within insurers appears to be "sticky" over time. Figure A1 shows the brand selections of households that are

new to Covered California as well as those that are returning. Brand selections are split between the four biggest insurers in Covered California—Anthem, BCBS, HealthNet, and Kaiser—and other insurers. New households tended to select insurers that offered plans with lower premiums, while returning households tended to select their previous insurer. For example, Anthem was highly price competitive in 2015. Nearly 40% of new households selected an Anthem plan in 2015, but only 3% of returning households did so. Returning households were thus 16 times less likely than new households to select an Anthem plan in 2015.

C. Descriptive Evidence of Inattention

Attentive households make a conscious choice among available options. Unlike the final plan choice of the household, attention is not directly observable to the econometrician. If a household is inattentive, we observe it "selecting" its default plan. If the household is attentive, we observe its utility-maximizing choice, which may or may not be the household's default plan.

We observe whether households actively selected their plans on the Covered California website or automatically reenrolled in their default plans. A household that actively selected a plan can switch plans or select its default plan. Importantly, we observe website activity only if a household actively selected and confirmed a plan choice; we do not observe website activity if a household browsed CoveredCA.com but reenrolled via automatic reenrollment. We find that 44% of returning households actively selected a plan the following year. The remaining 56% automatically reenrolled in their default plan.

It is tempting to interpret website activity as synonymous to attention. However, this is not necessarily the case. For example, a household may consider all available options and, upon deciding that its default option remains the optimal choice, use automatic reenrollment to reenroll in their previous plan rather than actively select their previous plan on the website. This household would be coded as inactive in the data. Furthermore, households that do register as active on the

website may simply re-select their default plans without any substantial consideration of other options. Despite these limitations, the level of website inactivity does suggest that inattention may play an important role in this market.

To find more rigorous evidence of inattention, we follow Abaluck and Adams (2017) in examining the asymmetry in households' responses to the premiums of their own default plans. Households are informed of the future premiums of their default plans each October. To be aware of the premiums of all other plans, the household must actively search the Covered California website.

In Table 3, we present the results of linear regressions for two binary outcomes: (a) whether a household switched plans and (b) whether a household registered any website activity. We regress both outcomes on the premium of households' default plans, the average premiums of other plans in households' choice sets, households' demographics, and rating area and year fixed effects. We also estimate similar regressions that substitute default and average premium levels with year-to-year changes in default and average premiums.

We find that households' switching behavior is more responsive to the premiums of their default plans, but only marginally so. A $100 increase in the default plan's premium level is associated with a 19 percentage-point increase in the probability that a household switches to a new plan, which is mirrored by an 18 percentage-point decrease in the probability of switching associated with a $100 increase in the mean premium level of all other plans. However, we find that switching is far more sensitive to premium changes in the default premium than changes in other plans. A $100 year-over-year increase in the default plan's premium leads to a 41 percentage-point increase in the probability of switching to a new plan. There is no association with the change in other plans' premiums.

We also find that household website activity is about twice as sensitive to the premium level of the default plan than the mean level of other plans' premiums. While website activity is positively associated with the premium level

of the default plan, it is negatively associated with the mean premium level of other plans. We find that both the change in the default plan's premium and the change in other plans' premiums are positively associated with website activity, but that the default premium has a substantially larger effect.

TABLE 3—REDUCED FORM TESTS OF ATTENTION

	Switch Plans		Website Activity	
Covariate	Premium Level	Premium Change	Premium Level	Premium Change
Premiums				
Default Premium	0.19 (0.00)	0.41 (0.00)	0.15 (0.00)	0.24 (0.00)
Other Premiums*	-0.18 (0.00)	0.00 (0.00)	-0.09 (0.00)	0.13 (0.01)
Household Demographics				
Max Age: 30 to 50	1.30 (0.11)	-0.30 (0.09)	1.96 (0.14)	2.41 (0.12)
Max Age: Over 50	0.89 (0.16)	-2.81 (0.09)	2.64 (0.21)	3.58 (0.12)
Non-Single	3.74 (0.06)	3.74 (0.06)	5.79 (0.08)	5.72 (0.08)
Has Premium Subsidy	1.21 (0.09)	1.50 (0.09)	7.12 (0.10)	7.24 (0.10)
Observations	2,469,303	2,469,303	2,469,303	2,469,303

Notes: All models include metal level, year, and rating area fixed effects. We report regressions using the premium levels and year-over-year premium changes. All premiums are in hundreds of dollars per month ($100/month).
* Mean premium of available plans excluding the default plan.

IV. MODEL, SPECIFICATION, AND IDENTIFICATION

In this section, we describe a two-stage model of plan selection that differentiates between three sources of inertia, including inattention, hassle costs, and tastes for provider continuity. In the first stage, households decide whether to be *attentive*, which we define as acquiring information about the choice set. Attentive households have full information about the entire choice set, which may be costly to obtain. If a household is not attentive, then the choice set of the household contains only the default plan (i.e. the plan they will be enrolled in if they continue to pay a monthly premium and take no other action). We assume all returning households are informed of the characteristics and availability of this

plan, since they are notified of its characteristics by mail. In the second stage, attentive households choose a health plan that maximizes their utility among available options. Households with full information about their choice sets still face two types of switching costs: tastes for provider continuity and hassle costs.[4]

Consider the choice of household i in rating area r during time t. The household chooses among health plans, indexed by j, where the household's default plan is j_0. The probability that the household selects plan j, s_{ijrt}, is

$$s_{ij_0rt} = (1 - \mu_{ij_0rt}) + \mu_{ij_0rt}\, s^*_{ij_0rt}$$
$$s_{ijrt} = \mu_{ij_0rt}\, s^*_{ijrt} \;\; \forall\, j \neq j_o \tag{1}$$

where μ_{ij_0rt} is the probability that the household is attentive to its choice set, given default plan j_o; s^*_{ijrt} is the conditional probability that the household will select plan j, conditional on the household being attentive.

The probability that a household selects a plan other than its default is the product of the probability that it is attentive and the probability that the plan is the utility-maximizing option for the household. The probability that the household selects its default plan is the sum of the probability that it is *not* attentive and the probability that the household will re-select the default plan if it is attentive.

We discuss each stage in detail below. We begin with the attention process that determines μ in Section IV.A and continue with the plan choice problem that determines s^* in Section IV.B. In Section IV.C, we discuss how the parameters of the model are identified. In Section IV.D, we present the details of estimation.

A. Attention and the Choice Set

The first source of inertia facing returning households is the informational barrier of attention. Attention itself is not observable. However, the household's options—and their resulting choice—depend on whether the household is

[4] For households that are new to the market, there is no default insurance plan. In this case, we assume that all households that newly enter the market have full information about their choices.

attentive. If a returning household is not attentive, it implicitly chooses its default plan, typically via automatic reenrollment. If a returning household is attentive, then it makes—and the econometrician observes—its choice from the full set of available plans. Households that are new to Covered California or are returning after discontinuing their coverage must be attentive, meaning must actively select a plan, to be insured through Covered California.

Returning households' decisions to be attentive likely depend on how costly it is to gather information about their options and how much households expect to gain by doing so. We do not explicitly model these costs and expectations; instead, we model the probability that a household pays attention to its plan choices as a logistic function of household demographics, the change in the premium of the household's default plan, and rating area and year fixed effects. Let μ_{ijrt} be the probability that household i with default plan j in rating area r in year t is attentive. We specify this probability as

$$\mu_{ijrt} = \frac{\exp(a_{ijrt})}{1 + \exp\,(a_{ijrt})} \tag{2}$$

$$a_{ijrt} = \delta' D_{irt} + \beta \Delta P_{ijrt} + \theta_r + \tau_t \tag{3}$$

where D_{irt} is a vector of household demographic characteristics including the age of the oldest household member (i.e., maximum age), an indicator for whether the household qualifies for a premium tax credit, and an indicator for whether the household consists of more than one member; ΔP_{ijrt} is the difference between the premium of the household's default option plan and the premium of the household's previous plan; and θ_r and τ_t are rating area and year fixed effects.[5]

B. Plan Choice

Attentive households choose a health plan that maximizes their utility. The utility U_{ijrt} that a new household i in rating area r in year t derives from plan j is

[5] This is identical to defining a household as attentive if $a_{ijrt} + \eta_{ijrt} > 0$, where η_{ijrt} is a logistic random variable.

$$U_{ijrt} = u_{ijrt} + \Psi_{ijrt} + \Phi_{ijrt} + \epsilon_{ijrt} \quad (4)$$

where u_{ijrt} is the static utility to the household; Ψ_{ijrt} is a the taste for provider continuity, a utility benefit to maintaining access to preferred medical providers; Φ_{ijrt} is a hassle cost, a switching cost that captures the additional time, administrative, and psychological costs associated with changing insurance plans; ϵ_{ijrt} is an unobserved idiosyncratic preference.

The static utility u_{ijrt} is specified as

$$u_{ijrt} = -\alpha_i P_{ijrt} + \nu_i F_{jrt} + \xi_{jr} \quad (5)$$
$$\alpha_i = \alpha' D_{irt}$$
$$\nu_i \sim N(0, \Omega)$$

where P_{ijrt} is the age-adjusted, post-subsidy monthly premium of plan j for household i; F_{jrt} is a vector of indicators for whether plan j is offered by one of the four largest firms (Anthem, Blue Shield, Kaiser, and HealthNet); and ξ_{jr} is a vector of unobserved plan quality.

We allow α_i to vary by demographic characteristics D_{irt}. Following Ho, Hogan, and Scott Morton (2017), we allow for a distribution of preferences, ν_i, over the four largest firms with a variance matrix Ω. We assume these preference distributions are normal and independent for each firm (i.e. Ω is diagonal).

We exploit the institutional features of the market to capture unobserved plan qualities ξ_{jr}. As described in Section II.B, all characteristics of insurance plans besides premiums and cost-sharing, which we control for, are constant within networks. We assume the premiums, cost-sharing, and other plan characteristics are additively separable and control for ξ_{jr} using network-level fixed effects for each rating area. These fixed effects also capture mean preferences for brands (i.e., insurers), since networks are offered by insurers.

Returning attentive households face two sources of inertia in their choice of health plans. The first is associated with the household's preferred medical

providers, Ψ_{ijrt}. A health plan may be more valuable to a household if its network includes the household's preferred medical providers. Under the simplifying assumption that a household is certain that their current providers are available in their current network and believe there is a lesser and equal probability that their current providers are available in any other network, the preference for provider continuity will appear as a network-level switching cost, which we specify as

$$\Psi_{ijrt} = \psi_i N_{ijrt} \qquad (6)$$
$$\psi_i = \psi' D_{irt}$$

where N_{ijrt} is an indicator for whether plan j is a part of the same network as the plan that household i is currently enrolled in. We allow ψ to vary by demographic characteristics D_{irt}, in the same manner as the premium sensitivity parameter, α_i.

The second source of inertia, hassle costs, captures other forces that make it costly for households to switch health plans after accounting for attention and tastes for provider continuity. These costs are captured in the plan choice model as a plan-level switching cost, $\Phi_{ijrt,}$ which we specify as

$$\Phi_{ijrt} = \phi_i I_{ijrt} \qquad (7)$$
$$\phi_i = \phi' D_{irt}$$

where I_{ijrt} is an indicator for whether plan j is the same insurance plan that household i is currently enrolled in. We allow the parameter ϕ to vary by demographic characteristics D_{irt}.

Conditional on being attentive—that is, having full information on the choice set—a household's probability of choosing plan j is given by

$$s^*_{ijrt} = \frac{\exp\left(u_{ijrt} + \Psi_{ijrt} + \Phi_{ijrt}\right)}{\sum_k \exp(u_{ikrt} + \Psi_{ikrt} + \Phi_{ikrt})}. \qquad (8)$$

We compute the probability that a household chooses plan j by integrating over the distribution of preferences given by the parameter Ω (see section IV.D for

details). Note that for households that are newly entering the market, or for whom their prior plans are no longer offered, Ψ_{ijrt} and Φ_{ijrt} are zero.

C. Identification

The first identification concern in estimating a discrete choice demand model is the co-determination of the premium and aspects of plan quality that are unobserved to the econometrician. We address these issues by exploiting aspects of the institutional environment. First, the structure of the age-rating curve and the ACA's premium tax credits lead to variation in premiums across households *within* rating areas that is plausibly exogenous to preferences over unobserved aspects of plan quality. Additionally, due to the strict plan standardization regulations in Covered California, we can control for the only dimensions on which plans are allowed to vary: premium, metal level, and network. As explained in Section II.B, all plan characteristics besides premiums and metal level must be set at the network level in Covered California. We thus use network fixed effects to control for all plan characteristics besides premiums and metal level. Furthermore, we allow network fixed effects to vary at the rating area level to allow for households' perceptions of network quality to vary with geography. This may occur if, for example, a prestigious northern California hospital is included in a statewide network. Households in northern California may be more likely to select the network due to the inclusion of the prestigious hospital, but the prestigious hospital is unlikely to affect perceptions of the network's quality in southern California. This approach has been used in other studies of Covered California (Drake 2019; Tebaldi 2017; Saltzman 2019).

The next concern is separately identifying inertia from *spurious state dependence*—unobserved household preferences that may cause households to repeatedly select the same plan. Our goal is to identify *structural state dependence*, the type of inertia we study in this paper. We provide two semi-parametric tests for the presence of structural state dependence. The first is a

Chamberlain test, which tests whether previous period premiums affect plan level market shares in the current period. The second is a descriptive analysis of household choice sequences (Honore and Kyriazidou 2000). Intuitively, we compare the frequency with which households that select the same plan twice in a three-year period choose the same plan consecutively or alternate between one plan and another. In both cases, we find substantial evidence of structural state dependence. Further details and results are included in Appendix A.

The identification of the inertia parameters relies upon the churn of households in and out of Covered California. Roughly 46% of household-years are new households during the study period. Our identifying assumption is that the entering cohorts of households have the same distribution of preferences—conditional on observable attributes—as returning households. Households' decisions to enter and exit the market are also often driven by other life events, such as changes in family structure and employment. This assumption is also maintained in other papers estimating inertia in insurance markets that exhibit considerably less churn than the Marketplaces (Handel 2013; Heiss et al. 2016).

We also decompose inertia into three separate sources: consumer inattention, tastes for provider continuity, and hassle costs. Since attention is not observable by the econometrician, we exploit the choices of inertial households in order to determine if they make choices *as if* they have information about their choice sets or not. The key determinant of attention in the model is the year-over-year change in the premium of the household's default plan, which is identified in part through demand asymmetry (Abaluck and Adams 2018) and in part through exclusion (Goeree 2008). One implication of full information is that households will have symmetric substitution patterns. For example, a change in the premium of plan x will have the same effect on the market share of plan y that a change in premium of plan y will have on the market share of plan x. Deviation in household substitution patterns from this symmetry helps separately identify the

degree to which a change in the premium of a household's default plan affects its attentiveness. We assume that the premium of a household's default plan in the prior year affects its choice in the current year only through the probability that the household pays attention to the available plans in the current year, as in Heiss et al. (2016) and Ho, Hogan, and Scott Morton (2017). We include fixed effects for demographics, year, and the default plan's metal level to allow mean attention levels to vary across these dimensions.

We exploit Covered California regulations to identify remaining inertia attributable to tastes for provider continuity. To do so, we include an indicator for whether each plan has the same network as the household's previous plan. The parameters of this network-level switching cost are identified by the relative frequency with which households that switch to a new insurance plan do so within the same network of their previous plan. This identification strategy relies on an assumption that either a household's preferred providers are unavailable through other insurance networks (as in the case of Kaiser) or that households are uncertain about which networks cover their preferred providers. While households can search network directories on the Covered California website, these directories are often inaccurate and can change at any time (Haeder, Weimer, and Mukamel 2016). Even informed households may thus be uncertain about which providers participate in which networks. Still, our model likely captures a lower bound on preferences for networks that include households' preferred providers.

A hassle cost indicator for whether a given plan is the household's default plan in the choice equation captures remaining inertia that cannot be attributed to other factors. This switching cost may contain things like the time and cognitive costs of switching health plans, uncertainty about receiving medical care and prescriptions with different cost-sharing levels, or additional search costs that are not captured by our binary information framework.

IV.D. Estimation

The likelihood of observing a sequence of choices for a given household that is enrolled in the market for time $t = 0, \ldots, T$ is given by

$$\mathcal{L}_i = \int_{\nu} \prod_{t} \prod_{j} \left(s_{ijrt}\right)^{Y_{ijrt}} \; dF(\nu; \Omega) \tag{9}$$

where Y_{ijrt} is an indicator of whether household i purchased plan j in time t. We use integration-by-simulation to integrate the probability of a particular sequence of choices over the distribution of unobserved brand preferences, ν, which are normally distributed with variance Ω. We solve for all parameters by maximizing the sum of the log-likelihood of the data, weighting equally each household choice sequence for a 5% sample of all households. We locate the maximum using Newton's method with a combination of the analytical hessian matrix and BFGS approximated hessian matrix.

V. RESULTS

We begin by presenting three increasingly complex versions of the choice model described in Section V. Model 1 includes only the plan-level switching cost indicator for whether the given plan choice is the same as the household's default option. Model 2 includes switching cost indicators at the plan and network levels, allowing us to separate hassle costs, the plan-level indicator, from tastes for provider continuity, the network-level indicator. Model 3 adds the attention stage described in Section IV.B—it is the full model described in Section IV. Each model allows for unobserved preference heterogeneity by including random coefficients on the fixed effects for the four largest insurers.

Since all models are estimated with maximum likelihood, we can compare their predictive power. We find that adding network-level switching costs and including an attention stage helps to explain households' plan choices. Table 4 shows the improving likelihood and Bayesian Information Criterion values as network-level switching costs and inattention are added to the model. We find

that the simpler specifications are rejected by a likelihood ratio test. Accordingly, we focus our subsequent discussion on the model with network-level switching costs and attention—model 3—though we do use the simpler models to understand how using simpler models could lead to incorrect inferences.

TABLE 4—COMPONENTS AND PROPERTIES OF CHOICE MODELS

	Model		
Model Components and Properties	(1)	(2)	(3)
Model Components			
Plan-Level Switching Cost	X	X	X
Network-Level Switching Cost		X	X
Attention Stage			X
Model Properties			
Number of Parameters	269	274	291
Log Likelihood*	-413,000	-412,800	-411,000
Bayesian Information Criteria (BIC)	829,300	829,000	825,600

Notes. All models are estimated on 5% sample of households. The data used for estimation contain 117,128 households and 243,001 household-years. The mean household in the sample had 27.2 plan choices. In total, there were 6,602,174 household-year choices in each model.
* Likelihood ratio tests reject the simpler models relative to model (3).

Table 5 reports the average marginal effects of the attention stage, which are percentage point changes in the probability that a household pays attention to its plan choices. Our key finding is that a $10 increase in the post-subsidy premium of the household's default plan is associated with a 0.28 percentage-point increase in the probability that a household pays attention to its plan options. A $10 increase in year-over-year post-subsidy premiums is a modest change in our sample; the median premium change is $18.20 and the inter-quartile range spans increases of $7.80 to $49.40 per month. We also find that receiving a premium tax credit (i.e., having a lower income) is associated with a 12.9 percentage point increase in the probability that a household is attentive.

TABLE 5—AVERAGE MARGINAL EFFECTS OF ATTENTION MODEL

Covariate	Average Marginal Effect
Change in Default Plan's Premium ($10/month)	0.28 (0.03)
Demographics	
Maximum Age: 30 to 50	4.49 (1.69)
Maximum Age: Over 50	6.07 (1.84)
Non-Single Household	4.64 (1.24)
Household Receives Premium Tax Credit	12.9 (1.29)
Observations	5,299,255

Notes: Model contains fixed effects for the metal level of the default plan, rating area, and year. Average marginal effects represent the percentage point change in the probability that a household pays attention to its plan options. The reference household has a maximum age under 30, is single, and does not receive a premium tax credit.

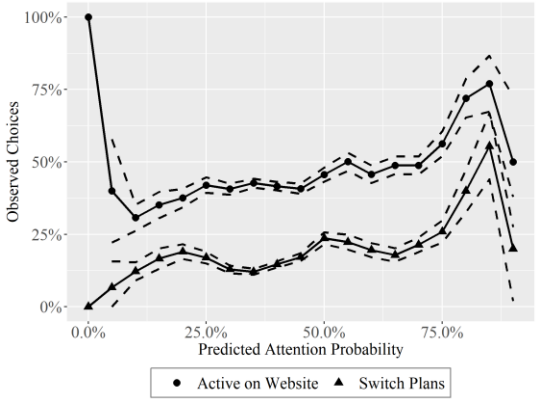

FIGURE 2. PREDICTED ATTENTION AND OBSERVED ACTIVITY

Notes: This figure shows the empirical switching probability and website activity probability conditional on intervaled values of predicted attention probability. The dashed lines represent 5 percent confident intervals around the empirical means.

In Figure 2, we show how the predicted probability that a household is attentive is related to plan switching and website activity. We find that the households with the highest probabilities of paying attention are also those most likely to actively select a plan on the website. These results suggest that the identification of attention in the model is coming from consumer behavior. Additionally, the mean predicted level of attention (42%) closely matches the

mean observed level of website activity (44%). This suggests that some households are attentive but still prefer their default plans and do not take the unnecessary effort to actively reenroll, and that some households are actively reenrolling in their plans but not fully considering the possible alternatives.

TABLE 6—MEAN SWITCHING COSTS

	Willingness to Pay ($/Month)		
Type of Household	(1)	(2)	(3)
Mean Willingness to Pay	146	152	113
Plan Level	146	144	78
Network Level	-	8	35

Notes. Willingness to pay, or switching costs, is calculated as the relevant inertia coefficient over the premium coefficient from model 3 as described in Table 4. For example, plan level willingness to pay is calculated as the coefficient of the plan-level inertia term over the premium coefficient.

Table 6 displays switching costs (i.e., willingness to pay) calculated from the estimated coefficients, which are shown in Appendix Table A1. In our preferred model, model 3, we find that total switching costs are $113 per month. Two thirds of these switching costs are due hassle costs ($78); the remaining third are due to tastes for provider continuity ($35). Total switching costs increase by 29 to 34 percent when the attention stage is not included in the model, as is the case in models 1 ($146) and 2 ($152). These differences are due to the models 1 and 2 overestimating hassle costs, even though they underestimate tastes for provider continuity. Specifically, network-level switching costs are $8 in model 2 without an attention stage and $35 in model 3 with an attention stage. Plan-level switching costs are $144 in model 2, but those costs decrease by nearly 50 percent in model 3 ($78). Failing to account for inattention thus alters our findings.

Table 7 shows the estimates of switching costs broken out by demographic groups. We find total switching costs are between $195 per month for older, non-single households with premium tax credits and $58 per month for young, single households without premium tax credits. Tastes for provider continuity range

from $25 to $53 per month, and hassle costs ranges from $30 to $142 per month. Both hassle costs and tastes for provider continuity (i.e., plan- and network-level switching costs) are higher for households with a higher maximum age, with median increases of roughly 50% between households with a maximum age of 50-64 relative to those with a maximum age of 18-29. Non-single households also have higher hassle costs and tastes for provider continuity. Hassle costs are significantly larger for households with premium tax credits, a rough proxy for income (e.g., a difference of $83 between non-single households with a maximum age of 50-64 by premium tax credit receipt).

TABLE 7—SWITCHING COSTS ACROSS DEMOGRAPHIC GROUPS

	Willingness to Pay ($/Month)		
Type of Household	Plan	Network	Total
Single with Premium Tax Credit			
18-29	47	25	72
30-49	67	29	96
50-64	96	39	135
Non-Single with Premium Tax Credit			
18-29	57	28	84
30-49	89	34	123
50-64	142	53	195
Single without Premium Tax Credit			
18-29	30	28	58
30-49	38	31	69
50-64	49	38	86
Non-Single without Premium Tax Credit			
18-29	33	30	63
30-49	44	35	79
50-64	58	43	102

Notes: Willingness to pay, or switching costs, is calculated as the relevant inertia coefficient over the premium coefficient from model 3 as described in Table 4. For example, plan-level willingness to pay is calculated as the coefficient of the plan-level inertia term over the premium coefficient.

In Table 8, we simulate the percentage of returning households that would have kept their default plans with and without each source of inertia. In the data, we observe that 83% of returning households keep their default plans. Models 1, 2, and 3 predict that 82%, 82%, and 83% of returning households would keep their default plan. Model 3, our preferred model, predicts that eliminating any one source of inertia would lead to modest decreases in returning households keeping their default plans, though these decreases are higher for inattention (22 percentage points) and hassle costs (16 percentage points) than they are for tastes for provider continuity (5 percentage points). There is, however, an interaction effect that occurs when both inattention and hassle costs are eliminated. Specifically, eliminating both reduces default plan reenrollment by 56 percentage points to 27%, 17 percentage points more than would be expected if inattention and hassle costs' effects on inertia did not interact with one another. Tastes for continuity do not have similar interaction effects.

TABLE 8—DEFAULT PLAN SELECTION WITH, WITHOUT INERTIA

	Returning Households Enrolling in Default (%)		
Scenario	(1)	(2)	(3)
Observed Default Enrollment	83	83	83
Predicted Default Enrollment	82	82	83
No Inattention	-	-	61
No Hassle Costs	26	27	66
No Tastes for Prov. Cont.	-	81	78
Inattention Only	-	-	63
Hassle Costs Only	26	81	51
Taste for Continuity Only	-	27	27
No Sources of Inertia	26	26	20

Notes. In this table we display the model-predicted probability that a returning household will reenroll in its default plan. We decompose the components of inertia by eliminating each mechanism one at a time. We do so by predicting a counter-factual model in which each type of switching cost (hassle costs and tastes for continuity) are equal to $0 and a model where the attention probability of all consumers is 1.

Eliminating all sources of inertia would lead to a default plan reenrollment rate of 20%, over a three-quarters reduction from the predicted rate of 83%. This suggests that roughly a quarter of default plan reenrollment is due to returning households simply preferring their previous plan in the subsequent year. The remaining three quarters of default plan reenrollments comprising 62% of returning households, however, are due to inertia.

VI. DISCUSSION

Although inertia is a well-documented phenomenon in the health insurance literature, relatively little is known about its causes. Furthermore, the literature has not examined inertia in the Health Insurance Marketplaces created by the Affordable Care Act. This paper examines three sources of inertia—inattention, hassle costs, and tastes for provider continuity—in the largest Health Insurance Marketplace, Covered California.

We exploit variation in inertial plan choice stemming from the churn of households in and out of Covered California over time. We have three key findings. First, inertia plays a large role in Marketplace health plan choice. Default plan selection among returning households is 83%, three quarters of which stems from households automatically reenrolling in their default plan. Mean switching costs are $146 per month, which is equivalent to 58% of the $252 median monthly premium paid by Covered California households in 2018. Our estimate also is consistent with studies of other health insurance markets, particularly Handel's (2013) estimate of $169 monthly switching costs. Second, we find that each source of inertia contributes to overall inertia, but that the effects of inattention and hassle costs are much greater than tastes for provider continuity. Separately eliminating inattention and hassle costs would reduce default plan selection by 22 and 16 percentage points; jointly eliminating them would reduce default plan selection by 56 percentage points, 17 percentage points more than the sum of their individual effects. The most effective interventions to

reduce inertia should therefore jointly address inattention and hassle costs. We also find that the large role that inattention plays in our findings is consistent with studies of Medicare Part D (Ho, Hogan, and Scott Morton 2017; Heiss et al. 2016; Abaluck and Adams 2017). Third, we find significant variation in inattention and especially hassle costs across household demographics. While lower income, older households are more likely to pay attention to their options, they face substantially higher hassle costs. Hassle costs for older households can be as much as 250% of those for younger households, and twice as large for lower income households than for higher income households.

A. Policy Implications

Our findings have important policy implications. First, given the prevalence of inattention, policymakers should reduce the welfare losses consumers experience by being inattentive. A simple way to do so without interfering with consumer autonomy would be to implement "smart defaults" (Handel and Kolstad 2015b). Under *smart defaults*, a simple algorithm would reassign returning households to a default plan within their network based on medical expenses from the previous year. For example, if a household were enrolled in a gold plan for a given network in 2019 and incurred no medical expenses, the household could be reassigned to a bronze plan. The household could still choose to remain in the gold plan, but its default option would minimize its total medical expenditures (absent a large change in health status). Another way to reduce the welfare losses from inattention is to nudge households toward plans that optimize expected medical expenses and premiums during initial enrollment. Covered California and healthcare.gov currently do so by recommending plans to enrollees based on the demographic information and simple questionnaires about expected medical expenses. While there is not a precedent for smart defaults in the Marketplace, they have been used in Medicare Advantage and Medicare Part D before and after initial enrollment to assign

enrollees to plans that cover their prescription drugs (Ericson 2014b; Hoadley et al. 2007) and their primary care providers (Layton, Ndikumana, and Shepard 2017). Such approaches would be feasible in the Marketplaces.

Second, interventions to reduce inertia should focus on reducing both inattention and hassle costs. Large reductions in inertia cannot be obtained without jointly reducing these two sources of inertia. Informational nudges may be an effective tool to reduce inattention. For example, a randomized intervention in Colorado's Marketplace found that mail-based informational nudges increased households' attention by 23% (Ericson et al. 2017). Similar interventions in Covered California and the Federally-facilitated Marketplace found that mail-based informational nudges were highly cost-effective at encouraging enrollment (Domurat, Menashe, and Yin 2019; Goldin, Lurie, and McCubbin 2019). Simple information nudges thus appear to be a promising tool to reduce inattention. However, different types of interventions appear to be necessary to reduce hassle costs. The informational nudge in Colorado, despite increasing attention, did not ultimately cause enrollees to switch health plans (Ericson et al. 2017). Survey-based and qualitative evidence suggests that limited numeracy and knowledge of health insurance are all important barriers to enrollee decision making (Taylor et al. 2016; Hero et al. 2019), and that access to consumer assistance can help alleviate these barriers (Lee et al. 2017; Hero et al. 2019), particularly for low income enrollees. That we found high hassle costs for lower income households in California, the state that has had the most robust Marketplace outreach (Lee et al. 2017), suggests that outreach efforts significantly beyond those that have occurred under the ACA may be necessary to provide consumers with the knowledge necessary to make welfare-maximizing health plan choices, even from a relatively standardized set of options. Our estimates also suggest that the Trump Administration's decision to cut Marketplace outreach funding by 90% (Jost 2017) may increase inertia in other states' Marketplaces—particularly those with

larger shares of low income enrollees—and ultimately result in increased Marketplace premiums and federal outlays for premium tax credits.

Third, interventions to reduce inertia have the potential to affect selection. When inertia is reduced, households are more likely to sort into health plans based on their health status (Ericson and Sydnor 2017; Handel 2013). Our findings indicate that sicker households, particularly those with older members and lower incomes, are more attentive than their healthier counterparts but also experience greater hassle costs. Interventions that reduce inattention thus are likely to encourage healthier households to sort into less generous plans, while interventions that reduce hassle costs are likely to cause sicker households to sort into more generous plans. Selection is increased in either case, though the way in which it is increased—via sicker enrollees selecting more generous plans or healthier enrollees selecting less generous plans—varies depending on the type of inertia addressed. Regardless, policy interventions to reduce inertia make the maintenance of an accurate risk adjustment system increasingly important. Without proper risk adjustment, adverse selection may have deleterious effects.

Fourth, subject to the limitation mentioned below, interventions to reduce tastes for provider continuity are unlikely to result in large decreases in inertia. They may, however, be part of a broader strategy to provide enrollees with information about the Marketplaces. Currently, insurers may drop in-network providers without notice and network directories are notoriously inaccurate (Haeder, Weimer, and Mukamel 2019). A requirement that insurers guarantee the contents of their provider network directories for one year would reduce enrollees' uncertainty as to whether they can continue receiving care from their preferred providers if they switch networks. The elimination of this uncertainty would likely reduce tastes for continuity and would reduce the learning required of enrollees to select a health plan that meets their medical and financial needs.

B. Limitations

Our study is subject to limitations. First, unlike Higuera, Carlin, and Dowd (2018), we are not able to control for consumer loyalty to individual providers. That study explicitly measured whether health plans' networks contained providers that were used by enrollees in the previous year. They found enrollees' willingness to pay for a broader network was substantially reduced once controls for the consumer's provider of choice were included. However, their model did not include inattention. Future studies of the Marketplaces should combine enrollment data with claims data to merge these approaches.

Another limitation is that, while we can identify why households exhibit inertia in plan choice, we are unable to determine why they are inattentive. Surveys suggests that unawareness and misunderstandings about the Marketplaces and the Affordable Care Act are prevalent throughout California, though lower than the rest of the nation due to aggressive marketing and outreach (Domurat, Menashe, and Yin 2019; Lee et al. 2017). Poor numeracy and misunderstandings about health insurance benefits also may contribute to inattention (Hero et al. 2019), particularly among lower-income enrollees. Unawareness of potential savings and returning enrollees' uncertainty about whether they may keep preferred providers may also contribute (Domurat, Menashe, and Yin 2019; Haeder, Weimer, and Mukamel 2019). While the literature has now began to clarify why consumers may not sign up for health insurance, it is less clear why existing enrollees may not pay attention.

VII. CONCLUSION

Despite the large role that inertia plays in health insurance markets, no paper to our knowledge has holistically examined its sources or its role in the Health Insurance Marketplaces. This paper fills both gaps by identifying three sources of inertia in California's Marketplace: inattention, hassle costs, and tastes for provider continuity. We do so by exploiting variation in churn in enrollment and plan offerings over time. Our findings indicate that, although all three sources of inertia

play a role in repeated plan choice, inattention and hassle costs play larger roles than tastes for provider continuity. Due to an interaction between these two sources of inertia, effective policy interventions will need to reduce both of them to achieve large reductions in inertia. Future researchers should continue to identify not only *if* but also *why* inertia is present in order to make concrete policy recommendations.

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Appendix A. Tests for Structural State Dependence

A. Chamberlain Test of Structural State Dependence

We formally test for structural state dependence by using a Chamberlain test (Chamberlain 1982; Erdem and Sun 2001). The Chamberlain test is a test of inertial behavior. It tests whether premiums from the previous period predict market share in the current period, conditional on plan characteristics. If inertia is associated with plan choice, then premiums from the previous period should be negatively associated with plans' market shares. Using a approach similar to Ericson (2014), we implement the Chamberlain test using aggregate enrollment data for incumbent Covered California plans.

We estimate the log market share $\ln(s_{jkrt})$ of plan j in rating area r in year t as

$$\ln(s_{jrt}) = \alpha_1 P_{jrt}^{Ord} + \alpha_2 P_{jrt-1}^{Ord} + \beta M_{jrt} + \lambda_j + \theta_r + \tau_t + \omega_{jrt.} \quad (1)$$

Plan j's premium-metal order P_{jrt}^{Ord} is its rank, from least to greatest, in terms of premiums among other plans of the same metal level within its rating area r in year t. For example, the second-lowest silver plan would have a premium-metal order of two among silver plans in a given rating area-year. Note that this measure is discrete, not continuous. Lagged premium-metal order P_{jrt-1}^{Ord} is plan j's premium-metal order in rating area r in the previous year, $t-1$. We use premium-metal order rather than premiums because premiums and lagged premiums are collinear ($\rho = 0.97$), whereas premium-metal order and lagged premium-metal order are not (Spearman rank-order correlation $\rho = 0.74$). This is the case because plans' premiums do not tend to change greatly over time, but their premium-metal order does due to the entry and exit of competing plans.

We also include fixed effects for metal level (M_{jrt}), networks (λ_j), rating area (θ_r), and year (τ_t). The error term ϵ_{jkr} has a gamma distribution and is

clustered by insurer. We estimate this model as a generalized linear model, confirming that a gamma distribution is appropriate using a Pregibon link test. Inertia predicts that there is a negative relationship between past premiums and current market share ($\alpha_2 < 0$), which is to say that lagged premium-metal order from the previous year is negatively associated with market share in the current year.

Table A2 shows results of several Chamberlain tests. Columns (1) and (2) are models with lagged premium-metal order. Column (1) has separated network and year fixed effects; column (2) has interacted network and year fixed effects. Both models show negative associations between premium-metal order and market share. Columns (3) and (4) are analogous to columns (1) and (2) but contain lagged premium-metal order. They both show that lagged premium-metal order is negatively associated with current market share, which suggests that structural state dependence influences plan choice. We also observe that the magnitude of the effect of contemporaneous premium-metal order on plan choice in models that include lagged premium-metal order (columns (3) and (4)) is lower than models that do not (columns (1) and (2)).

B. A Semi-Parametric Test for Structural State Dependence

In this section, we outline a descriptive analysis of the data that can provide intuitive support for structural state dependence in a multi-product discrete choice setting, following the spirit of the binary choice framework of Honore and Kyriazidou (2000). Suppose that consumers, indexed by i, have preferences over J plans given by a vector, $\mu_i = \{\mu_{ij}\}_{j=1}^{J}$. In a given period t, consumers select a plan according to this preference vector, μ_i, and a realization of a random component of utility, $\epsilon_{it} = \{\epsilon_{ijt}\}_{j=1}^{J}$, where each component of ϵ_{it} is identically and independently distributed according to a type I extreme value distribution. In

this case, the probability that a consumer i will select a plan j in time t can be written as

$$s_{ij} = \frac{\exp(\mu_{ij})}{\sum_k \exp(\mu_{ik})}.$$

In addition to consumer preferences, suppose that there is some structural state dependence in consumer choice that increases the utility of the plan selected in the previous period. Then, if plan j was previously selected in period $t-1$, the probability of selecting plan j again in period t for some $\delta_i > 0$ is given by

$$s_{ij}^{\gamma} = \frac{\exp(\mu_{ij} + \delta_i)}{\exp(\mu_{ij} + \delta_i) + \sum_{k/j} \exp(\mu_{ik})}.$$

Consider two possible sequences of consumer choices. In the first sequence, A_1, the consumer selects a plan j for the first two periods and then switches to another plan, denoted by $-j$, in the third period. In the second sequence, A_2, selects plan j, switches to another plan in period two, then switches back to plan j in period three.

$$A_1 = [j, j, -j]$$

$$A_2 = [j, -j, j]$$

Under the assumptions made so far,

$$\mathrm{P_i}(A_1) = s_{ij} s_{ij}^{\gamma} s_{ik}$$

$$\mathrm{P_i}(A_2) = s_{ij} s_{ik} s_{ij}$$

$$\frac{P_i(A_2)}{P_i(A_1)} = \frac{s_{ij}}{s_{ij}^{\gamma}} = \frac{\exp(\mu_{ij})}{\exp(\mu_{ij} + \gamma_i)} \frac{\exp(\mu_{ij} + \gamma_i) + \sum_{k/j} \exp(\mu_{ik})}{\exp(\mu_{ij}) + \sum_{k/j} \exp(\mu_{ik})}$$

In the presence of structural state dependence, $P_i(A_2)/P_i(A_1) < 1$. The intuition is that these two sequences contain the same frequency of plan selections and differ only via the number of switches. Importantly, this test relies on the assumption that the deterministic component of utility is constant across time. As

that is unlikely to hold in our environment, we consider these results to be suggestive rather than a formal test.

We restrict our sample to households that we observe in the data for at least three consecutive years after their initial purchase—649, 564 households out of a total of 2,290,514 returning households in the data. We drop 31,624 households that initially select plans that exit the market within three years of the initial purchase. We identify consumer types by conditioning on observable characteristics—income, family size, and the age of the oldest household member—and by conditioning on the household's initial choice to control for unobserved preferences of the household. We divide income based on whether a household is ineligible for premium subsidies (FPL > 400%), eligible for premium subsidies only (FPL $\leq$ 400% and FPL > 250%), or eligible for both premium subsidies and cost-sharing reductions (FPL $\leq$ 250%). We divide the age of oldest household member into five 10-year increments beginning with 10 to 20 years old and ending with 60 to 65. And we divide consumers based on whether they are a single member household or not. The demographic divisions, in combination with the initial choice of the household, result in 11,538 consumer types. We restrict our analysis to consumer types that contain at least 50 households, which leaves 2,393 distinct consumer types and covers 83% of the sample.

Across the first three periods that a household is in the market, we divide choice sequences into five possible paths based on whether a household stays in its previous plan, switches to its new plan, and in the final period, whether that switch is a return to the initially selected plan. In the first path, A_0, the household selects its initial choice, stays with that choice in period two, and stays with that choice again in period three. The second two paths are the sequences described above, A_1 and A_2. In A_1, the household stays in the initial path in period two and switches to a new plan in period three, and in A_2 the household switches to a new

plan in period two and returns to the initial plan in period three. In sequence A_3, the household switches to a new plan in period two and stays with that choice in period three. And finally, in sequence A_4, the household switches to a new plan in period two, and switches again to yet another plan in period three.

For each consumer type, we compute the empirical probability of each choice sequence. In Appendix Table A3, we show the distribution of these empirical probabilities across all consumer types. The most common choice sequence is the A_0, in which the household never switches away from its initial choice. The second most frequent choice sequences are A_1 and A_3 which each involve a single plan switch either in the second period or third period. The empirical probability of a choice sequence declines sharply with the number of choice switches in the sequence, suggesting the existence of structural state dependence.

The empirical analog to the test proposed above is displayed in the last row of Appendix Table A3. For the large majority of consumer types, the ratio of the probability of sequence A_2 to the probability of sequence A_3 is very small. For 25 percent of consumer types, the sequence A_2 does not appear at all and the ratio is 0, and for 75 percent of types, the sequence A_1 is more than 8 times more likely. This suggests that structural state depends plays a significant role in consumer choices.

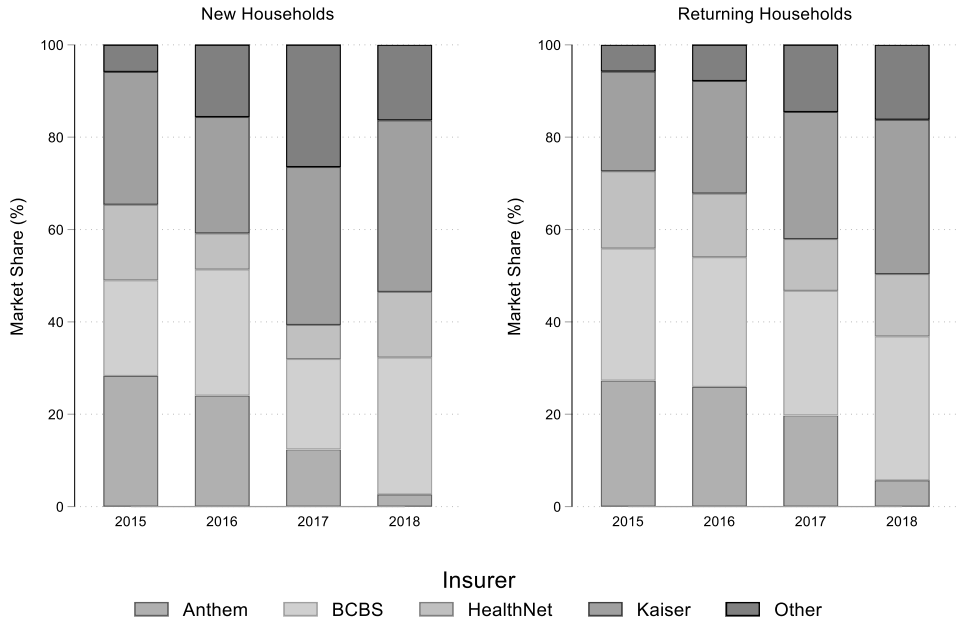

FIGURE A1. INSURER MARKET SHARES AMONG NEW AND RETURNING HOUSEHOLDS

Notes. Anthem, Blue Shield, HealthNet, and Kaiser are the four largest insurers in Covered California, accounting for over 80 percent of market share. Anthem withdrew from much of Covered California in 2018.

TABLE A1—COEFFICIENTS OF PLAN CHOICE MODELS

Covariate	(1)	(2)	(3)
Premium	-5.32	-5.29	-5.47
	(0.67)	(0.07)	(0.07)
Maximum Age: 30-50	0.99	0.98	0.98
	(0.04)	(0.06)	(0.04)
Maximum Age: 50-64	1.64	1.64	1.63
	(0.03)	(0.06)	(0.04)
Family (Non-Single)	0.74	0.73	0.73
	(0.02)	(0.04)	(0.02)
Receives Premium Tax Credit	1.52	1.50	1.73
	(0.05)	(0.04)	(0.06)
Switching Costs			
Plan	4.58	4.19	1.97
	(0.05)	(0.06)	(0.14)
Maximum Age: 30-50	-0.11	0.00	0.09
	(0.04)	(0.06)	(0.09)
Maximum Age: 50-64	-0.12	0.01	0.25
	(0.04)	(0.06)	(0.10)
Family (Non-Single)	-0.28	-0.18	-0.06
	(0.03)	(0.04)	(0.6)
Receives Premium Tax Credit	-0.86	-0.67	0.15
	(0.05)	(0.05)	(0.09)
Network		0.90	1.54
		(0.09)	(0.09)
Maximum Age: 30-50		-0.22	-0.13
		(0.08)	(0.08)
Maximum Age: 50-64		-0.25	-0.10
		(0.08)	(0.08)
Family (Non-Single)		-0.19	-0.10
		(0.05)	(0.05)
Receives Premium Tax Credit		-0.46	-0.61
		(0.08)	(0.08)
Fixed Effects			
Metal Level – Rating Area	X	X	X
Insurer – Rating Area[a]	X	X	X

[a] Insurer indicators are specified as random effects for the four largest insurers in Covered California—Anthem, Blue Shield, HealthNet, and Kaiser, which covered roughly 80 percent of households from 2014 to 2018—and as fixed effects for other insurers.

TABLE A2—CHAMBERLAIN TESTS OF STRUCTURAL STATE DEPENDENCE

	Percentage Point Change in Plan Market Share (SE)			
Covariate	(1)	(2)	(3)	(4)
Premium-Metal Order				
Second	-0.552	-0.632	-0.418	-0.496
	(4.50)	(3.73)	(3.47)	(3.34)
Third	-1.137	-1.186	-0.886	-0.951
	(4.53)	(3.84)	(4.28)	(3.51)
Fourth	-1.361	-1.366	-1.077	-1.102
	(4.92)	(4.20)	(4.97)	(3.90)
Fifth or greater	-1.657	-1.671	-1.271	-1.304
	(6.85)	(5.91)	(7.53)	(5.47)
Lagged Premium-Metal Order				
Second			-0.450	-0.309
			(2.34)	(3.85)
Third			-0.503	-0.397
			(2.40)	(2.79)
Fourth			-0.551	-0.433
			(2.36)	(2.42)
Fifth or greater			-0.652	-0.552
			(2.61)	(2.64)
Fixed Effects				
Metal Level	X	X	X	X
Network	X		X	
Year	X		X	
Network-Year		X		X
Observations	1,581	1,581	1,581	1,581

Notes. All models are estimated with generalized linear models with log links and gamma-distributed, insurer-clustered error terms. The dependent variable is the enrollment share for plan j in rating area r in year t. The sample is all incumbent Covered California plans (i.e., plans that were active in the previous year). All plan characteristics besides premiums and metal levels are set at the network level.

TABLE A3—DISTRIBUTION OF CHOICE SEQUENCE PROBABILITIES OF PLAN SWITCHING

		Percentiles					
	Sequence Description	10th	25th	Median	75th	90th	99th
Pr (A_0)	Stay, Stay	0.44	0.57	0.71	0.79	0.84	0.90
Pr (A_1)	Stay, Switch	0.06	0.09	0.12	0.18	0.26	0.41
Pr (A_2)	Switch, Return	0.00	0.00	0.01	0.02	0.03	0.06
Pr (A_3)	Switch, Stay	0.05	0.07	0.11	0.18	0.25	0.36
Pr (A_4)	Switch, Switch	0.01	0.02	0.03	0.06	0.09	0.16
$\Pr(A_2)$ /Pr (A_1)	Measure of Structural State Dependence	0.00	0.00	0.06	0.14	0.25	1.00

Notes. Each cell contains a point in the distribution among consumer types of the empirical probability that consumers of that type select a particular sequence of choices. For example, the top left cell indicates that, for 10th percentile of consumer types, the probability of selecting the choice sequence A_0 is 44 percent. These values are probabilities and thus bounded between 0 and 1. However, as the ranking of consumer types is not consistent across each sequence, the columns should not sum to 1. The final row displays the distribution among consumer types of the ratio of the choice sequence probabilities displayed in rows two (Stay, Switch) and three (Switch, Return). In the absence of structural state dependence, this measure should be close to 1. If structural state dependence is important, this measure should be strictly less than 1.