

Do Individuals Respond to Cost-Sharing Subsidies in their Selections of Marketplace Health Insurance Plans? *

Thomas DeLeire
Georgetown University and NBER

Andre Chappel
U.S. Department of Health and Human Services

Kenneth Finegold
U.S. Department of Health and Human Services

Emily Gee
Center for American Progress

* DeLeire: McCourt School of Public Policy, Georgetown University, 37th and O Streets, NW, Washington, DC 20057 and National Bureau of Economic Research (email: thomas.deleire@georgetown.edu). Chappel: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, 200 Independence Avenue, SW, Washington, DC 20201 (email: andre.chappel@hhs.gov). Finegold: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, 200 Independence Avenue, SW, Washington, DC 20201 (email: kenneth.finegold@hhs.gov). Gee: Center for American Progress, 1333 H Street NW, 10th Floor, Washington, D.C., 20005 (email: egee@americanprogress.org). We thank Xiao Xiao for research assistance and the Centers for Medicare & Medicaid Services for granting us access to the data used in this paper. We thank conference participants at AcademyHealth, the American Society of Health Economists, the Eastern Economics Association, the National Bureau of Economic Research, and the Institute for Research on Poverty Summer Research Workshop, seminar participants at American, Iowa, Indiana, Virginia Commonwealth, Cornell, Ohio State, West Virginia, and Johns Hopkins, and especially Laura Dague, Dan Sacks, Brandy Lipton, and two anonymous reviewers for their suggestions.

Abstract

The Affordable Care Act (ACA) provides assistance to low-income consumers through both premium subsidies and cost-sharing reductions (CSRs). Low-income consumers' lack of health insurance literacy or information regarding CSRs may lead them to not take-up CSR benefits for which they are eligible. We use administrative data from 2014 to 2016 on roughly 22 million health insurance plan choices of low-income individuals enrolled in ACA Marketplace coverage to assess whether they behave in a manner consistent with being aware of the availability of CSRs. We take advantage of discontinuous changes in the schedule of CSR benefits to show that consumers are highly sensitive to the value of CSRs when selecting insurance plans and that a very low percentage select dominated plans. These findings suggest that CSR subsidies are salient to consumers and that the program is well designed to account for any lack of health insurance literacy among the low-income population it serves.

1. Introduction

The 2010 Affordable Care Act (ACA) established Marketplaces in which individuals and families can purchase health insurance coverage. In order to help make the purchase of health insurance affordable to low-income consumers, the law made available two types of subsidies—Advanced Premium Tax Credits (APTCs) and cost-sharing reductions (CSRs). APTCs reduce the premium cost of insurance and CSRs reduce the amount of cost sharing (e.g., deductibles and co-insurance) faced by consumers. Both type subsidies are means tested—APTCs are available to individuals with family incomes up to 400% of the Federal Poverty Line (FPL) and CSRs are available up to 250% of FPL. While APTCs can be used to purchase any Marketplace plan, CSRs are only available if consumers select certain plans.

Reducing the cost sharing faced by low-income consumers is an objective of the ACA because of a concern that, absent such reductions, low-income consumers facing high deductibles or other facets of cost-sharing would forgo needed care. Research on the impact of cost-sharing on use of care has found that high deductibles lead to lower spending on health care, but also can lead to lower spending on valuable care such as preventive care (Buntin et al. 2011, Brot-Goldberg et al. 2017).

A large body of literature has documented both the incomplete take-up of social benefits (for reviews, see Currie 2006 and Finn and Goodship 2014) and of low-cost health insurance (Baicker, Congdon, and Mullainathan 2012). Moreover, the take up of tax credits targeted towards low-income individuals, such as the Earned Income Tax Credit, has also been found to be incomplete (Bhargava and Manoli 2015). Low take-up of benefits has been attributed to low program awareness and understanding, choice overload and complexity, and stigma (Currie 2006; Bhargava and Manoli 2015; Baicker, Congdon, and Mullainathan 2012). Other studies

have documented a substantial lack of health insurance literacy with a majority of U.S. consumers lacking a basic understanding of health insurance (Loewenstein, et al. 2013), including enrollees in ACA Marketplaces (Pollitz et al. 2016). In addition, studies have found large shares of privately insured workers choosing dominated plans, especially among those with a poor understanding of insurance (Handel 2013; Bhargava, Loewenstein, and Sydnor 2017). These literatures suggest that low-income consumers purchasing insurance through the ACA Marketplaces, many of whom were new to private insurance, may be unaware of the CSR subsidies, may not understand the value of these subsidies, and therefore may not take up these benefits.

This paper seeks to determine whether low-income consumers who purchased health insurance through the ACA Marketplaces behaved in a manner that suggests that they both understood and valued CSR subsidies. In addition, we determine the extent to which these low-income consumers were mistakenly forgoing CSRs and instead purchased dominated plans – that is, plans that have both higher premiums and lower actuarial values – as has been found among privately insured and higher income individuals (Handel 2013; Bhargava, Loewenstein, and Sydnor 2017).

To address these questions, we use administrative data on the 2014, 2015, and 2016 enrollment and plan choices of roughly 22 million low-income individuals who purchased health insurance in states that used the Federal portal, HealthCare.gov. We take advantage of discontinuous changes in the schedule of CSR benefits and employ a sharp regression discontinuity (RD) design in order to identify the plausibly causal effects of the value of CSRs on the take-up of these benefits.

We find that consumers are highly sensitive to the level of CSR benefits when selecting plans. At the point in the income distribution where individuals become eligible for CSR subsidized plans (and the actuarial value of plans discontinuously increases from 70 percent to 73 percent), we observe a 10 percentage point increase in the take-up of these benefits among consumers purchasing ACA Marketplace health plans. Similarly, when the actuarial value of CSR subsidized plans discontinuously increases from 73 percent to 87 percent), we observe a 16 percentage point increase in the take-up of these benefits; when the actuarial value of CSR subsidized plans discontinuously increases from 87 percent to 94 percent, we observe a 4 percentage point increase in take-up. We see no evidence that CSRs influence the extensive margin, that is, the decision to purchase health insurance through the ACA Marketplaces. Finally, we observe that only a very small percentage of consumers – 1.5% – forgo their cost-sharing subsidies and select dominated plans. These findings suggest that CSRs are salient to consumers and that the program is well designed to account for any lack of health insurance literacy among the low-income population it serves.

The paper proceeds as follows. In section 2, we review the literature on health insurance literacy and on the salience and take-up of social benefits and health insurance. In section 3, we describe how the ACA premium subsidies and CSRs are calculated and applied in the Marketplaces. In section 4, we discuss the administrative data we use and in section 5 we discuss the methods we use in our analysis. In section 6, we present our results. Finally, in section 7, we interpret these results in light of the literature on the salience and take-up of benefits and provide some concluding remarks.

2. Literature Review

There are three areas of literature in economics that are related the question of whether the ACA subsidy program to reduce cost sharing was well understood and valued by low-income consumers. These include the literatures on the take-up of social programs by eligible individuals, the salience of tax rates and tax credits, and health insurance literacy. These literatures suggest that the value of CSRs might not be well understood by consumers, which in turn may lead them to forgo these subsidies and perhaps to select dominated plans when purchasing health insurance through the ACA Marketplaces.

Participation in social insurance in the U.S. has been found both to be incomplete and to vary considerably across programs (Currie 2006). These low rates of participation have been found for health programs including Medicaid (Cutler and Gruber 1996, Currie and Gruber 1996, Gruber 2003) and the State Children's Health Insurance Program (Lo Sasso and Buchmueller 2004), the Earned Income Tax Credit (EITC; Bhargava and Manoli 2015, Manoli and Turner 2014), the Supplemental Nutrition Assistance Program/Food Stamps (Daponte, Sanders, and Taylor 1999) and Unemployment Insurance (Ebenstein and Stange 2010). Low take-up of social benefits has also been documented in the U.K. and in other developed countries (Finn and Goodship 2014).

Individuals have also been found to misperceive their tax rates. Salience of taxes on goods has been found to be very low in the case of sales taxes (where the tax is not included in posted price; Chetty, Looney, and Kroft 2009) or in the case of automated toll collection (Finkelstein 2009). Tax credits, such as the EITC, are also misunderstood, with different claiming behavior being dependent upon what information is provided to the individual (Chetty

and Saez 2013; Chetty, Friedman, and Saez 2013; Bhargava and Manoli 2015; Manoli and Turner 2016; Guyton et al. 2016).

Health insurance literacy has also been found to be very low among U.S. consumers. Surveys by Lowenstein et al. (2013) and by Norton et al. (2014) found low levels of comprehension of basic insurance features such as deductibles, copayments, and coinsurance, especially among low-income individuals. In surveys, insurance brokers also report very low levels of health insurance literacy among consumers seeking to purchase ACA Marketplace insurance (Pollitz et al. 2016). Individuals also have been found to have trouble selecting plans that would minimize their potential spending in both hypothetical situations (Bhargava, Lowenstein, and Benartzi 2017; Johnson et al. 2013; Barnes, Hanoch, and Rice 2015, 2016) and actual situations (Abaluck and Gruber 2011; Heiss, McFadden, and Winter 2010; Handel and Kolstad 2015). Even among consumers receiving health insurance from employers, studies have found that dominated health insurance plans are selected at high rates (Handel 2013; Sinaiko and Hirth 2011; Bhargava, Lowenstein, and Sydnor 2017), especially among consumers with low health insurance literacy (Bhargava, Lowenstein, and Sydnor 2017).

The incomplete take-up of social benefits and health programs and low rates of health insurance literacy have been attributed to a number of factors. These include stigma (Moffitt 1983; Ketsche et al. 2007; Manchester and Mumford 2009), program complexity (Bhargava and Lowenstein 2015; Congdon, Kling, and Mullainathan 2009; Bhargava and Manoli 2015), transaction costs or inconvenience (Ebenstein and Stange 2010), and low program awareness and understanding (Daponte, Sanders, and Taylor 1999; Bhargava and Manoli 2015; Currie 2006; Bhargava and Manoli 2015; Baicker, Congdon, and Mullainathan 2012). Schmitz and Ziebarth

(2017) find that the salience of cost information affects consumers' choice of health insurance plans in Germany.

These literatures, taken together, suggest that low-income consumers purchasing insurance through the ACA Marketplaces, many of whom were new to private insurance, may be unaware of the CSR subsidies, may not understand the value of these subsidies, and therefore may not take up these benefits.

3. ACA Premium Subsidies and Cost Sharing Reductions

In this section we summarize the two primary mechanisms by which the Federal government subsidizes health insurance purchased through the ACA Marketplaces — premium tax credits and cost-sharing reductions (CSRs).

The ACA established state-level health insurance Marketplaces through which consumers could purchase health insurance and receive subsidies. Health insurance plans must be offered at four different “metal levels” that vary by their actuarial value (AV), which is a measure of the percent of health care claims that a plan would be expected to pay for an average population. The metal levels are Platinum (90% AV), Gold (80% AV), Silver (70% AV), and Bronze (60% AV).¹ Within a sub-state geographic area called a “rating area,” health insurance premiums can vary only by age and smoking status, with premiums charged to individuals age 64 not to exceed 3 times the premium charged to individuals aged 21.²

Premium subsidies under the ACA take the form of Advanced Premium Tax Credits (APTCs), are available to individuals with incomes up to 400% of the federal poverty level (FPL) and who don't have access to other affordable coverage (either affordable employer-

¹ There is also a Catastrophic level of coverage with AVs that are lower than 60%, but these plans are only available to individuals under age 30 and premium tax credits cannot be used to purchase these plans.

² The default federal standard age curve is reported in CMS (2013). Smokers can be charged up to a 50% premium surcharge.

sponsored coverage or public coverage such as Medicaid or Medicare), and can only be used towards the purchase of health insurance through one of the ACA Marketplaces. The amount of APTC a person qualifies for varies by family income, geographically with the cost of health insurance, and by age. The APTC is determined as the difference between an individual's "expected contribution" – the maximum amount a person must pay toward the cost of a "benchmark" plan – and the cost of that benchmark plan. The expected contribution is a percentage of family income that increases as income increases. For tax year 2015, the percentages ranged from 2.01% of income for families at 100% of FPL to 9.56% of income for families at 400% of FPL. The benchmark plan is the second-lowest-cost plan at the Silver tier available to an individual. Because the APTC is based off the difference between the expected contribution and the cost of the benchmark plan to an individual, it increases with age and varies geographically with the cost of insurance. Individuals do not have to purchase the benchmark plan, however, and can use their APTC to purchase any Marketplace plan. The APTC is capped, however, at the premium for the plan the person chooses (so no one receives a credit that is larger than the premium of the selected plan).

CSRs are a second way in which the ACA subsidizes health insurance for low-income individuals who purchase plans from the Marketplaces. CSRs are available to consumers with incomes between 100% and 250% of FPL, who don't have access to other affordable coverage, and who purchase a Marketplace plan in the Silver metal level. All issuers offering coverage on the ACA Marketplaces must offer CSR variations for each Silver plan offered. These variations must be identical to the original Silver plan in all ways (including premium, network, and benefits) but must offer reduced cost-sharing so as to have a higher AV (through some

combination of reduced deductibles, reduced maximum out-of-pocket limits, or reduced copayments or co-insurance).

The actuarial values of the CSR plans available to an individual vary with family income as a percentage of FPL. Individuals with family incomes between 100 and 150% of FPL are offered CSR Silver plans with a 94% AV; individuals with incomes between 150 and 200% of FPL are offered CSR Silver plans with an 87% AV; individuals with incomes between 200 and 250% FPL are offered CSR Silver plans with a 73% AV. Individuals with incomes above 250% FPL are not eligible for CSR plans and the AV of the Silver plans they are offered is 70%. Note that the AVs of CSR plans are discontinuous with income as a percent of FPL and that these discontinuities occur at 150%, 200%, and 250% FPL. The values APTCs, while falling with income as a percent of FPL, do not have discontinuities at these thresholds (see Figure 1).³

There are important differences between how APTCs and CSRs work. First, CSR variant plans are only available for Silver plans; thus, CSRs are only available to consumers who select a Silver plan. APTCs, on the other hand, can be applied to any Bronze, Silver, Gold, or Platinum plan (even though the amount of APTC available is a function of the premium of the second lowest Silver plan). Second, APTCs are subject to reconciliation upon Federal tax filing. That is, if a consumer's realized annual family income differs from the projected family income provided in his or her application (for example, because a family member changes or begins employment during the year), the amount of premium tax credit the consumer is eligible for changes as well. CSRs are not subject to reconciliation. That is, if (based on projected family income from the application) a consumer is determined eligible for a particular CSR plan (for example a 94% AV Silver plan), that eligibility does not change if the consumer's realized income differs from their

³ There is a small discontinuity in the value of APTCs at 133% FPL and a major discontinuity at 100% FPL (for a discussion see Schwartz and Wallace 2014). Discontinuities in the value of APTCs can also occur at 400% FPL.

projected income. Third, and importantly for our research design, APTCs vary continuously with income over the eligible income range, while the value of CSRs varies discontinuously with income.

When shopping among health insurance plans on HealthCare.gov, a consumer first provides his or her personal information (such as age, projected family income, family size, and zip code). The portal then lists the plans, their premiums, metal levels, as well as some key cost-sharing information: the plan's deductible, out-of-pocket maximum, and applicable co-payments and co-insurance rates. A consumer's applicable APTC is automatically factored into the premium displayed to the consumer. If a consumer is eligible for a particular level of CSR, only Silver plans corresponding with that CSR level (and the corresponding plan information, including the premium net of applicable tax credit, the deductible and the out-of-pocket maximum) are displayed to the consumer.⁴ In this way, a consumer cannot select a Silver plan variation for which he or she is not eligible. Importantly, low-income consumers should automatically observe the lower deductibles and other features of cost-sharing that are associated with CSR plans if they provide their income and family size prior to shopping.

4. Data

The empirical analyses in this paper are based on administrative data from the Multidimensional Insurance Data Analytics System (MIDAS) of the Centers for Medicare & Medicaid Services (CMS). These data include all Marketplace enrollment collected for the 39 states that used the HealthCare.gov eligibility and enrollment platform in the 2014, 2015, or

⁴ In the online Appendix Figures 1 and 2, several screenshots from HealthCare.gov taken during the 2015 open enrollment period show what information is displayed to consumers when examining a Silver plan and a Gold plan and how that information differs for a consumer that is eligible for both CSRs and premium subsidies.

2016 plan years.⁵ We use data on health plans selected during each year’s open enrollment period by individuals with incomes between 100 and 400% of FPL.⁶ For our main analysis, we exclude enrollees who were members of federally recognized tribes or Alaska Native Claims Settlement Act Corporation shareholders (AIANs) because, as described below, these enrollees were eligible for different cost-sharing subsidies than were other enrollees.

The resulting dataset includes individual-level information on roughly 22 million plan selections by low-income individuals, including the plan selected, premium and APTC amount, plan characteristics including metal level, AV, deductible, out-of-pocket maximum, network density (measured as the percent of physicians in the area that are in the network), as well as individual-level demographic and income information including income as a percent of FPL, state and county of residence, self-reported race and ethnicity, age, gender, smoking status, and whether assistance in completing the application was received from an ACA assister, navigator, or from a private insurance broker.

5. Methods

In this section, we describe the methods we use to determine whether consumers are sensitive to the value of CSRs when selecting plans, the method we use to look for extensive margin effects, our robustness and sensitivity checks, and our approach for determining whether consumers select dominated plans.

⁵ States that used the HealthCare.gov portal during the 2014–2016 period include: Alaska, Alabama, Arkansas, Arizona, Delaware, Florida, Georgia, Hawaii (2016 only), Iowa, Idaho (2014 only), Illinois, Indiana, Kansas, Louisiana, Maine, Michigan, Missouri, Mississippi, Montana, North Carolina, North Dakota, Nebraska, New Hampshire, New Jersey, New Mexico, Nevada (2015 and 2016 only), Ohio, Oklahoma, Oregon, (2015 and 2016 only), Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Wisconsin, West Virginia, and Wyoming.

⁶ For more details on these data, see ASPE (2014).

A. Methods for CSR Take-up

The previous literature on the take-up of social benefits and on the salience of the tax and tax credit systems suggest that it is likely that Marketplace consumers would be incompletely aware of or may misunderstand the value of CSR subsidies and therefore may not take them up. In order to assess whether low-income consumers are aware of and understand the value of the ACA cost-sharing subsidies, we examine whether the take-up of CSRs changes when the value of CSRs change. In particular, we examine variation in CSR take-up among CSR eligible consumers of Marketplace insurance around the points of discontinuities in the CSR schedule. Take-up of CSRs among eligible Marketplace consumers is identified by the selection of a plan in the Silver metal level, as CSRs are not available for plans in other metal levels and are available for all Silver plans.

We employ a sharp regression discontinuity (RD) design (Lee and Lemieux 2010). In essence, this approach involves comparing take-up rates of enrollees with incomes just below a discontinuity in the CSR subsidy schedule with the take-up rates of enrollees with incomes just above that discontinuity. Because, as discussed above, all enrollees with incomes below CSR eligibility thresholds are determined to be eligible for that amount of CSR and no enrollees with income above that threshold are eligible for that amount of CSR, a sharp RD design is appropriate.

The RD design enjoys a distinct advantage over simple comparisons of enrollees by level of CSR eligibility. Since the income thresholds used to determine CSR eligibility are somewhat arbitrary and since net premiums do not vary discontinuously over these income ranges, it is reasonable to assume that enrollees with incomes just below the eligibility thresholds are very

similar to those with incomes just above the eligibility thresholds. The standard RD continuity assumption thus would seem to apply in this context.

We implement our RD design using local linear regression where the binary dependent variable indicates whether the individual purchased a Silver plan, the running variable is family income as a percent of FPL, and the triangular bandwidth is set at 10 FPL percentage points. The models are estimated at each point of discontinuity where the value of CSRs changes (150% of FPL, 200% of FPL, and 250% of FPL). We calculate standard errors that are clustered at each FPL point.

B. Other Metal Levels and Plan Characteristics

In addition to our main estimates, which indicate the take-up of CSRs, we estimate RD models in which the dependent variables are binary indicators of whether the individual purchased a Platinum plan, Gold plan, Bronze plan, or Catastrophic plan. These models indicate, for consumers that do take-up CSRs in response to a change in the value of CSRs at a particular point of discontinuity, the metal levels of the plans that counterfactually would have been selected. These estimates are of interest because they help indicate whether the CSR program actually increased the AVs of the plans selected by consumers, or whether it merely shifted their selections from high AV plans (e.g., Platinum and Gold plans) to CSR Silver plans.

We also present models in which the characteristics of plans – AV, the individual deductible, and the individual out-of-pocket maximum – are the dependent variables. These models also provide a picture of how CSRs lower the cost sharing of the plans selected by low-income consumers.

C. Extensive Margin Effects

Our main results estimate the effect of discontinuous changes in the value of CSRs on the take-up of CSRs among individuals who purchase a Marketplace health insurance plan in a state using the HealthCare.gov portal. It is possible that cost-sharing subsidies also influence the extensive margin – that is, the decision of whether to purchase a Marketplace health insurance plan at all. While we do not have data on the population of individuals eligible to purchase insurance on the ACA Marketplaces so as to estimate extensive margin effects directly, we are able to test whether the value of CSRs affects the take-up of Marketplace insurance by examining the density of observations around the points of discontinuity in the CSR schedule. If there are extensive margin effects, we should observe a discontinuous increase in the density just below the points of discontinuity, so long as the density of underlying eligible population is continuous.⁷

In addition, because CSR eligibility depends upon income as a percentage of FPL, it is conceivable that enrollees manipulate their income in order to become eligible for CSRs plans with higher AVs. As a result, the density of observations around the points of discontinuity in the CSR schedule could also change due to income manipulation (McCrary 2008; Heim et al. 2016). As a result, this density test can only determine whether there is neither extensive margin effects nor income manipulation, but if rejected, cannot distinguish between the two.

⁷ This test for extensive margin effects in the take-up of subsidized health insurance in Massachusetts in 2011 is also used in Finkelstein et al. (2017).

D. Robustness and Sensitivity Checks

We conduct several robustness checks. First, we re-estimate our main models at every bandwidth from 5 to 25 to determine whether estimates are sensitive to bandwidth. Second, we also conduct the standard covariate tests. That is, we estimate models in which the dependent variables are demographic characteristics including age, race/ethnicity (binary indicators for white, African American, Asian, and Hispanic), gender, smoking status, and the use of any form of application assistance (e.g., an assistor, navigator, or an insurance broker) as an indication for whether the sharp RD identification assumptions likely hold. Third, because Catastrophic plans are only available to individuals under age 30, we estimate models restricting the population to individuals age 30 or over. Fourth, while our analyses pool data across three plan years (2014, 2015, and 2016), we also estimate our main results and our density tests separately by plan year.

We also conduct several placebo tests and sensitivity checks. First, we examine plan selections of Marketplace enrollees who were members of federally recognized tribes or Alaska Native Claims Settlement Act Corporation shareholders. American Indian/Alaska Native (AIAN) enrollees with family incomes below 300% FPL were eligible for zero-cost sharing plans and AIANs with family incomes above 300% of FPL were eligible for limited-cost-sharing plans. Importantly and unlike for non-AIAN enrollees, eligibility for zero cost-sharing and limited-cost sharing is not contingent on the enrollee selecting a Silver plan. This feature of CSRs for AIANs allows us to conduct a falsification test. AIAN enrollees should not change their probability of selecting a Silver plan at the 150%, 200%, and 250% FPL, but could increase their probability of selecting a Silver plan at 300% FPL.

Second, we estimate the effect of CSRs on a measure of network density. Since the CSR program should not affect networks, as CSRs only improve the AV of Silver plans and networks

are not a factor in calculating AVs, we would expect that there should be no changes in network density at the points of discontinuity in the CSR schedule.

Third, we explore whether the responsiveness of consumers to the value of CSRs in their take-up decisions depends upon whether they received assistance in the application process from an ACA assister or navigator or from an insurance broker.⁸ Approximately 45% of Marketplace consumers received enrollment assistance from an assister, navigator, or broker. We do this by stratifying our main results by whether there is an indication on the application that the individual received help from an assister, navigator, or broker.

Fourth, states that expanded Medicaid under the ACA have fewer low-income consumers than states that did not expand Medicaid. Since Medicaid expansion was up to 133% FPL, expansion should not directly impact the composition of individuals facing discontinuities in the CSR schedule at 150% FPL or above. However, because Medicaid expansion has been found to affect Marketplaces indirectly, for example by reducing premiums by improving the health of the risk pool (Sen and DeLeire 2016), we explore whether consumer respond differently to CSRs in states that chose to expand Medicaid from states that chose not to expand Medicaid.

E. Dominated Health Insurance Plans

In addition to our RD analyses, we also look for evidence that ACA Marketplace enrollees select dominated health insurance plans. As discussed above, evidence that privately

⁸ Navigators and assisters are individuals or community-based organizations to help guide consumers in the Marketplace, assist with subsidy applications, and enroll in a health plan. The difference between an assister and a navigator is that navigators are funded by federal or state grants while assisters are funded by separate grants or contracts administered by states (Goodell 2013). Certified private health insurance brokers also can help consumers apply for non-group coverage and are paid commissions by insurance companies (KFF 2014). Consumers also could receive information helpful for their application by visiting HealthCare.gov or by calling HealthCare.gov call center. As these visits and calls are not linked to a consumer's application, it is not possible to determine which consumers may have received information or assistance in this manner.

insured individuals select dominated health insurance plans at high rates has been taken as evidence that a large share of consumers lack basic health insurance literacy (Handel 2013; Bhargava and Lowenstein 2015; Bhargava, Lowenstein, and Sydnor 2017).

In the context of the ACA Marketplaces, we define dominated plans as those with a lower AV but a higher premium. Dominated choices include Gold (which have an 80% AV) and Platinum (which have a 90% AV) plans for consumers with family incomes between 100% and 150% of FPL, who are eligible for CSR Silver plans with an AV of 94%. They also include Gold plans for consumers with family incomes between 150% and 200% of FPL, who are eligible for CSR Silver plans with an AV of 87%.

To examine whether consumers select dominated plans, we calculate the percentage of Marketplace enrollees with family incomes between 100% and 150% of FPL who select either a Platinum or Gold plan and the percentage of Marketplace enrollees with family incomes between 150% and 200% of FPL who select a Gold plan.

6. Results

In this section, we first present descriptive statistics on our population. We then present our main RD analyses on the take-up of Silver plans and our RD analyses of the selection of plans at other metal levels. We also present our placebo tests, sensitivity tests, and evidence of effects on the extensive margin. Finally, we present our analysis of rates of selection of dominated health insurance plans.

A. Descriptive Statistics

The total number of enrollments in Marketplace health insurance plans among states that used the HealthCare.gov platform in 2014, 2015, or 2016 was over 25 million. Of this, 85% or 21.7 million was among individuals with family incomes between 100% and 400% of FPL, making them potentially eligible for premium subsidies. 72%, or roughly 18 million, was among individuals with incomes between 100% and 250% of FPL, making them eligible for CSRs.

Overall, a large majority – almost 74% – of Marketplace enrollees with incomes between 100 and 400% of FPL selected Silver plans. The second most commonly selected metal level was Bronze (with roughly 19% of enrollment). About 5% of enrollees selected Gold plans in each plan year and relatively few (< 2%) selected Platinum and Catastrophic plans. Enrollees in families with lower incomes as a percent of FPL are more likely to choose Silver plans. For example, 89% of enrollees with incomes between 100 and 150% FPL selected a Silver plan compared with only 44% of enrollees with incomes between 250 and 400% of FPL. A table of descriptive statistics for the population of individuals enrolled in Marketplace coverage with family incomes between 100 and 400% FPL is presented in Appendix Table 1.

B. Main Results

The main outcome of our analysis is the probability of taking up CSRs, which is measured by the probability of selecting a Silver plan as eligible enrollees only receive CSRs if they select a Silver plan. We report the RD estimates of the probability of selecting a Silver plan at each of the three discontinuities – 150%, 200% and 250% of FPL – in the first column of Table 1.

At 150% FPL (the maximum eligibility threshold for 94% AV CSRs), the point estimate is a difference of 3.88 percentage points with a standard error of 0.65 percentage points. That is, Marketplace enrollees who are just eligible for CSR Silver plans with a 94% AV are about 3.9 percentage points more likely to select a Silver plan than enrollees who are just ineligible for these plans (and are instead eligible for CSR Silver plans with an 87% AV).

At 200% FPL (the threshold between being eligible for CSR Silver plans with an 87% AV and CSR Silver plans with a 73% AV), the point estimate indicates a difference of 15.9 percentage points with a standard error of 1.23 percentage points. Again, this estimate means that Marketplace enrollees who are just eligible for 87% AV CSRs are about 16 percentage points more likely to choose a Silver plan than enrollees who are just ineligible for 87% AV CSRs (and are eligible for Silver plans with a 73% AV).

At 250% FPL, (the eligibility threshold between CSR Silver plans with a 73% AV and regular Silver plans with a 70% AV), the point estimates indicates a difference of 10.4 percentage points with a standard error of 0.88 percentage points.

Figure 2 illustrates the how the probability of selecting a Silver plan changes at each point of discontinuity. The assignment variable (on the x-axis) is income as a percent of FPL and the outcome variable (on the y-axis) is the fraction of enrollees selecting a Silver plan. Each observation is the average of the outcome for all enrollees at that income/FPL percentage point and on top of the scatter plot we superimpose fitted lines estimated separately between 100% and 150%; 150% and 200%, 200% and 250%, and 250% and 400% FPL by local linear regression (with a triangular kernel and a bandwidth of 10 FPL percentage points). The probability of taking up CSRs falls in a visually noticeable manner at each of the eligibility thresholds – 150%, 200%, and 250% of FPL – consistent with the results presented in the first column of Table 1.

In Table 2, we report the effect of changes in the value of CSRs on characteristics of the plans selected by enrollees. These characteristics include the AV, the annual deductible, and the out-of-pocket maximum. The results show that the average AV of selected plans decreases by 6.9 percentage points at the 150% FPL threshold (where the value of CSRs change from 94% to 87%), decreases by 10.9 percentage points at the 200% FPL threshold (where the value of CSRs change from 87% to 73%), and decreases by 1.3 percentage points at the 250% threshold (where the value of CSRs change from 73% to 70%). The average deductible of selected plans increases substantially at each of the thresholds (by \$539, \$1525, and \$282 respectively). Similarly, the average out-of-pocket maximum of selected plans also increases at each threshold (by \$899, \$2315, and \$592 respectively). These results are also displayed in Appendix Figures 3-5.

These results show that low-income consumers take-up CSRs at high rates and that the take-up rate of CSRs is highly sensitive to the AVs of the CSR Silver plans. Moreover, they demonstrate that the low-income consumers purchasing insurance through the ACA Marketplaces who were eligible for subsidies, many of whom were new to private insurance and according to surveys had low health insurance literacy, were both aware of the CSR subsidies and appeared to understand their value (at least to a reasonable degree). This finding is in contract to the literatures on many social programs and tax-based subsidies in the U.S., which tend to find low rates of take-up and that many programs and subsidies have limited salience to low-income individuals.

C. Effects on Other Metal Levels

While knowing that consumers are responsive to the value of CSRs in their take-up decisions is important because it provides evidence that consumers are behaving in a way consistent with the subsidies being both salient and valuable to low-income consumers, it is also

important to know which metal level consumers would have chosen in place of Silver plans absent CSRs. This is because a goal of the CSR program is to increase the AVs of the plans that low-income Marketplace consumers select. If these consumers were already selecting high AV plans (such as Platinum plans) at high rates, then the CSR program would not necessarily increase average AVs by much even if they are taken up at high rates.

In Table 3, we also report the results of our RD analyses of the probability of selecting a Bronze plan, a Gold plan, a Platinum plan, and a Catastrophic plan among ACA Marketplace consumers. At 150% FPL, consumers who are just eligible for a 94% AV CSR plans are 3.1 percentage points less likely to choose a Bronze plan than consumers who are just ineligible for these plans. At the 200% FPL threshold, consumers who are just eligible for an 87% AV CSR plans are 8.3 percentage points less likely to choose a Bronze plan than consumers just ineligible for these plans. At the 250% FPL threshold, consumers who are just eligible for a 73% AV CSR plans are 5.3 percentage points less likely to choose a Bronze plan than consumers just ineligible for these plans. Thus, the vast majority of consumers at the 150% threshold and more than half of consumers at the 200% and 250% threshold would have selected Bronze plans (with AVs of 60%) had they not been induced to take-up a CSR Silver plan.

There are similar, but smaller, changes in the probabilities of selecting Gold and Platinum plans at each of the points of discontinuity in the value of CSRs. There is no evidence, however, of a statistically or economically meaningful difference in the probability of choosing a Catastrophic plan at any of the points of discontinuity.

These outcomes are also represented in Figures 3 through 6, which like Figure 2, show the how the probability of selecting a plan of a particular metal level (Bronze, Gold, Platinum, and Catastrophic) changes at each point of discontinuity.⁹

C. Extensive Margin Effects

We next present the results of our analysis of the impact of CSRs on the decision to purchase insurance through the ACA Marketplaces. We do this by estimating the impact of the discontinuous changes in the value of CSRs on the number of individuals purchasing an ACA insurance plan and we present these results in Table 1, column 6 and present them in Figure 7.

The density of observations in our data appears to be continuous through each of the FPL thresholds (150% FPL, 200% FPL, and 250% FPL). Moreover, none of the RD estimates on enrollment are statistically significant. This result is suggestive that there are no extensive margin effects. In addition, they suggest that there is no evidence that enrollees manipulate their income in order to become eligible for CSRs with higher AVs (McCrary 2008).

D. Results of Sensitivity and Robustness Checks

In this section, we report the results of our sensitivity and robustness checks. First, we re-estimate our main take-up model at every bandwidth from 5 to 25 FPL points to determine whether the RD estimates are sensitive to our choice bandwidth. The estimated effects range from 3.0 percentage points to 3.9 percentage points at the 150% FPL threshold, from 15.9 to 17.2 percentage points at the 200% threshold, and from 9.0 to 10.5 percentage points at the 250% threshold, and we graph these estimates along with 95% confidence intervals in Appendix Figure

⁹ Only individuals less than age 30 can purchase Marketplace Catastrophic insurance. None of the results for the other metal levels change in any meaningful way if we restrict the population to Marketplace enrollees age 30 or over.

6. As none of these estimates differ in an economic meaningful way from our main estimates, which use a bandwidth of 10 FPL points, we are not concerned about the choice of bandwidth.

Second, when we estimate models in which the dependent variables are demographic characteristics (age, gender, indicators for race/ethnicity, smoking status, and the use of any form of application assistance), we do not find any statistically significant difference in these characteristics at any threshold with one exception. There is a small, approximately one percentage point decrease in the fraction of enrollees that report being Hispanic at both the 200% and 250% FPL thresholds and these decreases are statistically significant at the 10% level. These results are reported in Appendix Table 2 and suggest that the standard sharp RD identification assumptions likely hold.

Third, when we restrict the population on which we conduct our main models to Marketplace enrollees age 30 or over, our estimates are unchanged (see Table 3 column 1). Fourth, our estimates of take-up of CSRs, on the choice of other metal levels, and of extensive margin effects are very similar across plan years (see Table 3, column 2-4 and Appendix Table 3).

As discussed above, individuals who purchase insurance through one of the ACA Marketplaces who were AIANs were eligible for a different CSR program than other enrollees. The AIAN CSR program had a discontinuity in the CSR value at 300% of FPL and not at any other point and eligibility for CSRs was not contingent on the enrollee selecting a Silver plan.

Because of these incentives, relatively few AIANs select Gold, Platinum, or Catastrophic plans. For example, of the roughly 77,000 AIAN enrollees with incomes between 100 and 400% of FPL, 26% selected Silver and almost 68% selected Bronze plans, and fewer than 6% selected Gold, Platinum, and Catastrophic plans combined. Table 3 columns 5 and 6 report our RD

estimates of how the probability of selecting Silver and Bronze plans change at each of the “placebo” thresholds (150%, 200%, and 250% of FPL) and at the AIAN CSR threshold at 300% FPL. We also illustrate these responses in Appendix Figure 7. The results show that there was no statistical or economic meaningful change in the probability of selecting a Bronze or Silver plan at any of the placebo thresholds. They do show a large –16.4 percentage point – increase in the probability of selecting a Silver plan at 300% FPL and a large – 25 percentage point – decline in the probability of selecting a Bronze plan at that threshold. This analysis adds confirmation that the changes in CSR take-up observed among ACA Marketplace enrollees are, in fact, due to discontinuous changes in the value of CSRs and not due to other factors.

We next discuss the results of our network density “placebo” test. We discussed above, an issuer’s CSR silver plans are required to be identical in terms of networks as their regular Silver plan. Thus, one would not expect to observe discontinuous changes in networks across the CSR thresholds. We show that this is indeed the case in Table 2 column 4 (and in Appendix Figure 8). Network density does not change by more than a percentage point at any of the thresholds (and this change is only statistically significant at the 250% FPL threshold).

To shed some light on whether the responsiveness of consumers to the availability of CSRs may have been due to the receipt of application assistance, we stratify our main results by whether there is an indication on the application that the individual received help from an assister, a navigator or an insurance broker. We find no evidence that there is a differential responsiveness to the availability of CSRs among individuals receiving application assistance from those not receiving assistance (see Table 3, columns 7 and 8 and Appendix Figure 9).

Similarly, we find no difference in our estimated consumer responsiveness to CSRs in states that chose to expand Medicaid and states that chose not to expand Medicaid (see Table 3 columns 9 and 10 and Appendix Figure 10).

D. Do Enrollees Choose Dominated Plans?

As surveys have found that a majority of consumers lack basic health insurance literacy (Lowenstein et al. 2013) and recent studies have found that large fractions of individuals purchasing insurance through their private employer select dominated plans, there is concern that the low-income consumers purchasing insurance through the ACA Marketplaces might also select dominated plans (Bhargava et al. 2017, Sinaiko et al. 2013). The choice of a dominated plan can occur when CSR-eligible consumers forgo cost-sharing subsidies in favor of high AV Gold or Platinum plans. In particular, 94% AV CSR Silver plans dominate both Platinum plans (90% AV) and Gold Plans (80% AV) because they generally have lower premiums and have higher AVs. 87% AV CSR Silver plans dominate Gold plans but do not dominate Platinum plans.¹⁰

We calculate the fraction of consumers that choose dominated plans and present these results in Table 4. In particular, we report the fractions of consumers with incomes in the range eligible for 94% and 87% AV CSR Silver plans that select Gold and Platinum plans. Among consumers potentially eligible for 94% AV CSRs, 0.7% chose a Platinum plan and 1.3% chose a Gold plan. Among consumers potentially eligible for 87% AV CSRs, 1.3% chose a Platinum plan. Overall, only 1.5% of Marketplace enrollees with incomes between 100 and 400% FPL

¹⁰ These plans may not be strictly dominated if they have different networks or secure in-network access to a specific provider. Our estimates of the fraction of consumers choosing dominated plans therefore should be considered upper bounds.

selected a dominated health insurance plan. As these percentages are very low, it suggests that the benefits and availability of CSRs may be reasonably well understood by consumers.

7. Conclusions

In this study, we use administrative data on roughly 22 million health insurance plan choices of low-income individuals who purchased a health insurance plan in either 2014, 2015, or 2016 in states using the HealthCare.gov platform in order to assess whether Marketplace consumers behave in a manner that suggests that they are aware of and value CSRs. Our RD analysis shows that consumers are highly sensitive to the value of CSRs when deciding whether to take-up CSRs, though we see no evidence that CSRs influence the extensive margin, that is, the decision to purchase health insurance through the ACA Marketplaces. In addition, we find little evidence that CSR eligible consumers are choosing dominated insurance plans. These results are consistent with consumers' both being aware of and valuing the benefits provided by the CSR program.

These findings suggest that CSR subsidies are reasonably salient to consumers and that the program is well designed to account for any lack of health insurance literacy among consumers of ACA Marketplace insurance. Unfortunately, we are unable to determine precisely which aspects of the HealthCare.gov portal or the CSR program enables consumers to respond to incentives to take-up the program and to forgo dominated plans. We suspect that the manner in which the portal displays key aspects of plans, including the premium net of tax credits, the deductible, and the out-of-pocket maximum, and the fact that only the relevant subsidized amounts of these plan features are displayed to consumers when they are shopping contributes to the salience of the program (consistent with Bordalo et al. 2011, 2012). These findings provide

some optimism that the ACA's CSR program, despite its complex design, is sufficiently salient to consumers so as to result in high rates of take-up despite the likely low levels of health insurance literacy among the low-income population it serves.

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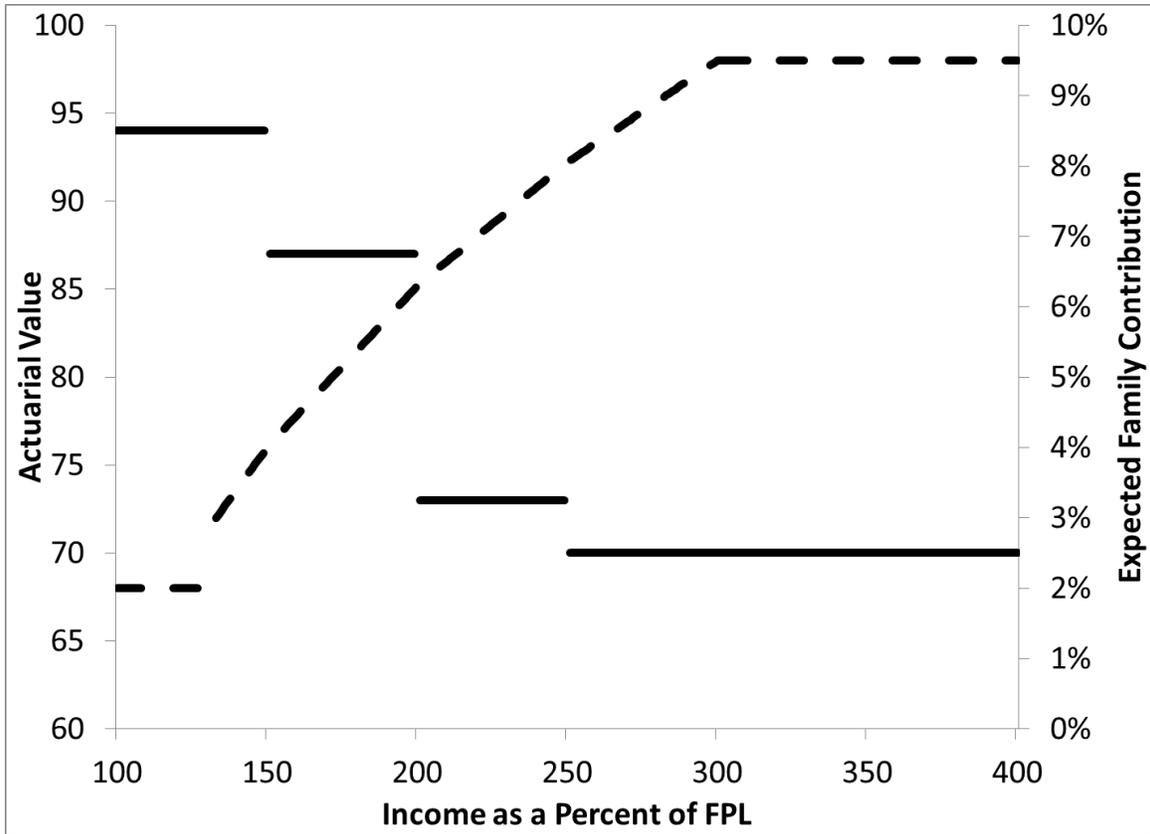
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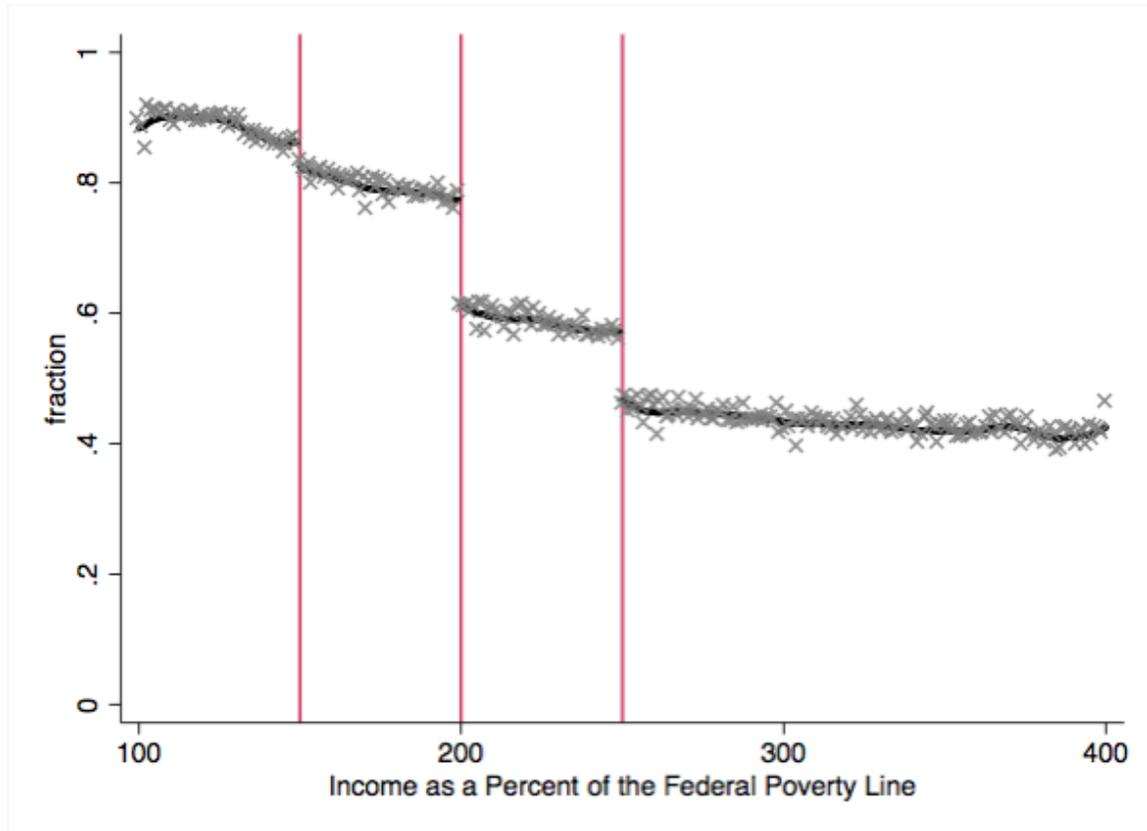
Figure 1. Cost-Sharing Reductions and Expected Family Contributions by Family Income as a Percent of FPL



Sources: Federal Register § 155.305; 26 U.S. Code § 36B.

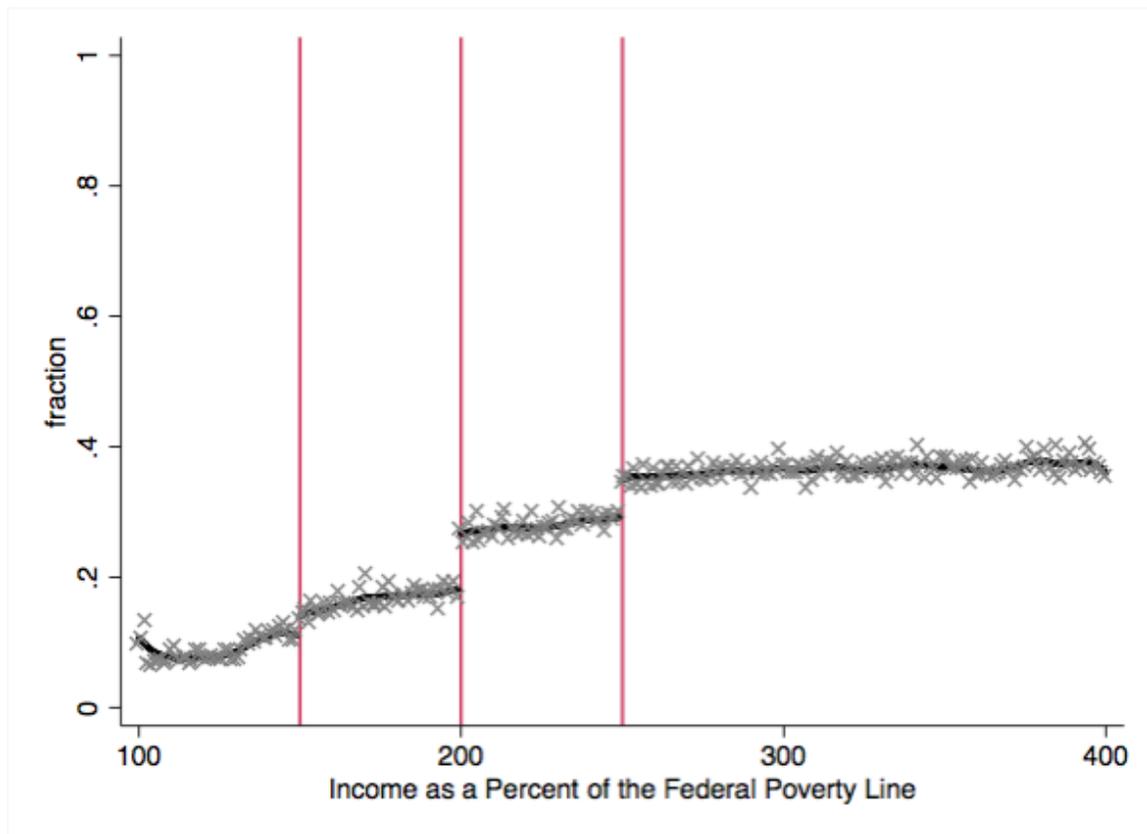
Notes: The expected family contributions as a percentage of family income increased slightly from these amounts in 2016. Solid line represents the actuarial value of a Silver plan at different levels of family income as a percent of FPL. Dashed line represents the percentage of family income that is the most families would pay for the benchmark plan in their area at different levels of family income as a percent of FPL.

Figure 2. Fraction of Marketplace Enrollees in Silver Plans, 2014-2016



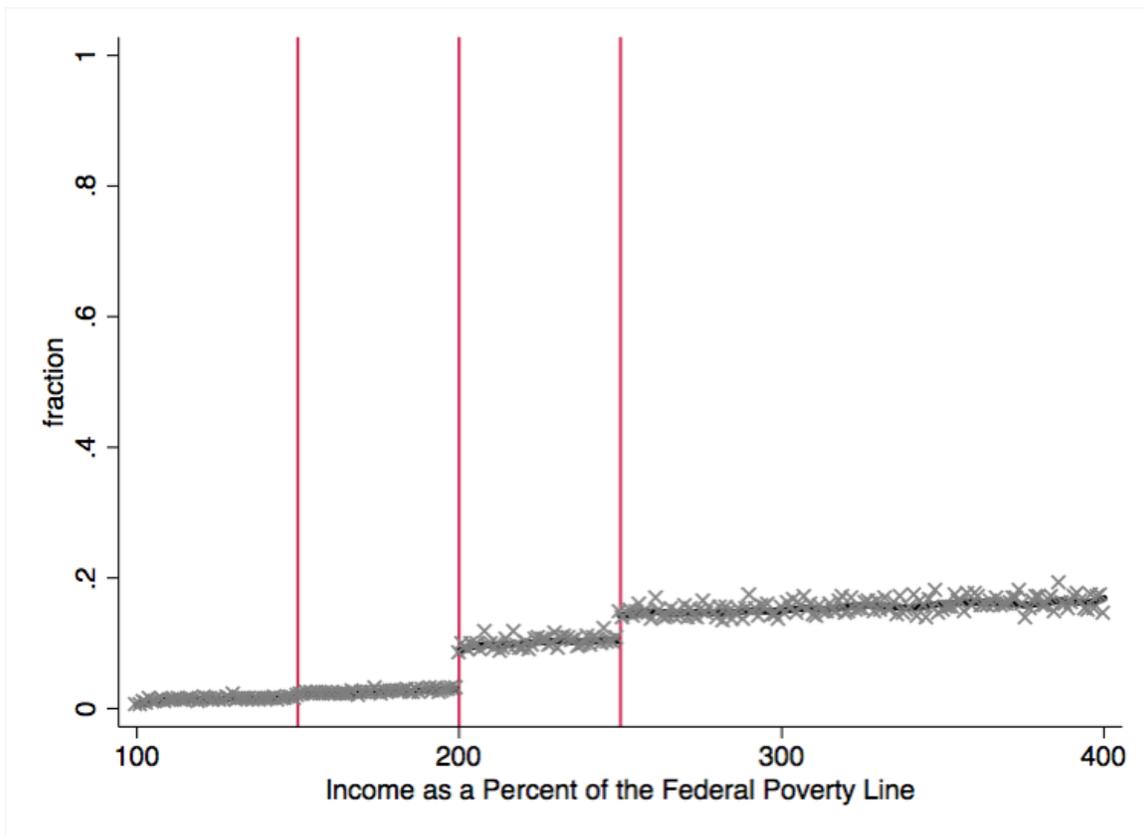
Notes: Estimated on individual-level administrative data on marketplace enrollment choices in states using the Healthcare.gov platform. Fractions of enrollees with Silver plans in a one-percentage point FPL cell are reported. The fitted lines are four separate local linear regressions estimated on all Marketplace enrollees between 100 and 149% FPL, 150 and 199% FPL, 200 and 249% FPL, and 250 and 400% FPL at a bandwidth of 10 percentage points.

Figure 3. Fraction of Marketplace Enrollees in Bronze Plans, 2014-2016



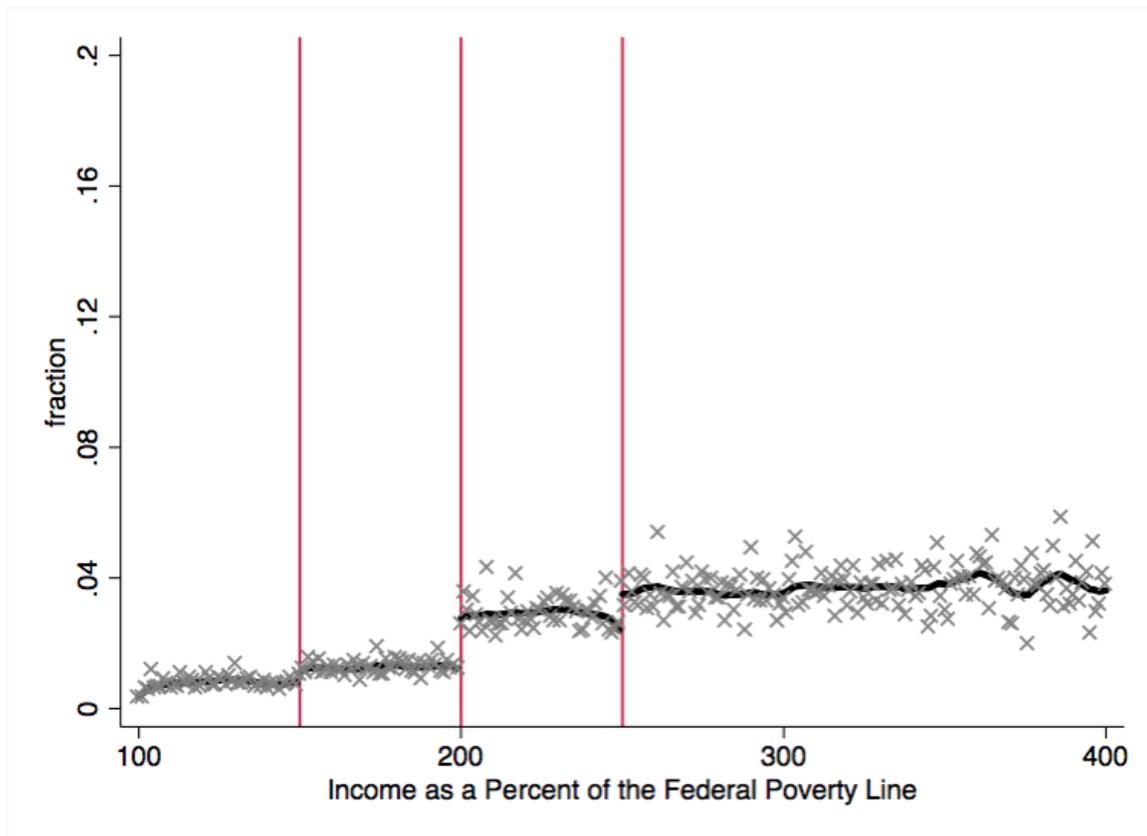
Notes: See notes for Figure 2.

Figure 4. Fraction of Marketplace Enrollees in Gold Plans



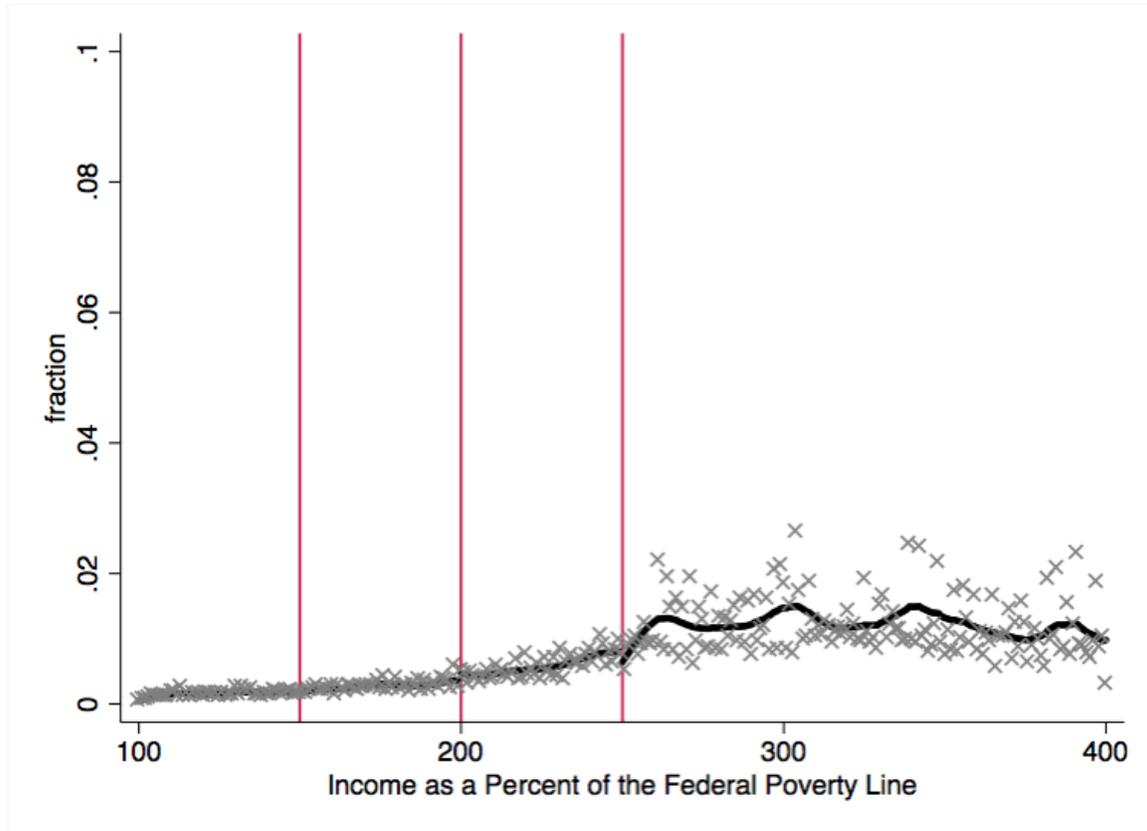
Notes: See notes for Figure 2.

Figure 5. Fraction of Marketplace Enrollees in Platinum Plans



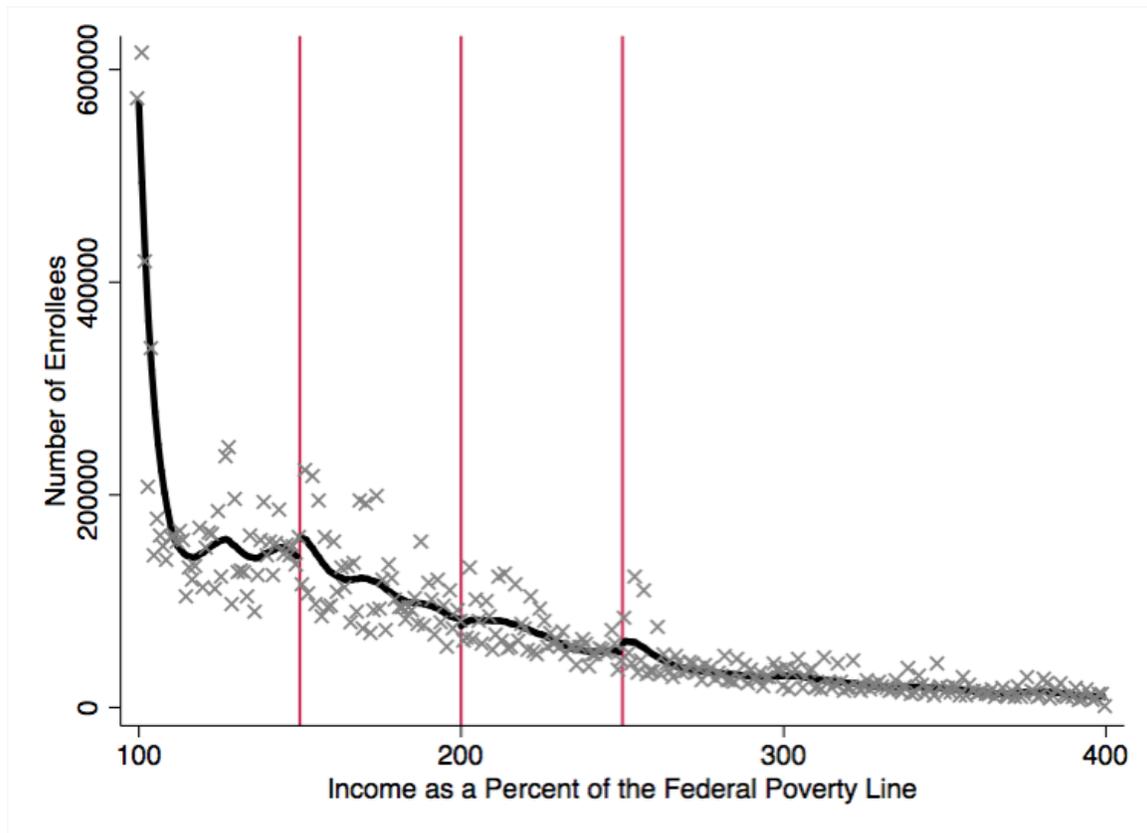
Notes: The scale of the y-axis runs from 0 to 0.2. See note for Figure 2.

Figure 6. Fraction of Marketplace Enrollees in Catastrophic Plans



Notes: The scale of the y-axis runs from 0 to 0.1. See notes for Figure 2.

Figure 7. Density of Marketplace Enrollment, by FPL



Notes: Individual-level administrative data on marketplace enrollment in states using Healthcare.gov platform. Enrollment in Marketplace plans in a one-percentage point FPL cell is reported. The fitted lines are four separate local linear regressions estimated on individual enrollment between 100 and 149% FPL, 150 and 199% FPL, 200 and 249% FPL, and 250 and 400% FPL with a bandwidth of 10 percentage points.

Appendix Figure 1. Screenshot from HealthCare.gov of a Silver and Gold Plan without Premium or Cost-Sharing Subsidies

Unity Health Insurance · Unity Prime Silver Maintenance 30/70 Compare

Silver HMO
Plan ID: 37833WI0510031

ESTIMATED MONTHLY PREMIUM \$298	ESTIMATED DEDUCTIBLE \$3,200 Estimated individual total	ESTIMATED OUT-OF-POCKET MAXIMUM \$6,600 Estimated individual total
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<p>COPYMENTS / COINSURANCE</p> <p>Primary doctor: \$30</p> <p>Specialist doctor: \$70</p> <p>Emergency room care: \$500</p> <p>Generic drugs: \$5</p>	<p>PEOPLE COVERED</p> <p>1 (Age 46): Covered</p>	<p>MORE INFORMATION</p> <ul style="list-style-type: none"> Summary of Benefits Plan brochure Provider directory List of covered drugs
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[LEARN MORE ABOUT THIS PLAN](#)

Group Health Cooperative- SCW · Gold 1,000 Deductible Compare

Gold HMO
Plan ID: 94529WI0210019

ESTIMATED MONTHLY PREMIUM \$470	ESTIMATED DEDUCTIBLE \$1,000 Estimated individual total	ESTIMATED OUT-OF-POCKET MAXIMUM \$3,000 Estimated individual total
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<p>COPYMENTS / COINSURANCE</p> <p>Primary doctor: \$30</p> <p>Specialist doctor: \$30</p> <p>Emergency room care: \$250</p> <p>Generic drugs: \$20</p>	<p>PEOPLE COVERED</p> <p>1 (Age 46): Covered</p>	<p>MORE INFORMATION</p> <ul style="list-style-type: none"> Summary of Benefits Plan brochure Provider directory List of covered drugs
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[LEARN MORE ABOUT THIS PLAN](#)

Appendix Figure 2. Screenshot from HealthCare.gov of a Silver and Gold Plan with Both Premium and Cost-Sharing Subsidies

Unity Health Insurance · Unity Prime Silver Maintenance 30/70 Compare

Silver HMO
Plan ID: 37833WI0510031

<p>ESTIMATED MONTHLY PREMIUM</p> <p>\$43</p> <p>Premium before tax credit: \$298</p>	<p>ESTIMATED DEDUCTIBLE</p> <p>\$0</p> <p>Estimated individual total</p>	<p>ESTIMATED OUT-OF-POCKET MAXIMUM</p> <p>\$675</p> <p>Estimated individual total</p>
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<p>COPAYMENTS / COINSURANCE</p> <p>Primary doctor: No charge</p> <p>Specialist doctor: \$10</p> <p>Emergency room care: \$60</p> <p>Generic drugs: No charge</p>	<p>PEOPLE COVERED</p> <p>1 (Age 46): Covered</p>	<p>MORE INFORMATION</p> <ul style="list-style-type: none"> Summary of Benefits Plan brochure Provider directory List of covered drugs
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Group Health Cooperative- SCW · Gold 1,000 Deductible Compare

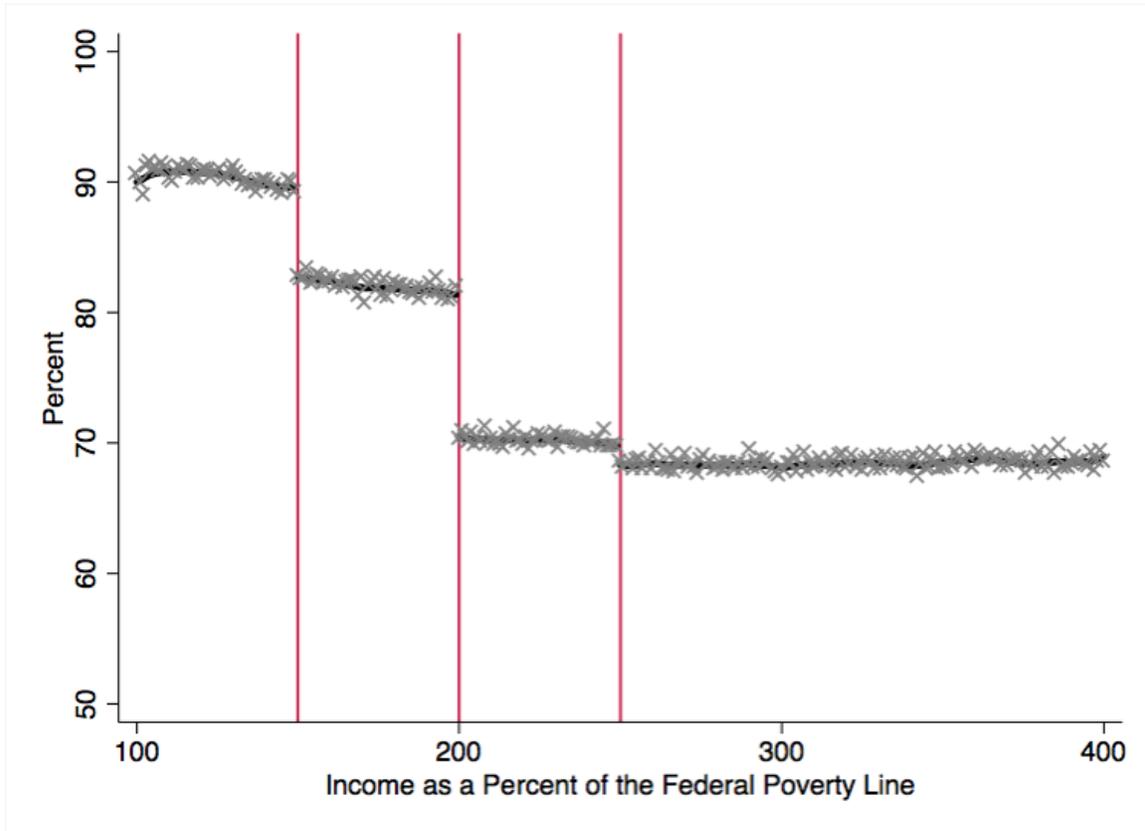
Gold HMO
Plan ID: 94529WI0210019

<p>ESTIMATED MONTHLY PREMIUM</p> <p>\$216</p> <p>Premium before tax credit: \$470</p>	<p>ESTIMATED DEDUCTIBLE</p> <p>\$1,000</p> <p>Estimated individual total</p>	<p>ESTIMATED OUT-OF-POCKET MAXIMUM</p> <p>\$3,000</p> <p>Estimated individual total</p>
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<p>COPAYMENTS / COINSURANCE</p> <p>Primary doctor: \$30</p> <p>Specialist doctor: \$30</p> <p>Emergency room care: \$250</p> <p>Generic drugs: \$20</p>	<p>PEOPLE COVERED</p> <p>1 (Age 46): Covered</p>	<p>MORE INFORMATION</p> <ul style="list-style-type: none"> Summary of Benefits Plan brochure Provider directory List of covered drugs
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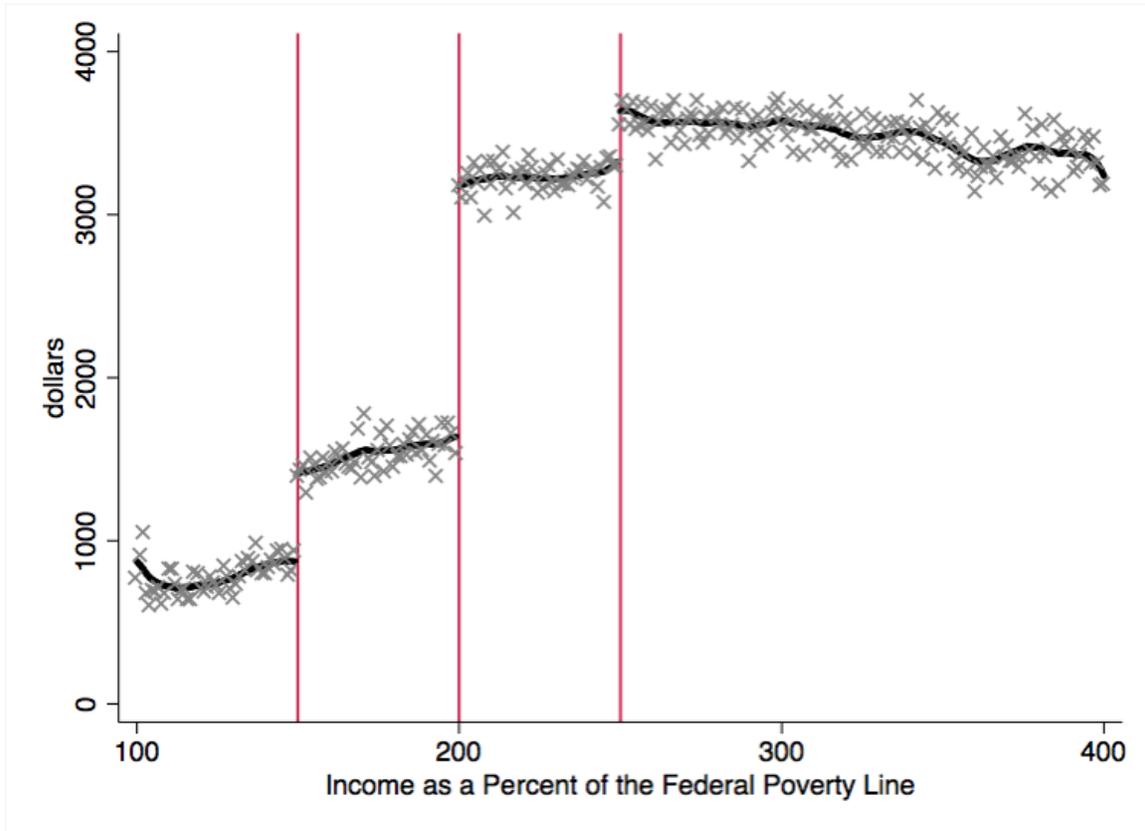
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Appendix Figure 3. Actuarial Values of Selected Plans



Notes: Estimated on individual-level administrative data on the characteristics of plans selected by Marketplace enrollees using the Healthcare.gov platform. Average outcomes in a one-percentage point FPL cell are reported. The fitted lines are four separate local linear regressions estimated on all Marketplace enrollees between 100 and 149% FPL, 150 and 199% FPL, 200 and 249% FPL, and 250 and 400% FPL at a bandwidth of 10 percentage points.

Appendix Figure 4. Annual Individual Deductibles of Selected Plans



Notes: See notes for Appendix Figure 3.

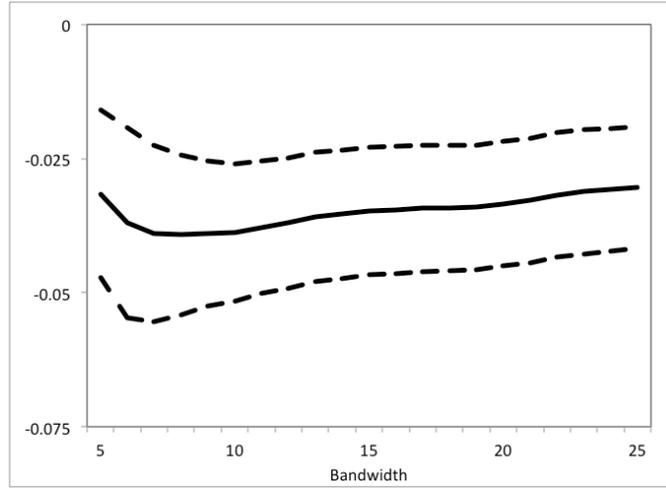
Appendix Figure 5. Annual Out-of-Pocket Maximums of Selected Plans



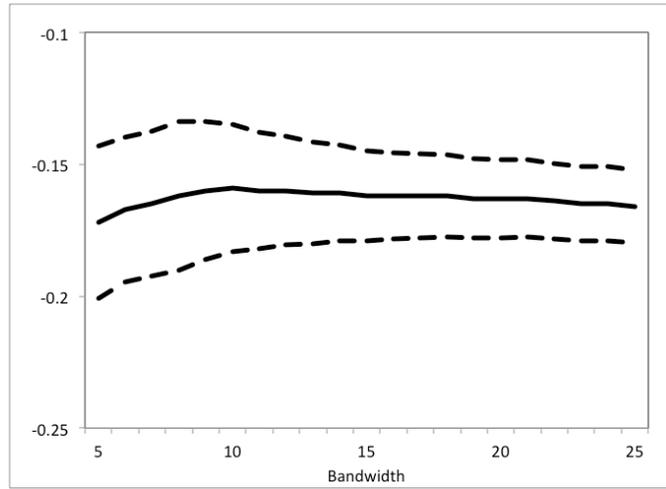
Notes: See notes for Appendix Figure 3.

Appendix Figure 6. Regression Discontinuity Estimates of the Effect of CSRs on the Fraction of Marketplace Enrollees Selecting Silver Plans at Various Bandwidths

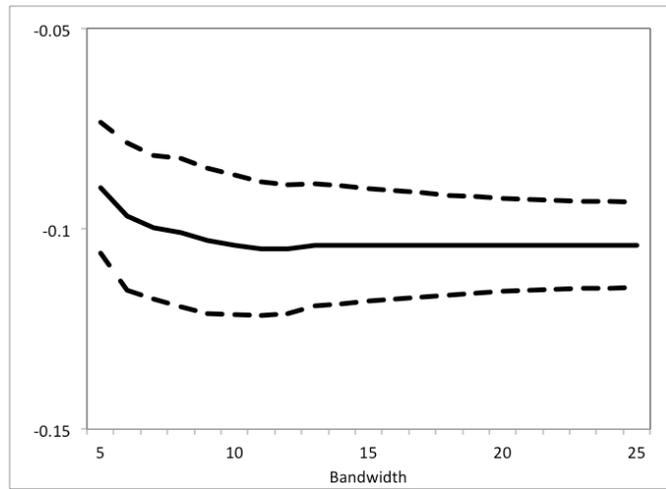
94% versus 87% AV CSRs (150% FPL Threshold)



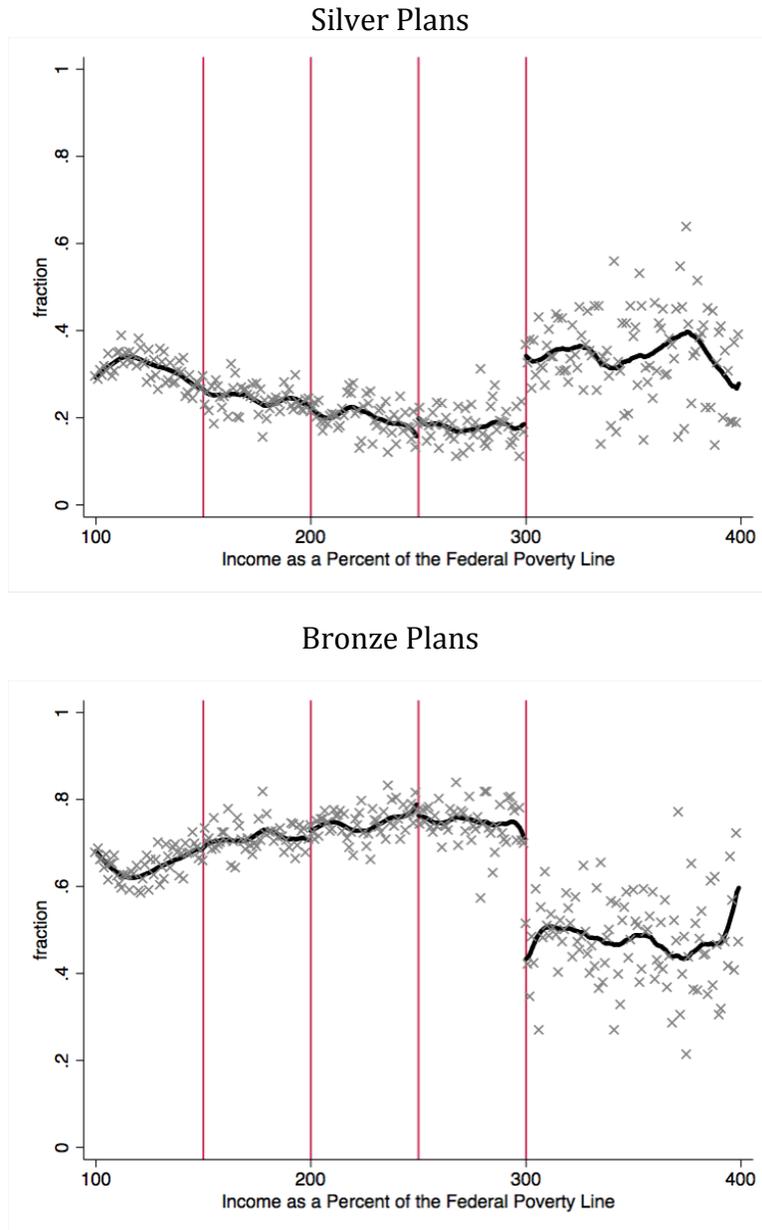
87% versus 73% AV CSRs (200% FPL Threshold)



73% versus 70% AV CSRs (250% FPL Threshold)

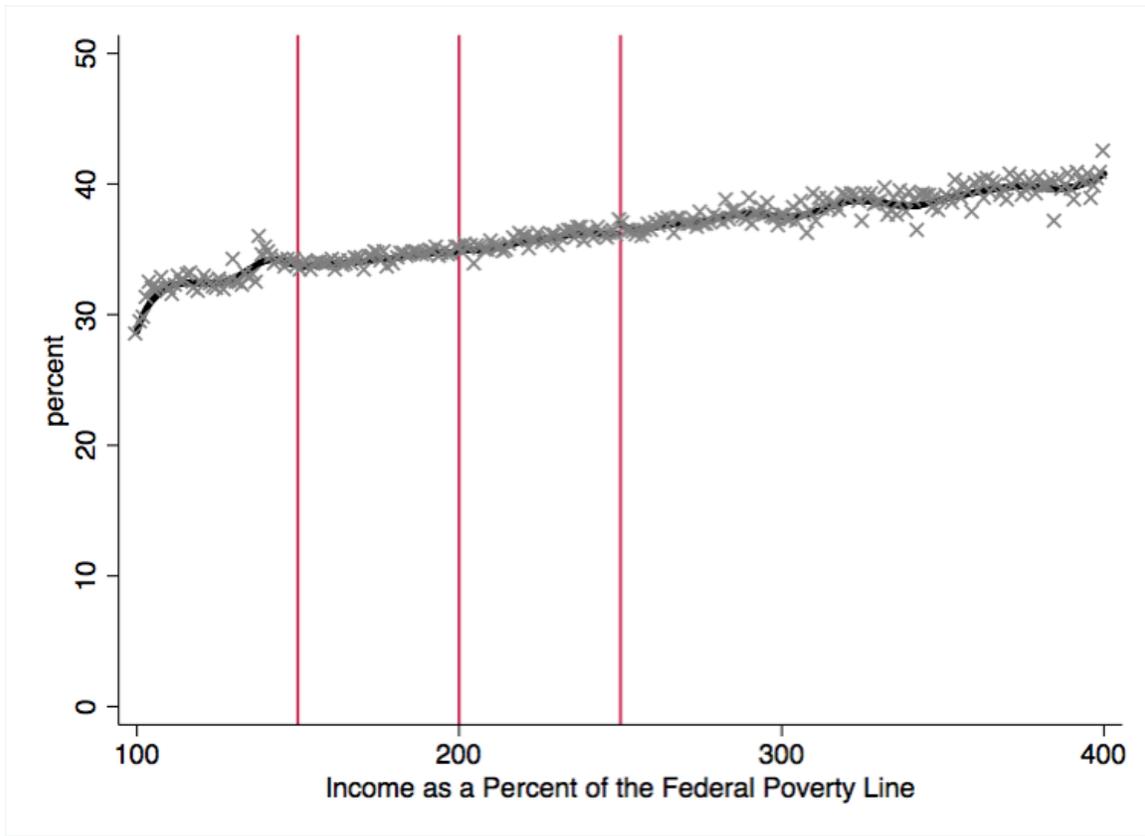


Appendix Figure 7. Fraction of Marketplace Enrollees who are Members of Federally-Recognized American Indian Tribes and in Silver and Bronze Plans



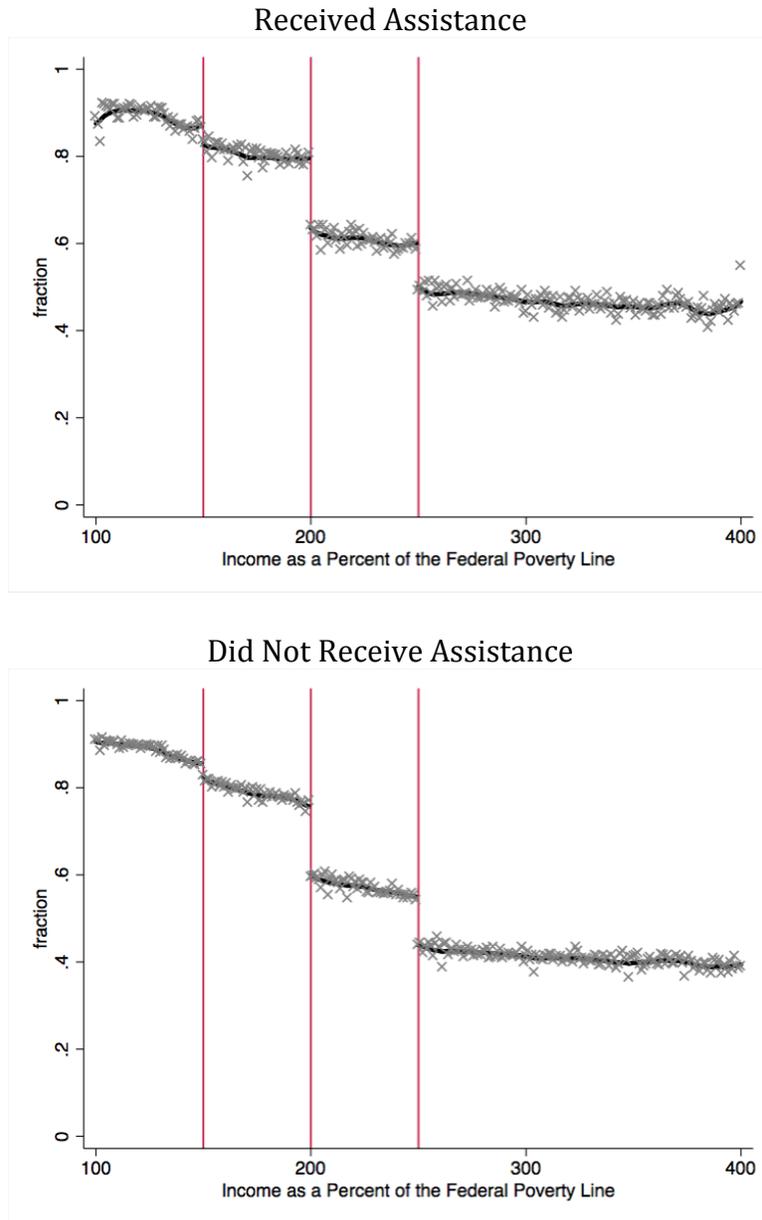
Notes: See notes for Appendix Figure 3.

Appendix Figure 8. Network Density of Selected Plans



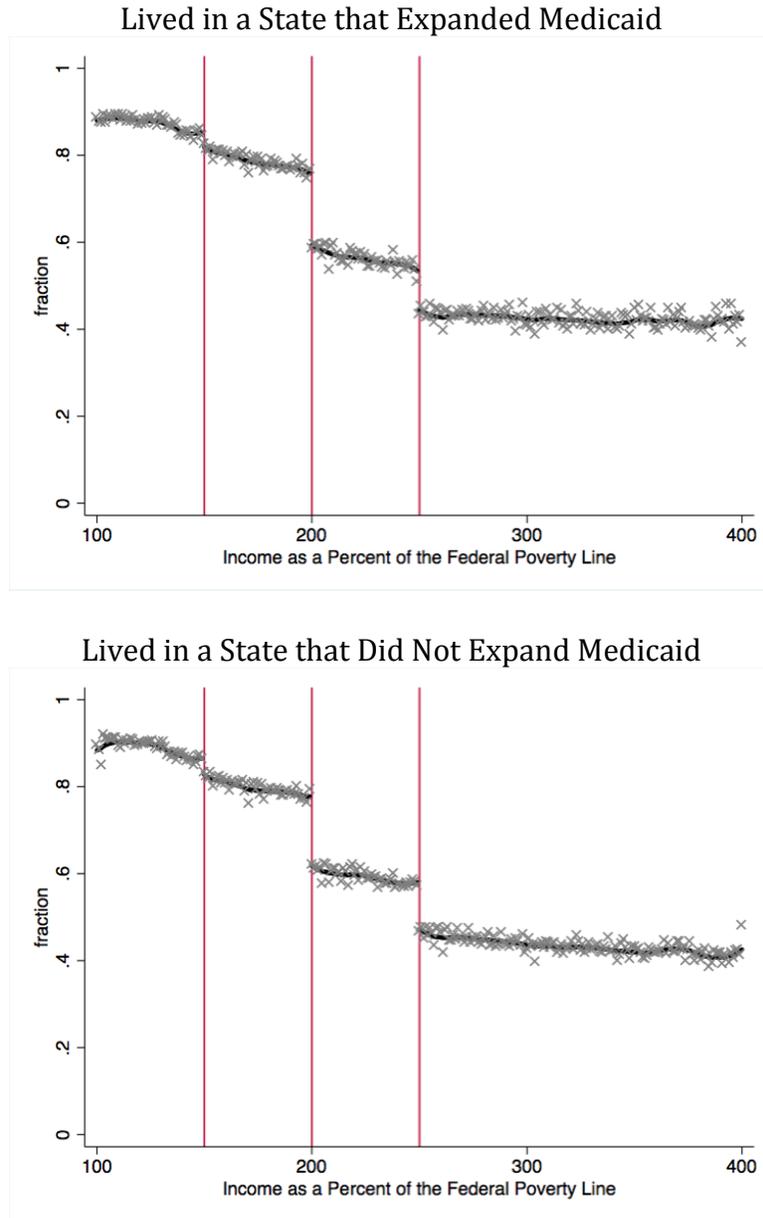
Notes: See notes for Appendix Figure 3.

Appendix Figure 9. Fraction of Marketplace Enrollees in Silver plans, by Receipt of Application Assistance



Notes: Application assistance includes assistance from an assister, navigator, or broker.

Appendix Figure 10. Fraction of Marketplace Enrollees in Silver plans, by Medicaid Expansion Status



Notes: States that used the HealthCare.gov portal and expanded Medicaid in 2014 include Arkansas, Arizona, Delaware, Iowa, Illinois, Indiana, Michigan, North Dakota, New Hampshire, New Jersey, New Mexico, Ohio, Pennsylvania, and West Virginia. States that used the HealthCare.gov portal but did not expand Medicaid by 2014 include Alaska, Alabama, Florida, Georgia, Idaho, Kansas, Louisiana, Maine, Missouri, Mississippi, Montana, North Carolina, Nebraska, Oklahoma, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Wisconsin, and Wyoming.

Table 1. Regression Discontinuity Estimates of the Effect of CSR Amount on Take up and Choice of Metal Level

	(1)	(2)	(3)	(4)	(5)	(6)
	Silver	Bronze	Gold	Platinum	Catastrophic	Enrollment in thousands
Over 150% FPL	-0.0388 (0.0065)	0.0307 (0.0075)	0.0046 (0.0014)	0.0033 (0.0012)	0.0001 (0.0002)	21.63 (25.89)
Over 200% FPL	-0.1590 (0.0123)	0.0826 (0.0127)	0.0588 (0.0043)	0.0168 (0.0033)	0.0009 (0.0013)	-7.45 (14.76)
Over 250% FPL	-0.1040 (0.0089)	0.0527 (0.0051)	0.0395 (0.0042)	0.0136 (0.0031)	-0.0016 (0.0015)	9.81 (18.36)

Notes: Standard errors, clustered within each income / FPL percentage point, are reported in parentheses. For each outcome, estimates are based on three local linear regression models with a triangular kernel and a bandwidth of 10 FPL points. The coefficient on the "Over 150% FPL" variable yields an estimate of the discontinuous change in the probability of selecting a particular metal level at 150% FPL, and the coefficients on the "Over 200% FPL" and "Over 250% FPL" variables can be interpreted similarly.

Table 2. Regression Discontinuity Estimates of the Effect of CSR Amount on Characteristics of Selected Plans

	(1)	(2)	(3)	(4)
	AV	Deductible	OOP Maximum	Network Density
Over 150% FPL	-6.90 (0.37)	539 (60)	899 (65)	-0.28 (0.20)
Over 200% FPL	-10.90 (0.48)	1525 (81)	2315 (78)	0.21 (0.27)
Over 250% FPL	-1.33 (0.18)	282 (56)	592 (57)	0.78 (0.23)

Notes: Standard errors, clustered within each income / FPL percentage point, are reported in parentheses.

Table 3. Alternative Specifications of RD Estimates of the Effect of CSR Amount

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Age 30 or Over	2014	2015	2016	AIANs	AIANs	Used Assister/ Navigator/ Broker	Did not Use Assister/ Navigator/ Broker	Lived in Medicaid Expansion State	Lived in Non- Expansion State
<i>Outcome</i>	Silver	Silver	Silver	Silver	Silver	Bronze	Silver	Silver	Silver	Silver
Over 150% FPL	-0.0397 (0.0063)	-0.0292 (0.0079)	-0.0307 (0.0076)	-0.0445 (0.0073)	-0.0089 (0.0225)	0.0123 (0.0251)	-0.0442 (0.0104)	-0.0340 (0.0051)	-0.0348 (0.0086)	-0.0397 (0.0061)
Over 200% FPL	-0.1590 (0.0123)	-0.1990 (0.0079)	-0.1530 (0.0121)	-0.1330 (0.0152)	-0.0056 (0.0144)	0.0241 (0.0197)	-0.1600 (0.0112)	-0.1570 (0.0115)	-0.1630 (0.0105)	-0.1580 (0.0129)
Over 250% FPL	-0.1040 (0.0089)	-0.1060 (0.0088)	-0.0827 (0.0069)	-0.1050 (0.0073)	0.0469 (0.0323)	-0.0340 (0.0267)	-0.0980 (0.0093)	-0.1100 (0.0068)	-0.0824 (0.0147)	-0.1100 (0.0078)
Over 300% FPL	--	--	--	--	0.1638 (0.0391)	-0.2502 (0.0509)	--	--	--	--

Notes: Standard errors, clustered within each income / FPL percentage point, are reported in parentheses.

Table 4. What Percentage of Enrollees Choose Dominated Plans?

	Number of Enrollees	Percent that Choose Platinum (90% AV)	Percent that Choose Gold (80% AV)	Percent that Choose Dominated Plans
100-149% FPL (eligible for 94% AV Silver Plan)	8,852,278	0.7%	1.3%	2.0%
150-199% FPL (eligible for 87% AV Silver Plan)	5,729,397	1.3%	2.4%	2.4%
200-249% FPL (eligible for 73% AV Silver Plan)	3,403,012	2.9%	9.9%	0.0%
250-400% FPL (not CSR eligible)	3,789,373	3.7%	15.2%	0.0%
100-400% FPL (All)	21,774,060	1.7%	5.3%	1.5%

Notes: Dominated plans include Platinum and Gold plans, for individuals with incomes between 100% and 150% FPL, and include Gold plans for individuals between 150 and 200% FPL.

Appendix Table 1. Summary Statistics, 2014 - 2016 Marketplace Enrollees

	Enrollees with Income as a Percentage of the Federal Poverty Level that is between:				
	100 to 400% FPL	100 to 149% FPL	150 to 199% FPL	200 to 249% FPL	250 to 400% FPL
<i>Metal Levels of Selected Plans</i>					
Catastrophic	0.4%	0.1%	0.3%	0.6%	1.2%
Bronze	18.8%	9.3%	16.6%	28.0%	36.4%
Silver	73.7%	88.6%	79.5%	58.6%	43.5%
Gold	5.3%	1.3%	2.4%	9.9%	15.1%
Platinum	1.7%	0.7%	1.3%	2.9%	3.6%
<i>Characteristics of Enrollees</i>					
Age	41.1	40.8	41.5	40.3	41.8
Income as a percent of FPL	182.6	121.2	172.6	222.5	305.4
White	69.2%	59.0%	70.3%	76.0%	81.5%
Black	14.4%	20.7%	13.6%	10.2%	7.2%
Asian	8.8%	10.8%	8.5%	7.4%	6.5%
Hispanic	9.6%	11.5%	10.0%	8.2%	5.8%
Male	45.1%	42.9%	45.6%	47.0%	47.7%
Assister/navigator/broker	45.1%	51.7%	41.1%	40.6%	39.7%
Tobacco user	6.5%	6.5%	7.2%	6.3%	5.7%
Number of enrollees	21,774,060	8,852,278	5,729,397	3,403,012	3,789,373

Source: Individual-level CMS administrative data on marketplace enrollment in states using the Healthcare.gov platform in 2014, 2015, or 2016.

Appendix Table 2. Covariate Tests

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Age	Male	White	Black	Asian	Hispanic	Tobacco Use	Used an Assister/ Navigator/ Broker
Over 150% FPL	0.685 (0.479)	0.005 (0.009)	0.009 (0.017)	-0.002 (0.009)	0.002 (0.009)	-0.005 (0.011)	0.002 (0.003)	-0.020 (0.020)
Over 200% FPL	1.070 (0.797)	-0.001 (0.008)	0.010 (0.006)	0.008 (0.011)	-0.002 (0.013)	-0.008 (0.004)	0.007 (0.008)	-0.041 (0.048)
Over 250% FPL	-0.470 (1.294)	-0.001 (0.004)	0.007 (0.018)	0.001 (0.008)	0.009 (0.013)	-0.010 (0.005)	-0.005 (0.005)	0.019 (0.043)

Notes: Standard errors, clustered within each income / FPL percentage point, are reported in parentheses. For each outcome and year, estimates are based on three local linear regression models with a triangular kernel and a bandwidth of 10 FPL points. The coefficient on the "Over 150% FPL" variable yields an estimate of the discontinuous increase in the outcome at 150% FPL, and the coefficients on the "Over 200% FPL" and "Over 250% FPL" variables can be interpreted similarly.

Appendix Table 3. Regression Discontinuity Estimates of the Effect of CSR Amount on Take-up / Choice of Metal Level, by Year

	(1)	(2)	(3)	(4)	(5)	(6)
	Silver	Bronze	Gold	Plati- num	Cata- strophic	Enroll- ment in thou- sands
<i>2014</i>						
Over 150% FPL	-0.0292 (0.0079)	0.0143 (0.0067)	0.0068 (0.0023)	0.0086 (0.0012)	-0.0004 (0.0008)	-8.44 (12.60)
Over 200% FPL	-0.1990 (0.0079)	0.0869 (0.0113)	0.0828 (0.0071)	0.0274 (0.0038)	0.0020 (0.0013)	0.70 (8.12)
Over 250% FPL	-0.1060 (0.0088)	0.0552 (0.0106)	0.0396 (0.0066)	0.0097 (0.0031)	0.0016 (0.0033)	4.75 (1.96)
<i>2015</i>						
Over 150% FPL	-0.0307 (0.0076)	0.0209 (0.0083)	0.0054 (0.0011)	0.0046 (0.0007)	-0.0002 (0.0002)	16.08 (8.93)
Over 200% FPL	-0.1530 (0.0121)	0.0759 (0.0158)	0.0561 (0.0047)	0.0206 (0.0037)	0.0008 (0.0008)	-0.66 (7.85)
Over 250% FPL	-0.0827 (0.0069)	0.0289 (0.0071)	0.0453 (0.0037)	0.0168 (0.0015)	-0.0083 (0.0020)	6.22 (5.70)
<i>2016</i>						
Over 150% FPL	-0.0445 (0.0073)	0.0393 (0.0070)	0.0039 (0.0011)	0.0005 (0.0002)	0.0009 (0.0002)	14.02 (21.30)
Over 200% FPL	-0.1330 (0.0152)	0.0886 (0.0128)	0.0419 (0.0031)	0.0023 (0.0008)	0.0002 (0.0020)	-7.50 (9.62)
Over 250% FPL	-0.1050 (0.0073)	0.0745 (0.0068)	0.0262 (0.0045)	0.0020 (0.0009)	0.0023 (0.0018)	-1.13 (12.96)

Notes: See Appendix Table 2.