For Online Publication

Appendix for:
What Difference Does a Health Plan Make? Evidence from Random Plan Assignment in Medicaid

A   Medicaid Managed Care in New York

New York State began experimenting with managed care in Medicaid in 1967. In 1997, New York obtained a Section 1115 waiver from the Department of Health and Human Services that authorized a statewide Medicaid managed care program utilizing private carriers in place of a traditional fee-for-service program. This program was voluntary in the 1980s and expanded into a mandatory program in the 1990s and 2000s.[1] Under mandatory managed care, beneficiaries are required to join a managed care plan operated by a for-profit or not-for-profit third party organization.

A.1   Broader Nationwide Context

During the study sample period New York State was similar to the national mean in its use of private managed care organizations to administer Medicaid enrollee benefits. According to CMS, as of July 2011 (toward the end of the study sample period), about three quarters of New York State's Medicaid beneficiaries were enrolled in a managed care program. The Kaiser Family Foundation reports that as of 2014, 77 percent of the US Medicaid population was enrolled in a Medicaid managed care plan, with 39 states using MCOs to deliver Medicaid benefits.

A.2   Auto Assignment in NYC

There are two exceptions to the auto-assignment policies described in Section 2. First, New York takes into account family member enrollment, defaulting beneficiaries into their family member's plan. Second, beneficiaries who were enrolled in a managed care plan in the year prior to assignment are reassigned to their previous plan.[2] Beneficiaries assigned on the basis of family members or prior enrollment are flagged and removed from our analysis sample.[3]

For our study period, in New York City beneficiaries had 30, 60, or 90 days to make an active choice. In practice, the gap we observe between enrollment and auto-assignment (see Appendix Figure A2) is often in excess of 90 days. During our study period (and today), Medicaid beneficiaries were retroactively enrolled upon successful application—a mechanism intended to cover recent unpaid medical bills that would have been covered by Medicaid. From a 2011 NY Medicaid policy document: "the retroactive eligibility period ... begins on the first day of the third month prior to the month in which the individual applied for Medicaid and ends on the date the individual applies for Medicaid."[4] Thus, although auto-assignment happens within 90 days of successful application, the observed enrollment spell often extends back prior to application, including the retroactive period as well. When taking this retroactive eligibility period into account, beneficiaries could be enrolled in

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[1]The shift to mandatory managed care took place via county-by-county "enrollment mandates." The mandates initially applied only to children and TANF adults, but were expanded to include disabled Medicaid beneficiaries (Sparer, 2012).

[2]Preferential assignment to a prior plan does not apply if the beneficiary's prior plan was a partial capitation plan, a low quality plan, or a plan without further capacity.

[3]We also remove beneficiaries with any managed care enrollment in the year prior to auto-assignment.

[4]The document, which includes additional details on New York's retroactive eligibility policy, is available here: https://www.health.ny.gov/health_care/medicaid/reference/mrg/june2011/pages495.6-8.pdf. (Accessed 8/17/2020)

the fee-for-service (FFS) Medicaid program for as long as 6 months prior to auto-assignment (which we often observe, as reported in Appendix Figure A2). Beneficiaries could also be enrolled for longer than six months prior to assignment if their assignment occurs due to a new MMC enrollment mandate for their eligibility group. While MMC enrollment mandates were in effect for most populations in NYC prior to the beginning of our study period, some small groups were transitioned at some point during the period. These groups would have 30, 60, or 90 days to make an active choice *from the date the mandate kicks in*, not from the date they applied for Medicaid. Given that some of these individuals could have been enrolled in Medicaid for years prior to the implementation of an MMC enrollment mandate for their group, it is possible for these beneficiaries to have pre-assignment enrollment periods much longer than six months.

Plans qualify as eligible for assignment based on a yearly composite measure that incorporates state-specific quality measures, Consumer Assessment of Healthcare Providers and Systems (CAHPS) responses, Prevention Quality Indicators (PQIs), and regulatory compliance measures. Prevention Quality Indicators (PQIs) are a set of measures developed by the Agency for Healthcare Research and Quality to evaluate the quality of care for "ambulatory care sensitive conditions." These are conditions for which good outpatient care can prevent hospitalizations or complications. Because plans do not necessarily qualify for random assignment over our entire study period and are not always available in all counties, we treat a beneficiary's county-by-year-by-month of assignment as the unit of randomization.

A.3 Auto Assignee Sample Sizes by Plan

The sample size of auto-assignees is not identical across plans for several reasons. First, as noted above, plans qualify to receive auto-assignees based on a performance composite that measures plan-level quality, consumer satisfaction, and regulatory compliance. Plans that don't qualify are ineligible to receive auto-assignees during the specified period. Second, some of the plans in our sample do not service Staten Island, one of the five boroughs of New York City, and so will not receive auto-assignees that reside there. Figure A1 shows enrollment flows into each plan each month, and verifies that conditional on eligibility, each plan received a $\frac{1}{N}$ share of enrollees, where N is the number of eligible plans.

In addition to the two factors above, there was a merger of two of the plans in our sample. The merger, which took place in the final year of our study (2012), led to all enrollees in the acquired plan being transferred to the acquiring plan. Since this was not a voluntary plan switch, for the set of auto-assignees that were in the acquired plan, we recoded their plan of assignment to be the acquirer beginning the month of the acquisition.

B Data

B.1 Administrative data and outcomes

We use the validated administrative data from the NYSDOH to construct a series of outcomes including enrollee spending, utilization of medical services and drugs, healthcare quality (including avoidable hospitalizations), plan satisfaction, and the likelihood of re-enrolling in Medicaid. All of these outcomes are either used by policymakers to regulate plans, publicly-reported to enrollees during the plan choice process, or both. We briefly describe the details of these outcomes below.

- **Categories of service.** We use an algorithm provided by the New York State Department of Health to classify administrative healthcare claims into mutually-exclusive categories of service. The state's algorithm takes into account the claim type, provider category of service,

provider specialty code, rate code (a New York data element used to identify the broad type of service provided), procedure code (e.g., CPT, HCPCS, ICD), modifier code, and enrollee age.

- **Drug classification.** We use Truven Health Analytics Red Book to classify the pharmaceutical claims in our data. Red Book groups claims into mutually-exclusive buckets based on the National Drug Code (NDC). Our drug groups are supersets of REDBOOK therapeutic classes. Diabetes includes: Anti-diabetic agents, Sulfonylureas; Anti-diabetic agents, misc; Anti-diabetic agents, Insulins. Statins include: Anti-hyper-lipidemic Drugs. Anti-depressants include: Psychother, Anti-depressants. Anti-psychotics include: Psychother, Tranq/Antipsychotic; ASH, Benzodiazepines; Anticonvulsant, Benzodiazepine. Anti-hypertension includes: Cardiac, ACE Inhibitors; Cardiac, Beta Blockers; Cardiac, Alpha-Beta Blockers. Anti-stroke includes: Coag/Anticoag, Anticoagulants. Asthma/COPD includes: Adrenals and Comb, NEC.

- **Healthcare quality.** We construct three sets of healthcare quality measures. First, we determine whether beneficiaries comply with recommended preventive care. Second, we examine the rate of avoidable hospitalizations. And, third, we measure the prevalence of low value care.

  Preventive care. We examined whether beneficiaries complied with recommended flu vaccinations for adults ages 18 to 64, breast cancer screenings, cervical cancer screenings, and chlamydia screenings in women. These measures follow the specifications of the Medicaid Adult Core Set HEDIS measures but do not include any continuous enrollment restriction for inclusion. The Breast cancer screening measure determines the percentage of women ages 50 to 65 who had a mammogram. The cervical cancer screening measure determines the percentage of women ages 21 to 64 who were screened for cervical cancer. Chlamydia screening determines the percentage of sexually active women 18 to 24 who were tested for chlamydia. The HbA1c measure determines the percentage of diabetic adults ages 18 to 64 who had a hemoglobin A1c test.

  Avoidable hospitalizations, avoidable emergency department use, and hospital readmissions. Avoidable hospitalizations follow the specifications of the Medicaid Adult Core Set HEDIS measures. PQI-01 counts the number of inpatient hospitalizations for diabetes short term complications for adults ages 18 to 64. PQI-05 counts the number of inpatient hospitalizations for COPD or asthma for adults ages 40 to 64. PQI-08 measures the number of inpatient hospitalizations for heart failure for adults age 18 to 64. PQI-15 measures inpatient hospitalizations for COPD or asthma for adults 18 to 39. In addition to the avoidable hospitalization measures focused on the inpatient setting, we also construct an avoidable emergency department (ED) utilization measure that captures ED utilization for low-acuity services that could be treated in another ambulatory setting (Medi-Cal Managed Care Division, 2012). Lastly, we construct a measure of all-cause hospital readmission rates in the 30 days following a hospitalization, relying on the Medicaid Adult Core Set specification.

  Low value care. We use 5 claims-based measures from Charlesworth et al. (2016) to measure low value care. These measures are recommendations from CMS or the Choosing Wisely initiative, which aims to avoid unnecessary medical tests, treatments, and procedures. We selected these 5 measures as they had both a large number of qualifying diagnoses for the denominator and a high overall prevalence of low value care conditional on that diagnosis.

- **Denied claims.** In our administrative claims data, we observe the final payment status of each encounter reported by the Medicaid managed care plans. Since there is very minimal cost-sharing in New York Medicaid, these administrative denials represent the denial of claims submitted to Medicaid managed care plans by healthcare providers. We are unable to observe the reasons for denial in our data. Denials may occur for several reasons, including duplicate claims being submitted, claims submitted with errors, and claims submitted for unapproved

services. We evaluate the role of denied claims (which are paid $0 in our data) by repricing each denied claim using the pricing regression described in Appendix Section D.2.

C   Robustness and Alternative Specifications

C.1   Plan Group IV Regressions

Some of our results involve an IV regression in which the regressors are plan groups: low- (Plans A, B, C, G, H, I), medium- (Plans E, F, and X), and high-spending (Plan D). The corresponding equation is:

$$Y_{it} = \rho + \psi_{c(i)} + \nu X_{it} + \gamma_{\text{Low}}\widehat{\text{Low Plan}}_{it} + \gamma_{\text{High}}\widehat{\text{High Plan}}_{it} + \mu_{it}$$

Medium spending is the omitted category. The endogenous variables are indicators for enrollment in any plan in each set, and the instruments are indicators for *assignment* to any plan in each set, so there are two first-stage regressions:

$$LowPlan_{it} = \phi_{1c(i)} + \delta_1 X_{it} + \sum_{j\in\text{High,Low}} \lambda_{1j} Assigned\_j_{it} + \eta_{1,ict},$$

$$HighPlan_{it} = \phi_{2c(i)} + \delta_2 X_{it} + \sum_{j\in\text{High,Low}} \lambda_{2j} Assigned\_j_{it} + \eta_{2,it}.$$

Results using this specification are presented in Figure 5 and Tables A13 and A25.

C.2   Unfolding of Effects Over Event Time

In Table A10, we investigate the sensitivity of our estimates in the main estimation sample to pooling per-enrollee spending over the entire six-month spell, rather than examining month-by-month spending. One practical consequence is that there are fewer observations (now enrollee-spells, rather than enrollee-months) with zero spending. This change in the underlying distribution of the dependent variable leads to spending results that are numerically different in the log specification (though not in the Winsorized level specification), with the aggregated spending estimates generally being larger than the monthly estimates. The table nonetheless shows that all specification variations yield results that qualitatively track the main spending estimates.

In Table A12 we report coefficient estimates for low- vs. medium-plan effects over different time periods. In column 1 we report our original results, where we restrict to the first 6 months post-assignment. In columns 2 and 3 we maintain the same sample of beneficiaries, but we allow post-assignment months 7-9 and 7-12 to enter the regression, respectively. In columns 4 and 5, we restrict to balanced panels of beneficiaries enrolled for at least 9 and at least 12 months, respectively, also restricting the observations to 9 months and 12 months post-assignment. In all cases, the coefficients on "high" and "low" are virtually unchanged, though statistical power decreases for the "high" coefficient. These results provide evidence that the main effects presented in Table 2 and Figure 5 persist into the longer run—for the minority of managed care enrollees that have these longer enrollment spells.

D   Mechanisms

D.1   Selection and organization of providers

We briefly explore provider networks as a mechanism for the spending, quality, and satisfaction gaps we estimate across plans. We start by discussing how we construct the measures of healthcare

provider network breadth we use to assess the role of networks.

D.1.1 Measuring provider network breadth

We measure network breadth as the share of simulated physician and hospital visits from a given zip code covered by each plan's network in each year. To simulate physician and hospital visits, we use estimates from models of physician and hospital demand in Wallace (2020), which include a "hassle cost" for going to an out-of-network provider. The estimates from these models are used to simulate where Medicaid enrollees would seek care if every provider was in-network for each plan (i.e., an unconstrained counterfactual). As in Ericson and Starc (2015), the "simulated visit shares" measure is a calculation of the share of simulated physician and hospital visits for Medicaid enrollees living in a given zip code that are covered by each plan's network. Because there is substantial variation between plans in the out-of-network (OON) hassle costs in the hospital demand model, we also assess the correlation between our causal plan effects and plan-specific OON hassle costs.[5]

D.1.2 Assessing whether provider network breadth mediates our causal plan effects

We assess whether provider network breadth mediates our causal plan differences in two ways. First, we re-estimate the plan-level spending and satisfaction results in our randomly-assigned sample but with controls for network breadth. Appendix Tables A15 and A16 present the results of this analysis for log spending. Column 1 of Appendix Table A15 reproduces our primary estimate of the causal effects of assignment to a low- or high-spending plan on log spending. In Column 2 we additionally instrument for provider network breadth using the network breadth (which varies at the plan-by-zip level) of the plan of assignment and the enrollee's zip code. The additional control for network breadth does not change the large estimated differences across plan spending groups. In Appendix Table A16 we present an analogous exercise for the estimation of the individual plan effects (rather than plan spending groups). Additionally instrumenting for provider network breadth does not substantially reduce the dispersion of the plan effects as measured by their range or standard deviation. In Appendix Tables A17 and A18 we demonstrate that our consumer satisfaction results are also not sensitive to including instruments for provider network breadth in the model.

Second, we plot our causal estimates of plan-level spending and willingness-to-stay (i.e., consumer satisfaction) against plan-level measures of provider network breadth. We plot these relationships in Appendix Figure A8. Panel (a) plots our estimated plan-level spending effects against provider network breadth measured at the plan-level. The slope of the line of best fit if we include all plans is close to zero. This can be reconciled with evidence from Gruber and McKnight (2016) and Wallace (2020) that narrower provider networks reduce spending and satisfaction by noting that the complex set of tools that modern health insurers rely on to constrain spending may counteract the effects of broader networks. For example, one of the Medicaid managed care plans in our sample is vertically-integrated with the public, safety net hospitals in New York City. This "provider-owned" plan operates a very narrow hospital network but, when enrollees are randomly-assigned to it, we observe high levels of spending. Hence, it is likely that it combines a narrow hospital network with a relatively lenient set of utilization management tools. Indeed, this multi-dimensional nature of the contract is the primary motivation for the strategy used by Wallace (2020) to separately identify the effect of networks from other dimensions of MMC plans.

If we exclude the provider-owned plan and plot the line of best fit for log spending through the 9 plans, we observe a steeper slope and tighter fit (i.e., narrower network plans have lower spending) but the relationship is noisy ($R^2 = 0.13$). We observe a stronger linear relationship between our estimated plan-level willingness-to-stay effects against provider network breadth in the rightmost

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[5]Additional details on network breadth measure construction and summary statistics are available in Wallace (2020).

figure of panel (a), though that relationship is also noisy given the small number of points. However, if we exclude the provider-owned plan, we observe a statistically significant relationship between willingness-to-stay and provider network breadth, with the variation in plan-level network breadth explaining 48% of the between-plan differences in willingness-to-stay.

Because plans differ in how difficult they make it for enrollees to seek out-of-network (OON) care, we also assessed the relationship between our causal plan effects and estimates of the OON "hassle costs" for each plan in panel (b). These estimates are based on a model of hospital demand in Wallace (2020), which includes a "hassle cost" for going to an out-of-network provider; the hassle cost estimates are not rescaled (i.e., they are the values recovered by the conditional logit model of hospital choice). We find no relationship between the OON hassle costs and plan spending (with or without the provider-owned plan). However, if we exclude the provider-owned plan we do see some suggestive evidence that enrollees randomly assigned to plans with larger hassle costs (i.e., more negative values on the x-axis) have lower satisfaction. We find that OON hassle costs explained 24% of the variation in WTS in the rightmost figure of panel (b).

D.1.3   Assessing whether provider steering mediates our causal plan effects

Another aspect of provider networks, beyond the question of broad versus narrow, involves whether certain plans steer patients to providers with more efficient practice styles (Glied, 2000). To assess this, we used administrative data on enrollees' healthcare utilization in the post-assignment period to attribute them to the physician or hospital with whom they utilized the most services. A limitation of this approach is that enrollees with no physician or hospital spending could not be attributed to a provider. This is particularly problematic in our setting given evidence that random plan assignment impacts the extensive margin of whether enrollees use any physician or hospital care.

With the caveat that we are conditioning on a pair of post-treatment outcomes (enrollees non-random choice of provider for a sample limited to enrollees with physician and hospital claims), column 3 of Appendix Table A15 reproduces our primary estimates for the sub-sample of enrollees we were able to attribute to a physician or hospital. Relative to the estimated effect of assignment to a low-cost plan in the full sample, the effect size in this sub-sample was smaller (-0.125), but remained highly statistically significant. Columns 4 and 6 demonstrate that the estimated spending difference was attenuated by 15-18% when we controlled for provider fixed effects. We observed similar reductions in the magnitude of the dispersion of individual plan effects when we controlled for provider fixed effects (Appendix Table A16). Hence, while the analysis is complicated by sample selection and the nonrandom sorting of enrollees to providers, the results suggest that steering to more efficient providers partly mediates our causal plan effects on spending, but does not appear to explain plan effects on consumer satisfaction (Appendix Tables A17 and A18).

D.2   Prices

In panel (a) of Figure 3, we reprice all claims as if all plans transacted at a common set of prices. We then re-calculate enrollee spending using the repriced claims and re-run the IV analysis.[6] To construct our list of common reference prices, we begin by following Cooper et al. (2019) in estimating plan "effects" on prices. The estimating equation is:

$$P_k = \nu_{d(k)} + \sum_{j=1}^{9} \Psi_j \mathbf{1}[\text{Plan j}] + \mu_k,$$

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[6]For ease of comparison, panel (c) of Figure A9 plots these plan effects re-estimated on the price-standardized data against our main IV plan effects. These coefficients are tabulated in Table A8.

where P_k indicates the log price paid by plan j for service d on individual claim record k in our data. Services $d(k)$ are comprised of DRGs for inpatient admissions and HCPCS for outpatient procedures. The regressors include service code-by-service group (physician office visit, ED visit, etc.) fixed effects (ν_d) and nine plan fixed effects (Ψ_j) that indicate the relative price level of each plan. If the data generating process underlying prices consisted of each plan determining prices as a constant-multiple markup for all services relative to some common index price for each service (such as the FFS Medicaid price), then Ψ_j would exactly recover that markup. To reprice the claims, we use predicted values from this regression, assigning a common price across plans for each procedure. This common price is set to equal $e^{(\nu_d + \Psi_X)}$—the procedure fixed effect plus the plan effect from the omitted plan, de-logged.

Figure 3 uses this repricing to analyze individual plan effects. For completeness, in the first panel of Figure 5, we summarize repriced spending results for plan *groupings* (low-, medium-, and high-spending). Each row of the figure corresponds to a separate regression, plotting coefficients and 95% confidence intervals for the group-level coefficients on low-spending plans. The first coefficient is from the unadjusted regression (also in Table A13). The next row reports the coefficient on price-standardized spending and shows no change. The final row in the first panel reports the coefficient from a price-standardized regression in which we additionally reprice each denied (zero paid) claim as if it had been paid at a common-across-plans price, and then re-estimate the effect of low- versus medium-spending plans. Denied claims also do not appear to be important for explaining spending effect differences. These results combine to show that low-spending plans are reducing spending by reducing actual utilization of healthcare goods and services, *not* by just paying less for the same goods and services.

Figure A9 investigates the role of prices in greater detail. In it we plot the median log prices for the medium- versus low-spending plans for thousands of services. A price here is the paid amount at the level of the DRG for inpatient admissions (panel (a)) and at the level of the procedure code for outpatient services (panel (b)). The figure shows that prices appear very similar across medium- and lower-spending plans. Systematically higher prices in the medium-spending group would appear as a vertical shift of the cloud of points above the 45 degree line. No shift is evident. Analogous figures for high- versus medium-spending plans are shown in Figure A10, revealing a similar pattern.

E   Additional Figures and Tables

Appendix Figure A1: Share of Enrollees Assigned Each Month in New York City and Staten Island

(a) Entire City

(b) Staten Island
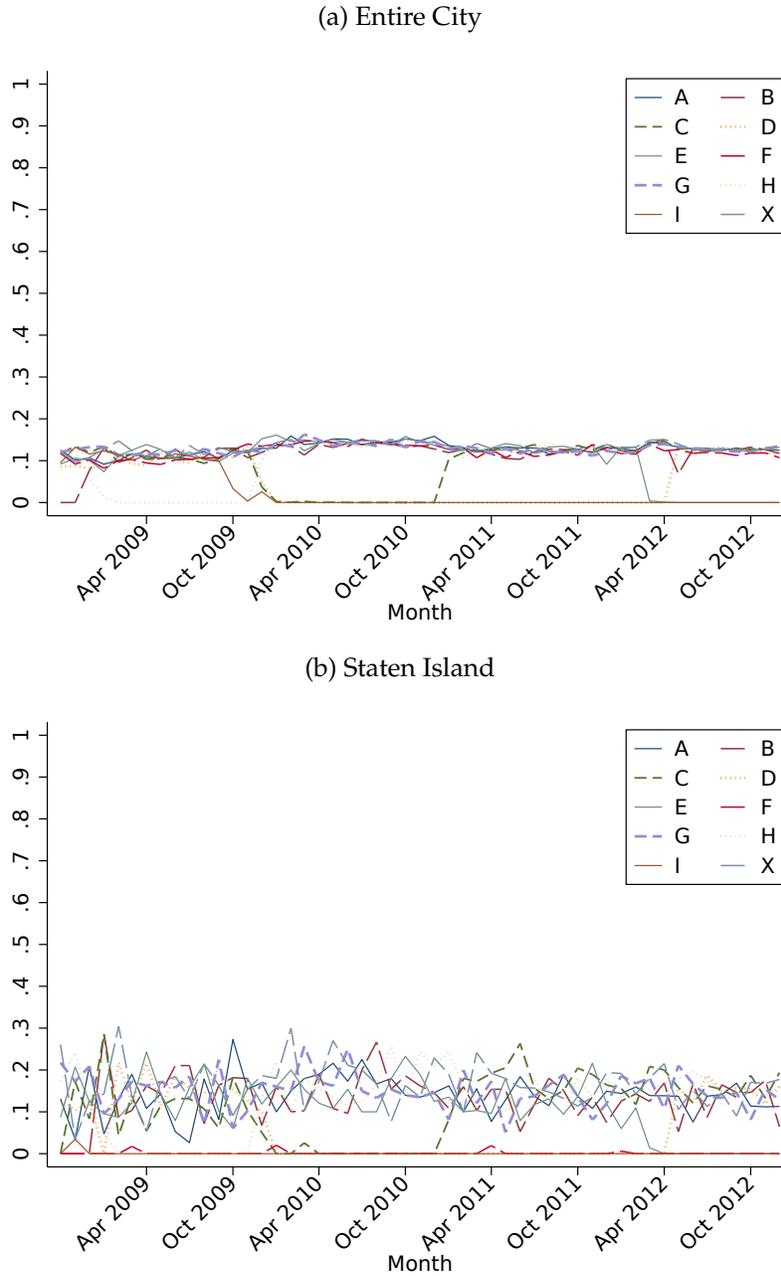
Note: Figure plots shares of monthly auto-assignee enrollment flows over time for each plan. Shares are calculated as the fraction of enrollees assigned to a plan in a given borough-month divided by the number of enrollees assigned in that borough-month. The top panel includes all five boroughs. The bottom panel limits attention to Staten Island. Plans qualify to receive auto-assignees based on a performance composite that measures plan-level quality, consumer satisfaction, and regulatory compliance. When a plan is ineligible to receive auto-enrollees, its predicted enrollment flow is zero. When a plan is eligible, its predicted enrollment flow as a share of total enrollment should be equal to $\frac{1}{N}$, where N is the number of eligible plans.

Appendix Figure A2: Enrollment Spell Lengths of Auto-Assignees

(a) Medicaid Enrollment (FFS plus MMC) Spell Lengths

Typical enrollment spell (FFS + MMC) is 12 months, including a retroactive FFS period to cover expenses prior to the date on which signup occurred

(b) Post-Auto-Assignment (MMC) Spell Lengths

Typical post-auto-assignment spell is 6 months, due to a New York regulation that guarantees Medicaid eligibility for 6 months following the beginning of a managed care enrollment spell

Note: Figure displays histograms of enrollment spells in our data for auto-assignees, prior to making sample restrictions based on enrollment length. The top panel shows the length of the overall Medicaid enrollment spell, which includes a fee-for-service (FFS) spell prior to assignment and a managed care (MMC) spell post-assignment. The bottom panel shows the length of the managed care (MMC) spell post-assignment. The typical post-assignment spell is 6 months due to a NY regulation that guarantees Medicaid eligibility for 6 months following the beginning of a managed care enrollment spell.

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Appendix Figure A3: Plan Effects by Groups

(a) By Sex and Plan

(b) By Age and Plan

(c) By Baseline Spending and Plan

(d) Event Study: Plan Groups By Baseline Spending Groups
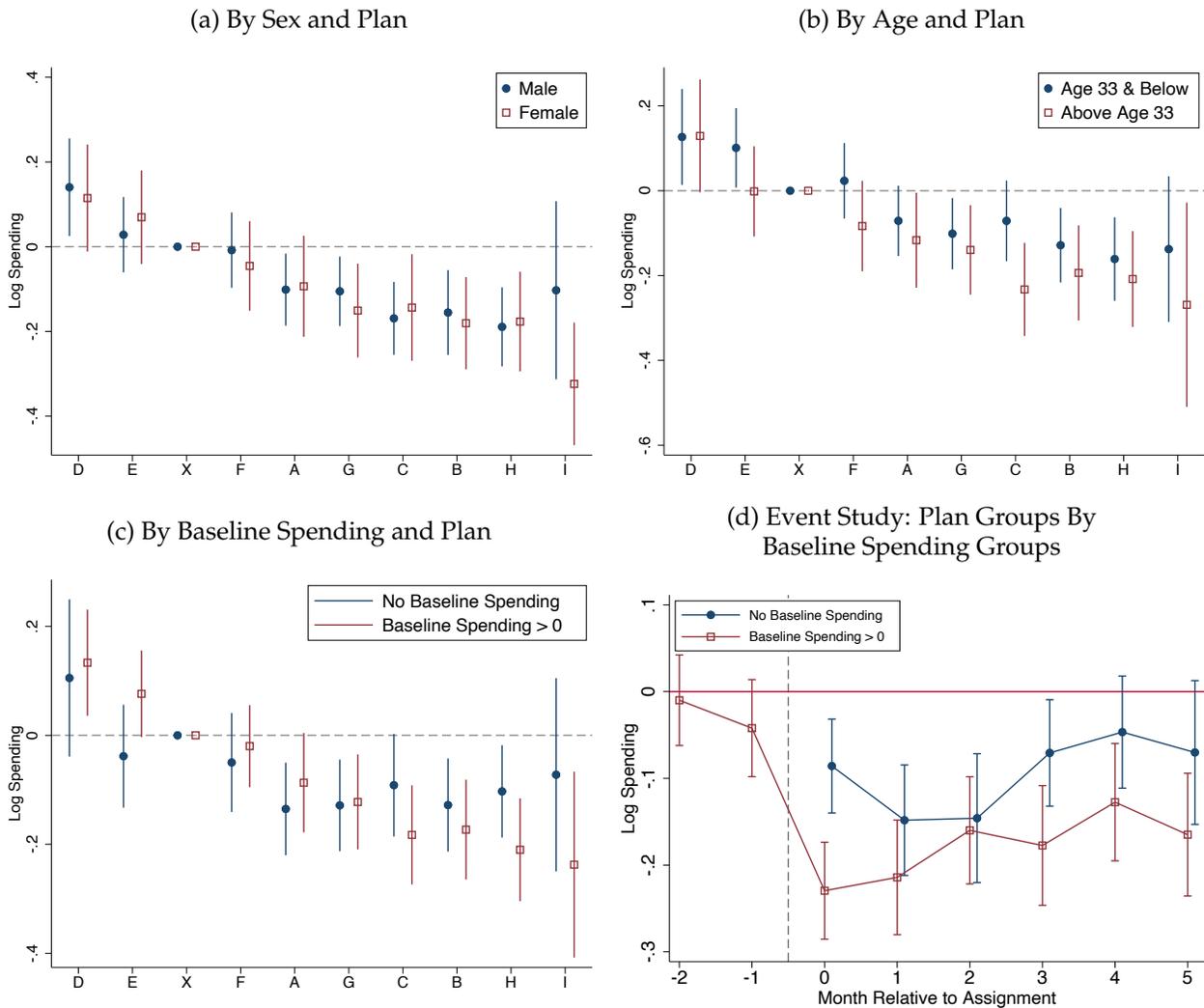
Note: Panels (a) through (c) replicate the spending result from panel (a) of Figure 3 in various subsamples. These panels plot IV coefficients corresponding to Eq. 3, where the dependent variable is log(total healthcare spending +1), estimated separately within the indicated subsamples. Plans are ordered identically to Figure 3. Standard errors are clustered at the county × year × month-of-assignment level. This is the level at which the randomization operates. Panel (d) replicates panel (a) of Figure 4 separately in subsamples defined by baseline spending.

Appendix Figure A4: Primary Care Use by Time Since Plan Assignment
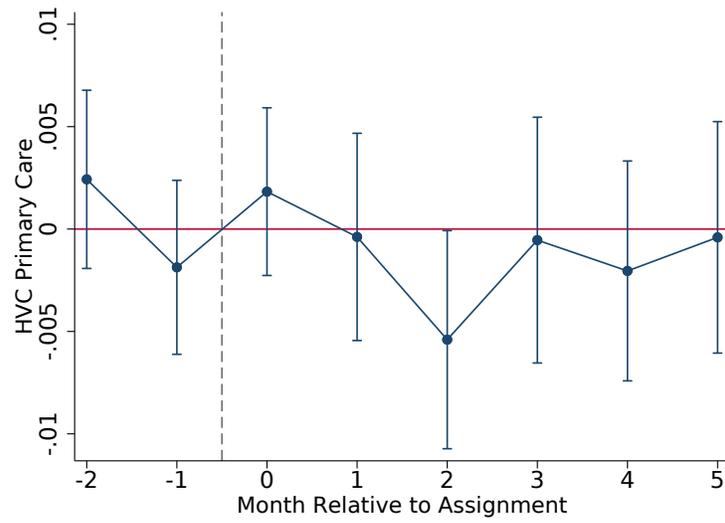
Note: Figure displays results in the spirit of difference-in-difference event studies showing the spending impacts of being assigned to a low- versus medium-spending plan. The specification follows Figure 4 but uses an indicator for any primary care physician (PCP) visit in the enrollee-month as the dependent variable. See Figure 4 for additional detail.

Appendix Figure A5: Carved-Out FFS Claims versus Total (FFS and MMC) Claims
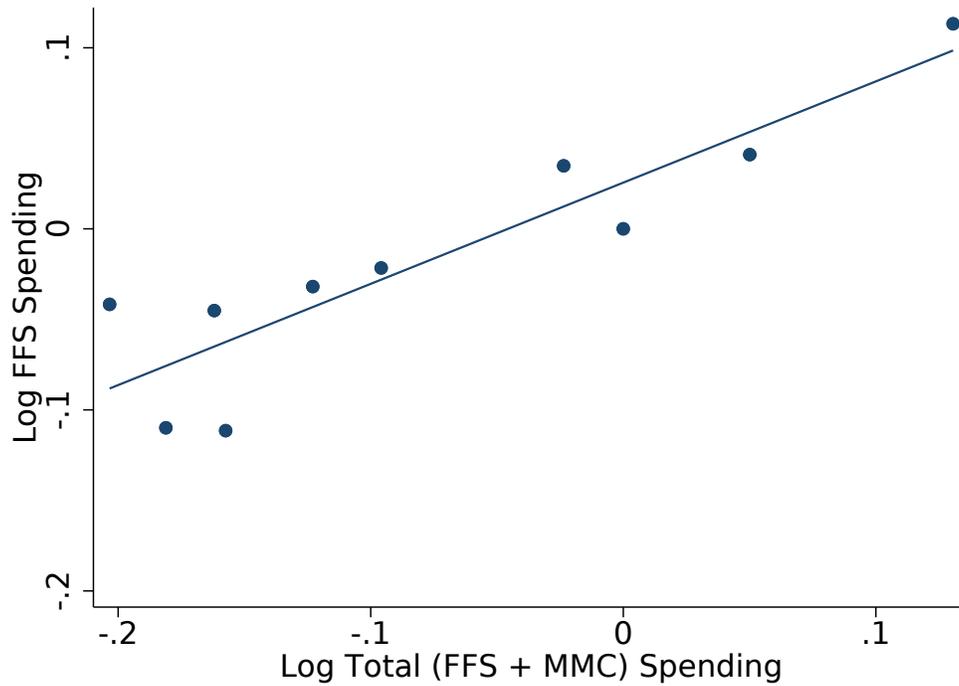
Note: Figure plots IV estimates of plan effects on carved-out FFS claims against plan effects on total (FFS plus MMC) claims. The sample is the main IV analysis sample. Carved-out FFS claims for MMC enrollees are paid and reported directly by the state, rather than by the plans despite occurring during MMC enrollment. Markers correspond to plans. The coefficients plotted along the horizontal axis are identical to those reported in Figure A9. Correlation between FFS claims and total claims is consistent with the joint hypothesis that low-spending plans affect spending across a broad set of services (including carved-out services) and that MMC claims data reveal true differences in utilization rather than merely differences in reporting.

Appendix Figure A6: Extending the Figure 5 Results to the High-Spending Plan
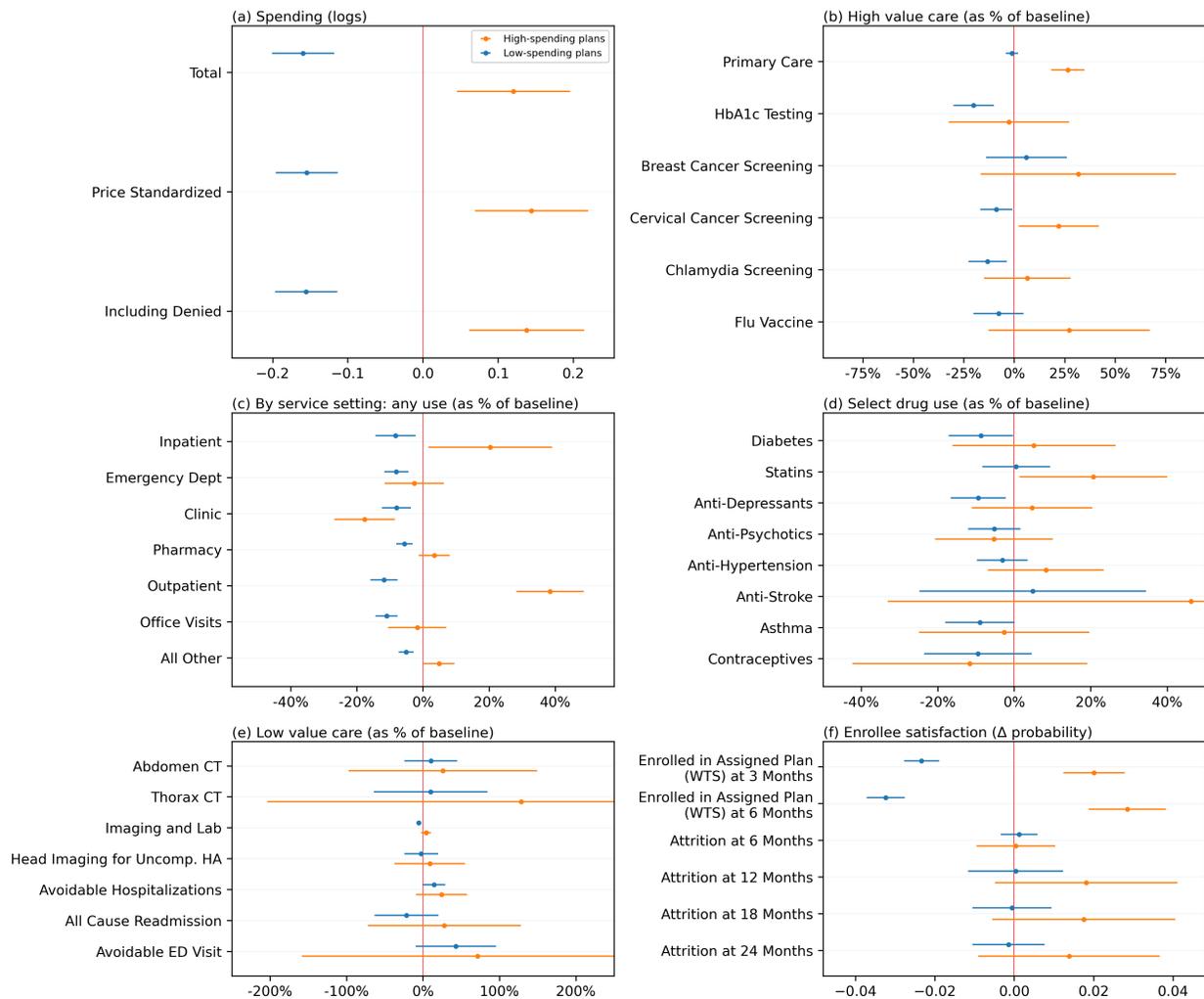
Note: Figure shows outcomes in low-spending plans and high-spending plans compared to medium-spending plans (omitted category) across various categories and service settings. See Figure 5 notes for additional detail.

Appendix Figure A7: Auto-Assignees Divided by Baseline (Pre-Assignment) Spending
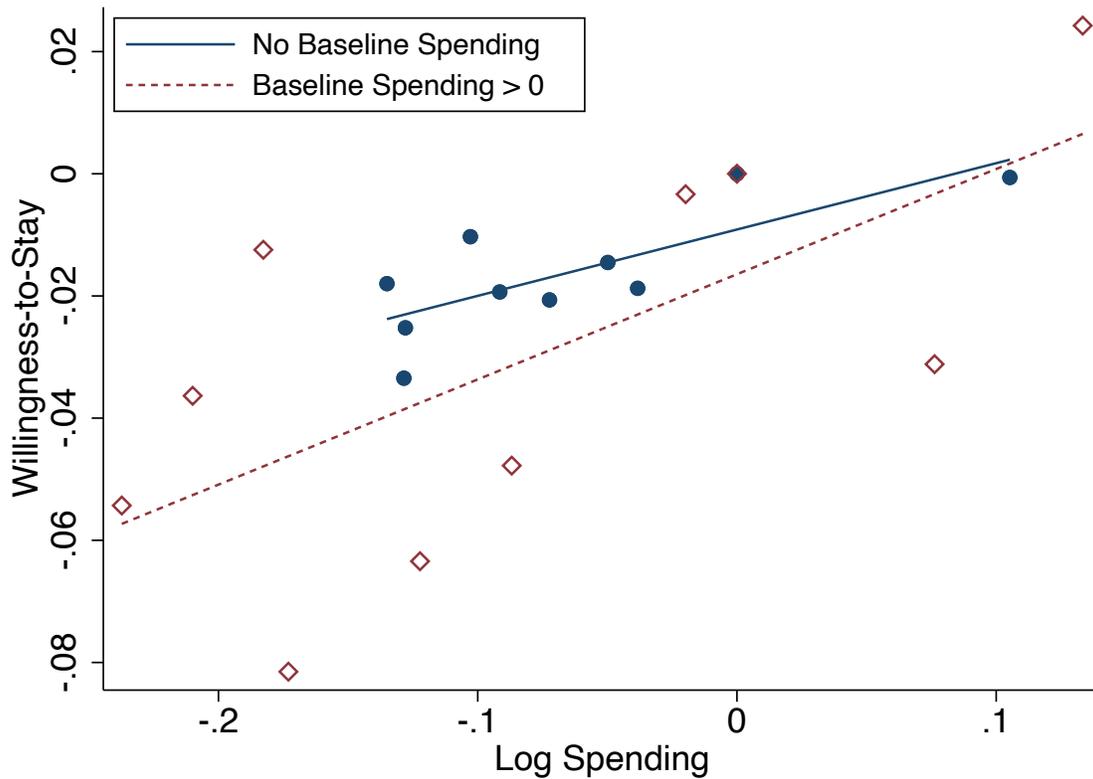
Note: Figure shows the correspondence between willingness-to-stay (WTS) and IV plan spending effects. In the top panel, each plan corresponds to one point, with the coordinates corresponding to the coefficient estimates from Table 2. In the bottom panel, each plan corresponds to two points: The WTS and plan spending effects are estimated separately for enrollees with some spending during the baseline FFS period (prior to random assignment) and for enrollees with no spending during the baseline FFS period. The lines in each panel correspond to the OLS fit of the 10 points.

Appendix Figure A8: Association Between Plan Effects and Provider Network Characteristics

(a) Provider Network Breadth
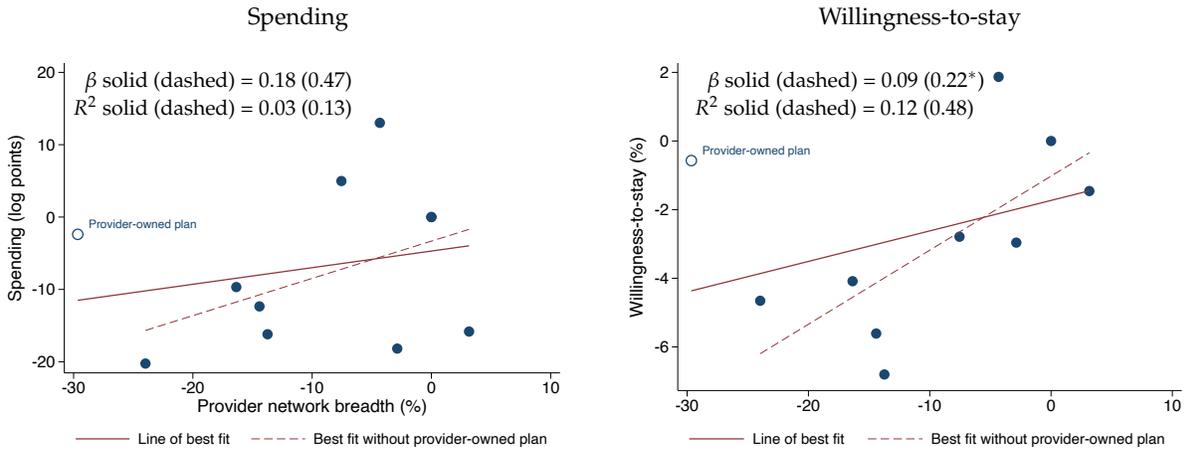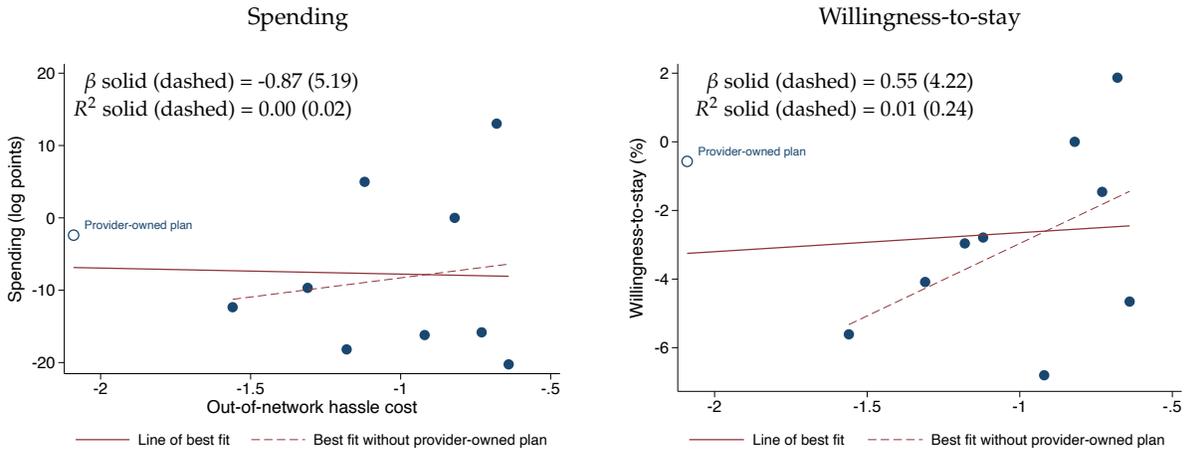
Notes: Figure displays the association between the main results of the paper—causal plan effects on healthcare spending and satisfaction—and plan-level measures of provider network breadth and out-of-network hassle costs. The leftmost figure in Panel (a) plots IV coefficients corresponding to Eq. (3), where the dependent variable is log healthcare spending on the y-axis. Plan of enrollment is instrumented with plan of assignment. Coefficients are relative to the omitted plan, X. The x-axis contains the average network breadth for each plan, measured using the simulated visit shares measure. The rightmost figure in Panel (a) presents analogous estimates for our willingness-to-stay measure on the y-axis, where the dependent variable is an indicator for whether an enrollee remained in their assigned plan at six months post-assignment, as in the last column of Table 2. The x-axis is identical in the two figures. In Panel (b), the plan effects on the y-axes are identical to Panel (a), but the x-axis now contains the plan-specific, out-of-network hassle cost from a model of hospital demand in (Wallace, 2020). Appendix Section D.1 describes how network breadth and out-of-network hassle costs are measured.

Appendix Figure A9: Transaction Price Differences Do Not Account for Spending Differences

(a) Inpatient Prices (DRGs)
Medium- vs. Low-Spending Plans
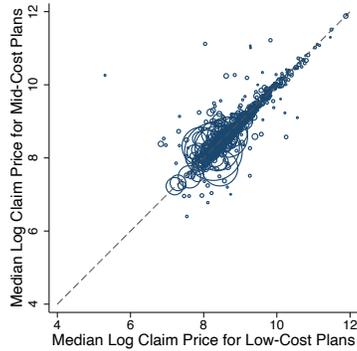
(b) Outpatient Prices (HCPCS)
Medium- vs. Low-Spending Plans
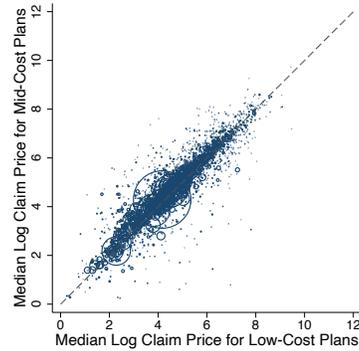
(c) Normalized Spending: Repricing All Claims to Common Price List
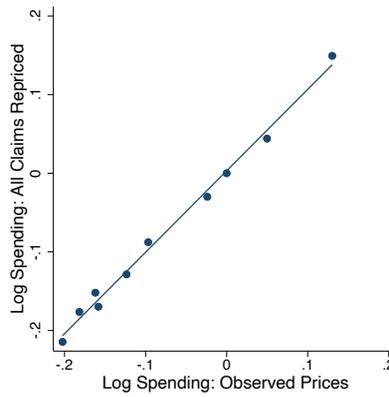
Note: Figure shows the minor role played by transaction prices in explaining spending differences across plans. The top two panels divide plans into high-, medium-, and low-spending groups as described in the text. We focus on medium- and low-spending plan groups as the high spender is a single plan outlier. Figure A10 shows analogous comparisons for high- versus medium- and high- versus low-cost plans. Panel (a) plots the log of median prices for all inpatient admissions with common support in our data among medium- and low-spending plans. Each circle in Panel (a) is a diagnosis-related group (DRG), and marker size is proportional to frequency in our claims data. Panel (b) plots the analogous price comparison for outpatient claims, using the Healthcare Common Procedural Coding System (HCPCS). Panel (c) reverts to a plan-level analysis and reprices all claims to a common set of prices across all plans and then re-estimates the main IV specification for plan effects on log spending. The plan spending effects for the repriced data are plotted along the vertical axis, against the main (non-repriced) IV estimates along the horizontal axis.

Appendix Figure A10: Price Comparisons Across High-, Medium-, and Low-Spending Plans

(a) Prices (DRGs) for High- vs.
Medium-Spending Plans

(b) Prices (DRGs) for High- vs.
Low-Spending Plans

(c) Prices (HCPCS) for High- vs.
Medium-Spending Plans

(d) Prices (HCPCS) for High- vs.
Low-Spending Plans
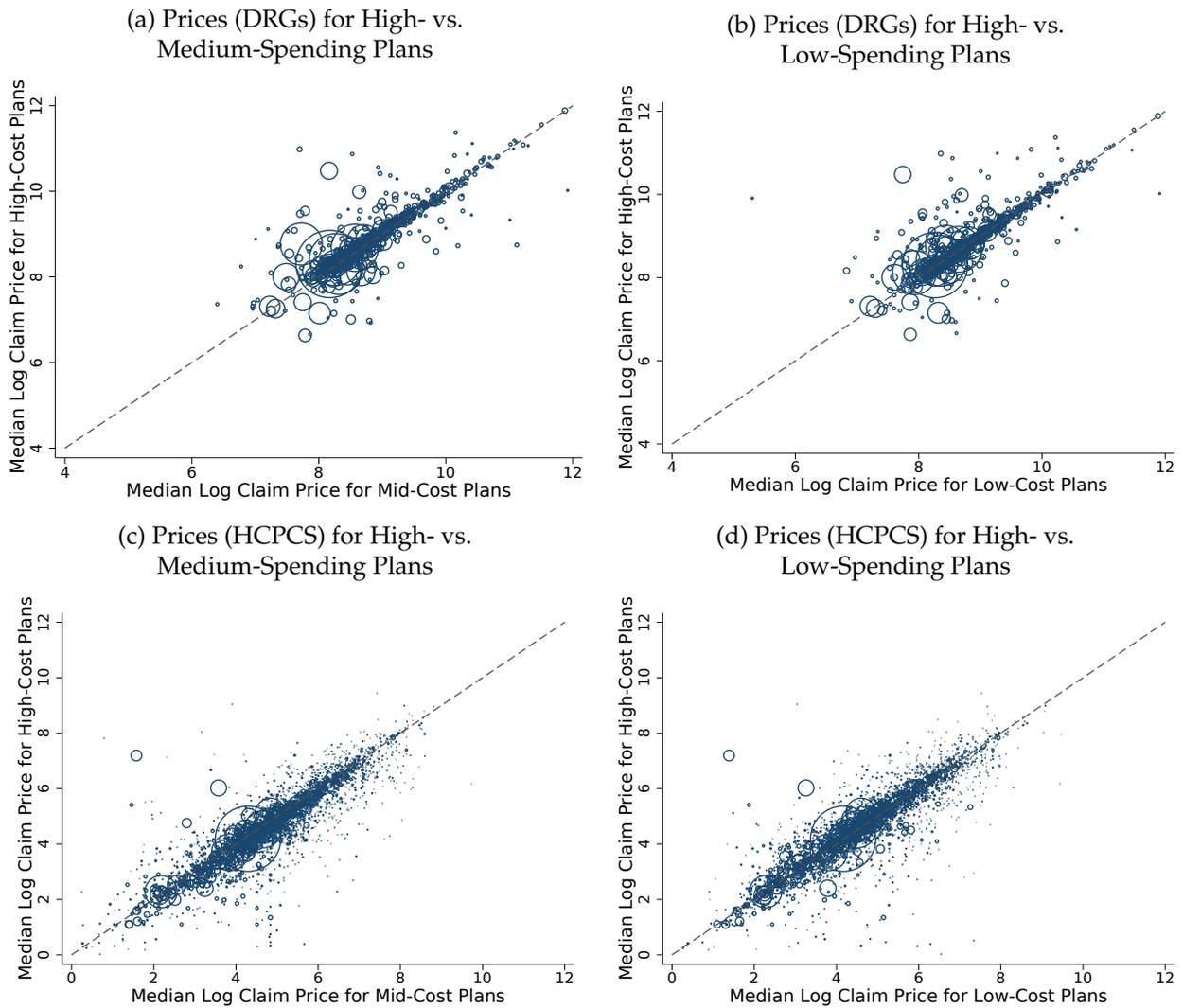
Note: Figure compares prices for inpatient admissions and outpatient services between high-, medium-, and low-spending plans. We divide plans into high-, medium-, and low-spending groups as described in the text. Figure A9 shows analogous comparisons for low- versus medium-spending plans. Each circle represents a pricing unit: either a diagnosis-related group (DRG) in the case of inpatient prices or a Healthcare Common Procedural Coding System unit (HCPCS) in the case of outpatient prices. Marker size is proportional to frequency in our claims data. See Figure A9 for additional notes.

Appendix Table A1: Sample Restrictions for the Main Analytic Sample

Sample restrictions	Unique recipients	Fraction of original (%)
Total Auto-Assignees in New York State	809,785	100.00
Not in NYC	458,629	56.64
Out of Age range	295,577	36.50
Previously in a MMC Plan	177,143	21.88
Dropped/Switched out of an MMC plan	155,515	19.20
Assigned to a Non-Sample Plan	145,868	18.01
Fewer than 6 Post-Assignment Months	65,595	8.10

Note: Table presents sample restrictions to bring the full Auto-Assignee population in New York State to our main analytic sample. Each row presents the number and percentage of enrollees retained after each sample restriction is made. The first row gives the population of Medicaid recipients assigned to a Managed Care plan and the last row gives our main analytic sample.

Appendix Table A2: Summary Statistics for the Main Sample

	3 Months Pre-Assignment			6 Months Post-Assignment		
	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.
	(1)	(2)	(3)	(4)	(5)	(6)
Demographics						
Female (%)	40.1	49.0	195,228	40.1	49.0	393,570
White (%)	27.2	44.5	195,228	27.2	44.5	393,570
Black (%)	51.7	50.0	195,228	51.8	50.0	393,570
Age (years)	35.4	12.7	195,228	35.8	12.7	393,570
Healthcare Spending, $ per enrollee-month						
Total	689	4,151	195,228	510	2,877	393,570
Office Visits	7	73	195,228	21	165	393,570
Clinic	85	295	195,228	52	280	393,570
Inpatient	347	3,885	195,228	220	2,546	393,570
Outpatient	60	280	195,228	41	302	393,570
Emergency Dept.	20	111	195,228	16	100	393,570
Pharmacy	78	469	195,228	75	454	393,570
All Other	92	655	195,228	84	621	393,570
Enrollees with Any Spending (%)	38.80	48.73	195,228	34.87	47.65	393,570
Spending Conditional on Any ($)	1,777	6,517	75,742	1,462	4,727	137,222
Drug Days Supply, days per enrollee-month						
Diabetes	1.04	8.87	195,228	1.11	8.69	393,570
Statins	0.76	5.59	195,228	0.83	5.79	393,570
Anti-Depressants	1.33	7.84	195,228	1.31	7.80	393,570
Anti-Psychotics	1.50	8.79	195,228	1.49	8.64	393,570
Anti-Hypertension	1.17	7.55	195,228	1.32	7.91	393,570
Anti-Stroke	0.11	2.31	195,228	0.10	2.14	393,570
Asthma	0.50	4.34	195,228	0.46	4.11	393,570
Contraceptives	0.23	3.36	195,228	0.25	3.28	393,570
High-Value Care, per 1,000 enrollee-months						
HbA1c Testing	3.88	62.19	195,228	5.49	73.91	393,570
Breast Cancer Screening	1.35	36.68	195,228	1.47	38.29	393,570
Cervical Cancer Screening	4.63	67.85	195,228	7.29	85.05	393,570
Chlamydia Screening	4.98	70.42	195,228	6.61	81.01	393,570
Low-Value Care, per 1,000 enrollee-months						
Abdomen CT	0.32	17.82	195,228	0.33	18.17	393,570
Imaging and Lab	127.52	333.56	195,228	143.88	350.97	393,570
Head Imaging for Uncomp. HA	1.77	42.06	195,228	1.90	43.52	393,570
Thorax CT	0.11	10.37	195,228	0.09	9.43	393,570
Avoidable Hospitalizations	6.67	81.42	195,228	5.44	73.56	393,570
All Cause Readmission	0.80	32.00	195,228	0.29	18.59	393,570

Note: Table presents summary statistics for our main analysis sample ("auto-assignees") in the 6 months post-assignment and 3 months pre-assignment. See Table A21 notes for a complete listing of the therapeutic classes included in each grouping of prescription drugs. See Appendix B for detailed descriptions of the low- and high-value care measures.

Appendix Table A3: First Stage Estimates: Plan of Assignment Predicts Plan of Enrollment

	(1) A	(2) B	(3) C	(4) D	(5) E	(6) F	(7) G	(8) H	(9) I
A	0.924**	0.001+	0.001	0.005**	0.000	0.012**	-0.000	0.001+	0.000
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)
B	0.000	0.905**	0.003**	0.012**	0.001	0.017**	-0.000	0.002**	0.001*
	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)
C	0.002	0.002*	0.940**	0.001	0.001	-0.002	0.001	0.000	0.000
	(0.001)	(0.001)	(0.003)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)
D	0.000	-0.002	-0.001	0.955**	-0.002+	-0.005*	-0.002*	0.002*	-0.000
	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.002)	(0.001)	(0.001)	(0.000)
E	-0.003**	-0.001*	-0.001	0.004**	0.939**	0.010**	-0.003**	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)
F	0.001	0.001	0.000	0.006**	0.001	0.933**	0.002*	0.002**	0.001+
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.000)
G	0.000	0.001*	0.002**	0.009**	-0.000	0.013**	0.915**	0.002**	0.001+
	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)	(0.002)	(0.003)	(0.001)	(0.000)
H	0.001	0.001	0.001	0.008**	-0.001	0.001	0.001	0.933**	0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.000)
I	0.001	-0.001	0.004	0.005+	0.001	0.001	0.002	0.002+	0.933**
	(0.002)	(0.001)	(0.003)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.006)
Observations	393570	393570	393570	393570	393570	393570	393570	393570	393570

Standard errors in parentheses
$^+ p < 0.1$, $^* p < 0.05$, $^{**} p < 0.01$

Note: Table reports coefficients from the nine first stage regressions defined in Equation 2. In each regression, the outcome is a binary indicator for being enrolled in one of the ten plans. The right-hand-side variables of interest—the plan assignment instruments—are nine indicators for whether the individual was assigned to each of the plans. All regressions control for county $\times$ year $\times$ month-of-assignment and the count of months since plan assignment, both as indicators. Person level controls, as described in Table 2 are included as well in all columns. Standard errors in parentheses are clustered at the county $\times$ year $\times$ month-of-assignment level. This is the level at which the randomization operates. $^+ p < 0.1$, $^* p < 0.05$, $^{**} p < 0.01$

Appendix Table A4: Balance in Predetermined Characteristics Across Plan of Assignment

	Auto-Assignee		Active Chooser	
	F-Stat	P-Value	F-Stat	P-Value
Age	.8	.65	21.5	0.00
Female	1.2	.28	85.2	0.00
Black	1.2	.28	113	0.00
SSI	1.1	.35	18.8	0.00
Other	1.2	.32	37.2	0.00
Dental	1.1	.4	56.1	0.00
Transportation	.9	.56	8.3	0.00
Lab	1	.42	50.1	0.00
Pharmacy	1.4	.18	41.3	0.00
Inpatient, Non-delivery	.7	.72	34.1	0.00
Inpatient, Delivery	1	.41	33.4	0.00
Emergency Dept	.9	.52	113.2	0.00
Specialist, Hospital	.4	.95	39.1	0.00
Specialist, Clinic	.4	.95	14	0.00
Specialist, Office	2.4	.01	61.3	0.00
Primary Care, Hospital	.7	.71	347.3	0.00
Primary Care, Clinic	.6	.79	64.2	0.00
Primary Care, Office	.7	.74	15.5	0.00
Any Spend	1.1	.4	123.8	0.00
Spend Conditional on Any	1	.42	20	0.00
Pred. Spend	.7	.69	11	0.00
HCC 3 Month	1.4	.17	22.5	0.00

Note: Table reports results from balance tests on the pre-determined characteristics of auto-assignees who are randomized to different plans, and of active choosers who selected different plans. These tabulated values are used in the plot in Figure 2. Pre-determined characteristics include demographics and healthcare utilization in FFS Medicaid prior to joining a managed care plan. Each managed care enrollee spent a pre-period (often a few months, once retroactive enrollment is included) enrolled in the FFS program prior to choosing or being assigned to a managed care plan. Two samples are used: the main IV analysis sample of auto-assignees (AA) and a same-sized random subsample of active choosers (AC), for comparison. Each pre-determined characteristic is regressed on the set of indicators for the assigned plan (for auto-assignees) or for the chosen plan (for active choosers). We report the p-values from F-tests that the plan effects in these regressions are jointly different from zero. Large p-values are consistent with random assignment. Small p-values indicate selection (endogenous sorting).

Appendix Table A5: Summary Statistics

	Active Choosers			Auto-Assignees		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Demographics						
Female (%)	59.1	49.2	592,692	40.1	49.0	393,570
White (%)	33.8	47.3	592,692	27.2	44.5	393,570
Black (%)	30.0	45.8	592,692	51.8	50.0	393,570
Age (years)	34.5	12.7	592,692	35.8	12.7	393,570
Healthcare Spending, $ per enrollee-month						
Total	467	2,159	592,692	510	2,877	393,570
Office Visits	67	580	592,692	21	165	393,570
Clinic	24	166	592,692	52	280	393,570
Inpatient	181	1,675	592,692	220	2,546	393,570
Outpatient	43	259	592,692	41	302	393,570
Emergency Dept.	10	65	592,692	16	100	393,570
Pharmacy	59	304	592,692	75	454	393,570
All Other	83	742	592,692	84	621	393,570
Enrollees with Any Spending (%)	49.22	49.99	592,692	34.87	47.65	393,570
Spending Conditional on Any ($)	949	3002	291,745	1462	4727	137,222
Drug Days Supply, days per enrollee-month						
Diabetes	1.64	11.02	592,692	1.11	8.69	393,570
Statins	1.32	7.71	592,692	0.83	5.79	393,570
Anti-Depressants	0.85	6.24	592,692	1.31	7.80	393,570
Anti-Psychotics	0.60	5.37	592,692	1.49	8.64	393,570
Anti-Hypertension	1.53	8.62	592,692	1.32	7.91	393,570
Anti-Stroke	0.07	1.86	592,692	0.10	2.14	393,570
Asthma	0.42	3.94	592,692	0.46	4.11	393,570
Contraceptives	0.59	5.17	592,692	0.25	3.28	393,570
High-Value Care, per 1,000 enrollee-months						
HbA1c Testing	9.44	96.72	592,692	5.49	73.91	393,570
Breast Cancer Screening	5.15	71.55	592,692	1.47	38.29	393,570
Cervical Cancer Screening	24.79	155.50	592,692	7.29	85.05	393,570
Chlamydia Screening	14.09	117.86	592,692	6.61	81.01	393,570
Low-Value Care, per 1,000 enrollee-months						
Abdomen CT	0.63	25.18	592,692	0.33	18.17	393,570
Imaging and Lab	239.88	427.01	592,692	143.88	350.97	393,570
Head Imaging for Uncomp. HA	2.38	48.70	592,692	1.90	43.52	393,570
Thorax CT	0.11	10.63	592,692	0.09	9.43	393,570
Avoidable Hospitalizations	1.42	37.69	592,692	5.44	73.56	393,570

Note: Table presents summary statistics for our main analysis sample ("auto-assignees") and a comparison sample of Medicaid beneficiaries who made an active choice ("active choosers") and so were not included in the IV sample. Rows report means and standard deviations of the indicated characteristics. See Table A21 notes for a complete listing of the therapeutic classes included in each grouping of prescription drugs. We omit All Cause Readmission from this table because we only construct this measure for the auto-assignee sample. See Appendix B for detailed descriptions of the low- and high-value care measures.

Appendix Table A6: No Differential Attrition Out of Medicaid Program Across Plan of Assignment

	(1) 6 Months	(2) 12 Months	(3) 18 Months	(4) 24 Months
A	0.003	0.008	0.003	-0.000
	(0.004)	(0.010)	(0.010)	(0.009)
B	-0.005	-0.015	0.011	0.043**
	(0.005)	(0.011)	(0.011)	(0.011)
C	-0.003	-0.013	-0.022$^+$	-0.017$^+$
	(0.005)	(0.013)	(0.011)	(0.010)
D	-0.003	0.012	0.011	0.008
	(0.006)	(0.013)	(0.013)	(0.012)
E	-0.007	-0.014$^+$	-0.026*	-0.065**
	(0.004)	(0.008)	(0.011)	(0.010)
F	-0.002	-0.006	-0.009	-0.003
	(0.004)	(0.011)	(0.010)	(0.008)
G	-0.005	-0.002	0.003	0.004
	(0.004)	(0.010)	(0.009)	(0.008)
H	0.001	-0.018	-0.018	-0.013
	(0.005)	(0.012)	(0.011)	(0.009)
I	-0.002	-0.007	-0.017	-0.013
	(0.007)	(0.014)	(0.012)	(0.011)
Mean	.955	.344	.269	.197
Observations	33902	33902	33902	33902

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports on the probability of continued enrollment in Medicaid—in any managed care plan or in fee-for-service—as a function of plan of assignment. The sample is restricted to enrollees auto-assigned to plans prior to February 2011, in order to allow a full 24 month run out and therefore keep a consistent sample across columns (i.e., to avoid censoring due to the end date of our data). Attrition out of the Medicaid program would imply attrition out of our data and sample. The table displays regression coefficients for plan of assignment, where coefficients are relative to the omitted plan (X). The dependent variables are indicators for continued enrollment at 6, 12, 18, and 24 months, as indicated. See Appendix A.3. Observations are enrollees. Standard errors in parentheses are clustered at the county $\times$ year $\times$ month-of-assignment level. This is the level at which the randomization operates. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$ $p < 0.01$.

Appendix Table A7: Medicaid Managed Care Markets by State

State	Population Characteristics		Medicaid Program Characteristics		Medicaid Managed Care Characteristics		
	Population (Millions) (1)	Urban (2)	% in Medicaid (3)	% Auto-Assigned (4)	MMC Penetration (5)	No. Plans (6)	% Plans For-Profit (7)
New York	19.4	88%	25%	4%	59%	20	40%
New York City	8.2	100%	28%	10%	100%	10	70%
All Other States	289.4	80%	18%	43%	34%	11	59%
Arizona	6.4	90%	21%	17%	69%	9	67%
California	37.3	95%	20%	37%	27%	25	28%
Colorado	5	86%	12%	94%	4%	2	50%
Delaware	.9	83%	22%	45%	68%	2	50%
District of Columbia	.6	100%	34%	20%	51%	4	75%
Florida	18.8	91%	16%	53%	33%	15	67%
Georgia	9.7	75%	16%	-	48%	4	75%
Hawaii	1.4	92%	20%	100%	78%	5	60%
Illinois	12.8	89%	22%	53%	7%	6	83%
Indiana	6.5	72%	16%	68%	54%	4	50%
Kansas	2.9	74%	12%	65%	45%	3	100%
Kentucky	4.3	58%	19%	54%	13%	5	100%
Maryland	5.8	87%	17%	32%	58%	9	56%
Massachusetts	6.5	92%	24%	30%	28%	19	16%
Michigan	9.9	75%	18%	24%	31%	11	36%
Minnesota	5.3	73%	16%	25%	53%	8	0%
Mississippi	3	49%	21%	80%	7%	3	100%
Missouri	6	70%	15%	13%	43%	3	100%
Nebraska	1.8	73%	13%	52%	42%	3	100%
Nevada	2.7	95%	11%	30%	29%	3	100%
New Jersey	8.8	95%	12%	15%	50%	6	83%
New Mexico	2.1	77%	27%	22%	49%	3	67%
Ohio	11.5	78%	18%	47%	52%	6	67%
Oregon	3.8	81%	17%	5%	44%	15	33%
Pennsylvania	12.7	79%	17%	40%	45%	10	30%
Rhode Island	1.1	91%	19%	20%	44%	3	33%
South Carolina	4.6	66%	19%	60%	35%	5	60%
Tennessee	6.3	66%	19%	100%	75%	3	67%
Texas	25.1	85%	16%	30%	44%	17	41%
Utah	2.8	91%	10%	20%	18%	5	40%
Vermont	.6	39%	28%	-	50%	1	0%
Virginia	8	76%	11%	80%	49%	6	67%
Washington	6.7	84%	18%	50%	41%	5	80%
West Virginia	1.9	49%	18%	50%	31%	3	67%
Wisconsin	5.7	70%	21%	60%	59%	15	33%

Note: Table displays Medicaid program characteristics by state. States without a system that uses Managed Care Organizations are excluded. These include states with a strict Fee-For-Service systems as well as states with only programs like PCCM, PIHP, or PAHP. States that use Accountable or Coordinated Care Organizations are included in the table. In columns 2–7, the "All Other States" row gives population-weighted average values for all states other than New York. In column 1, it gives the total US population in 2010.

Appendix Table A8: Alternative Specifications for Main IV Results: Monthly Spending

	(1) Log Total	(2) Inverse Hyperbolic Sine	(3) Winsorized	(4) Any Spending	(5) Log Std. Pay	(6) Winsorized Std. Pay	(7) Log Total Weighted
A	-0.097**	-0.106**	-23.198$^+$	-0.012*	-0.088*	-21.373	-0.104**
	(0.035)	(0.039)	(13.966)	(0.005)	(0.035)	(13.315)	(0.036)
B	-0.162**	-0.179**	-24.408	-0.024**	-0.152**	-23.499	-0.161**
	(0.036)	(0.040)	(14.997)	(0.006)	(0.036)	(14.516)	(0.043)
C	-0.158**	-0.174**	-40.190**	-0.023**	-0.169**	-48.447**	-0.076
	(0.036)	(0.040)	(14.746)	(0.006)	(0.036)	(13.940)	(0.051)
D	0.130**	0.145**	64.733**	0.020**	0.149**	68.863**	0.154*
	(0.041)	(0.045)	(22.525)	(0.007)	(0.041)	(22.349)	(0.069)
E	0.050	0.055	13.588	0.007	0.044	7.536	0.016
	(0.033)	(0.036)	(14.666)	(0.005)	(0.033)	(14.192)	(0.044)
F	-0.024	-0.028	-2.724	-0.007	-0.030	-15.596	-0.038
	(0.031)	(0.034)	(15.355)	(0.005)	(0.030)	(14.574)	(0.041)
G	-0.123**	-0.138**	5.996	-0.021**	-0.129**	2.212	-0.106*
	(0.034)	(0.037)	(15.388)	(0.005)	(0.034)	(15.036)	(0.041)
H	-0.182**	-0.198**	-52.608**	-0.024**	-0.177**	-55.613**	-0.113**
	(0.038)	(0.042)	(15.148)	(0.006)	(0.038)	(14.368)	(0.042)
I	-0.202**	-0.227**	-14.218	-0.036**	-0.215**	-23.053	-0.170*
	(0.069)	(0.076)	(28.523)	(0.011)	(0.069)	(27.152)	(0.069)
Mean	2.09	2.33	416.74	0.35	2.09	402.43	1.50
Observations	393570	393570	393570	393570	393570	393570	392764
F-Statistic	12.2	12.1	5.8	11.0	12.7	6.7	6.0
Plan Effect SD	0.105	0.116	30.990	0.016	0.110	32.924	0.092
Corrected SD	0.098	0.108	25.939	0.015	0.102	28.591	0.079

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan's causal effect on utilization relative to an omitted plan (X), using the IV regression in Equation 3. The columns vary the parameterization of spending used as the dependent variable, as indicated in the column headers. For columns with price-standardized spending ("Std."), we first reprice all claims across all plans to a common set of prices and then re-estimate the IV specifications for plan effects on spending. The repricing follows the procedure used to create panel (c) of Figure A9 and is described in full detail in Appendix D.2. Winsorized outcomes are Winsorized above only, at the 99th percentile. "Any Spending" is a binary variable for the presence of any paid claim. "Log Total Weighted" uses the Log Total outcome and reweights observations to match the Active Chooser sample. To mitigate common support issues, the reweighting cells here are coarser than in the Table 2 reweight (column 5). However, due to lack of common support, 806 enrollee-months are still omitted from this regression. All regressions control for county × year × month-of-assignment and the count of months since plan assignment, both as a set of indicators. Person level controls, as described in Table 2 are included as well in all columns. Observations are enrollee × months. Standard errors in parentheses are clustered at the county × year × month-of-assignment level. This is the level at which the randomization operates. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A9: Alternative Specifications for Main RF results: Monthly Spending

	(1)	(2)	(3)	(4)	(5)
	Log Total	Inverse Hyperbolic Sine	Winsorized	Any Spending	Poisson
A	-0.089**	-0.098**	-0.012*	-21.235	-0.052
	(0.033)	(0.036)	(0.005)	(13.052)	(0.032)
B	-0.149**	-0.165**	-0.022**	-22.101	-0.039
	(0.034)	(0.037)	(0.005)	(13.801)	(0.034)
C	-0.149**	-0.164**	-0.021**	-37.789**	-0.047
	(0.034)	(0.037)	(0.005)	(13.870)	(0.033)
D	0.125**	0.138**	0.019**	61.720**	0.127*
	(0.039)	(0.043)	(0.006)	(21.496)	(0.051)
E	0.052+	0.057+	0.008	13.771	-0.032
	(0.031)	(0.034)	(0.005)	(13.830)	(0.034)
F	-0.022	-0.027	-0.007	-2.300	-0.015
	(0.029)	(0.032)	(0.004)	(14.406)	(0.033)
G	-0.113**	-0.127**	-0.020**	5.773	0.007
	(0.032)	(0.035)	(0.005)	(14.258)	(0.035)
H	-0.169**	-0.184**	-0.022**	-48.677**	-0.097**
	(0.036)	(0.040)	(0.006)	(14.191)	(0.036)
I	-0.189**	-0.212**	-0.034**	-13.150	-0.159*
	(0.065)	(0.072)	(0.010)	(26.672)	(0.077)
Mean	2.09	2.33	0.35	416.74	416.74
Observations	393570	393570	393570	393570	393570
F-Statistic (χ^2 for Poisson)	12.4	12.3	11.2	5.9	5251.3
Plan Effect SD	0.099	0.110	0.015	29.220	0.070
Corrected SD	0.092	0.102	0.014	24.511	0.057

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports reduced form estimates of each plan's causal effect on utilization relative to an omitted plan (X), using the reduced form version of Equation 3. Columns 1-4 vary the parameterization of spending used as the dependent variable, as indicated in the column headers. Column 5 uses a Poisson regression on the winsorized outcome used in column 3. The test statistic reported is the F-Statistic for all columns except for 5 which presents a χ^2-Statistic.

Appendix Table A10: Alternative Specifications for Main IV Results: Aggregate Spending

	(1) Log Total	(2) Inverse Hyperbolic Sine	(3) Winsorized	(4) Any Spending	(5) Log Std. Pay	(6) Winsorized Std. Pay
A	-0.257**	-0.275**	-185.400$^+$	-0.074*	-0.232**	-183.610*
	(0.054)	(0.059)	(99.975)	(0.033)	(0.054)	(91.684)
B	-0.345**	-0.371**	-212.450*	-0.151**	-0.305**	-197.644$^+$
	(0.056)	(0.061)	(107.298)	(0.036)	(0.056)	(101.772)
C	-0.231**	-0.247**	-309.405**	-0.135**	-0.246**	-359.976**
	(0.054)	(0.058)	(92.942)	(0.034)	(0.053)	(86.328)
D	0.182*	0.197*	509.089**	0.122**	0.223**	501.685**
	(0.076)	(0.083)	(163.601)	(0.039)	(0.076)	(156.453)
E	0.099$^+$	0.106$^+$	101.338	0.052$^+$	0.092$^+$	42.674
	(0.055)	(0.059)	(106.460)	(0.031)	(0.054)	(97.865)
F	-0.009	-0.009	-48.731	-0.042	-0.011	-139.525
	(0.054)	(0.058)	(106.503)	(0.028)	(0.053)	(96.406)
G	-0.259**	-0.281**	19.124	-0.128**	-0.257**	-0.833
	(0.054)	(0.058)	(101.029)	(0.031)	(0.053)	(96.258)
H	-0.339**	-0.362**	-326.469**	-0.141**	-0.319**	-378.373**
	(0.059)	(0.064)	(104.424)	(0.037)	(0.058)	(96.771)
I	-0.332**	-0.364**	-47.907	-0.217**	-0.352**	-76.055
	(0.112)	(0.122)	(193.946)	(0.063)	(0.112)	(183.743)
Mean	4.41	4.84	2732.90	2.09	4.40	2601.26
Observations	65595	65595	65595	65595	65595	65595
F-Statistic	16.1	15.8	5.9	10.7	16.1	7.6
Plan Effect SD	0.187	0.202	230.481	0.099	0.190	236.984
Corrected SD	0.176	0.190	198.218	0.092	0.179	209.680

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan's causal effect on utilization relative to an omitted plan (X), using the IV regression in Equation 3. The columns vary the parameterization of spending used as the dependent variable, as indicated in the column headers. The difference here compared to Table A8 is that spending and utilization outcomes are totalled over the full six-month enrollment spell. The endogenous variables instrumented are the fraction of the enrollment spell spent in the indicated plan. Observations are enrollees. See Table A8 notes for additional details. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A11: Healthcare Spending for Active Chooser Sample

	(1) Unadjusted	(2) Weighted	(3) Risk Adjusted	(4) Risk Adjusted, Weighted	(5) Any Utilization	(6) Standardized	(7) Denied
A	-0.282**	-0.229**	-0.290**	-0.276**	-0.042**	-0.264**	-0.305**
	(0.029)	(0.067)	(0.029)	(0.057)	(0.005)	(0.028)	(0.028)
B	-0.533**	-0.481**	-0.459**	-0.394**	-0.059**	-0.394**	-0.376**
	(0.031)	(0.075)	(0.035)	(0.067)	(0.006)	(0.034)	(0.035)
C	0.071*	0.045	-0.142**	-0.188**	-0.012*	-0.133**	-0.179**
	(0.033)	(0.076)	(0.031)	(0.067)	(0.005)	(0.031)	(0.031)
D	0.147**	0.226**	-0.111**	-0.064	-0.007+	-0.053*	-0.054*
	(0.025)	(0.059)	(0.023)	(0.055)	(0.004)	(0.023)	(0.023)
E	0.085**	0.107+	-0.084**	-0.065	-0.012**	-0.078**	-0.086**
	(0.029)	(0.064)	(0.027)	(0.055)	(0.004)	(0.027)	(0.027)
F	0.277**	0.370**	-0.126**	-0.040	-0.018**	-0.119**	-0.159**
	(0.025)	(0.057)	(0.025)	(0.048)	(0.004)	(0.025)	(0.024)
G	-0.002	0.012	-0.225**	-0.214**	-0.033**	-0.235**	-0.254**
	(0.035)	(0.074)	(0.031)	(0.068)	(0.005)	(0.031)	(0.031)
H	-0.101**	-0.194**	-0.125**	-0.152*	-0.004	-0.064+	-0.076*
	(0.032)	(0.073)	(0.034)	(0.070)	(0.006)	(0.033)	(0.033)
I	-0.526**	-0.687**	-0.375**	-0.423**	-0.054**	-0.395**	-0.409**
	(0.041)	(0.095)	(0.040)	(0.073)	(0.006)	(0.038)	(0.038)
Mean	2.798	2.972	2.798	2.972	0.492	2.785	2.820
Observations	592692	392026	592692	392026	592692	592692	592692
F-Statistic	136.9	35.6	30.5	10.3	28.7	34.6	38.2
Plan Effect SD	0.262	0.304	0.135	0.140	0.020	0.134	0.134
Corrected SD	0.260	0.296	0.132	0.126	0.020	0.131	0.131

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Column 1 repeats the specification from Table 2, column 4. Column 2 reweights the active chooser sample to match the auto-assignee (IV) sample based on observable characteristics. Weights are set to equalize sizes of cells defined by the interactions of: deciles of FFS (prior to managed care enrollment) spending, sex, six age groups, five race groups, and each county × year × month tuple. Risk adjusted regressions include the following person-level controls: sex, 5 race categories, deciles of spending in FFS prior to MMC enrollment, and 47 age categories (single years from 18 to 64). All regressions control for county × year × month-of-assignment and the count of months since plan assignment/plan enrollment, both as indicators. Standard errors in parentheses are clustered at the county × year × month-of-assignment level. This is the level at which the randomization operates. See Table 2 notes for additional specification details. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Appendix Table A12: IV Results Using Various Post-Assignment Observation Windows

	(1) 6 Months Balanced	(2) 6 Months Extended to 9	(3) 6 Months Extended to 12	(4) 9 Months Balanced	(5) 12 Months Balanced
High-Cost Plans	0.120**	0.122**	0.130**	0.107	0.098
	0.038	0.040	0.042	0.087	0.094
Low-Cost Plans	-0.160**	-0.154**	-0.154**	-0.133**	-0.189**
	0.021	0.022	0.023	0.036	0.039
Observations	393570	492483	557304	237339	221562

Standard errors in second row

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan grouping's causal effect on utilization, using a modification to the IV regression in Equation 3. We divide the ten plans into three sets: low- (Plans A, B, C, G, H, I), medium- (Plans E, F, and X), and high- (Plan D) spending plans. Medium plans are the omitted category. The first column reproduces column 1 from A13, which includes only the first six months post-assignment. See Table A13 for additional specification detail. Columns 2 and 3 maintain the same sample of enrollees as column 1, but include observations in months 7–9 and 7–12 post-assignment, respectively, in the regression. This leads to an unbalanced panel as many beneficiaries exit Medicaid after month 6. Columns 4 and 5 restrict to balanced panels of beneficiaries enrolled for at least 9 and at least 12 months, respectively, and restrict observations to the first 9 months and first 12 months post-assignment, respectively. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A13: Alternative Specifications for Main IV Results: Monthly Spending, Plan Groups

	(1) Log Total	(2) Inverse Hyperbolic Sine	(3) Winsorized	(4) Any Spending	(5) Log Std. Pay	(6) Winsorized Std. Pay
High-Cost Plans	0.120**	0.134**	59.428**	0.020**	0.144**	62.781**
	(0.038)	(0.042)	(22.043)	(0.006)	(0.038)	(19.822)
Low-Cost Plans	-0.160**	-0.175**	-30.159**	-0.022**	-0.155**	-25.462**
	(0.021)	(0.023)	(9.101)	(0.003)	(0.021)	(7.968)
Mean	2.09	2.33	416.74	0.35	2.09	385.47
Observations	393570	393570	393570	393570	393570	393570

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan grouping's causal effect on utilization, using a modification to the IV regression in Equation 3. We divide the ten plans into three sets: low- (Plans A, B, C, G, H, I), medium- (Plans E, F, and X), and high- (Plan D) spending plans. Medium plans are the omitted category. The endogenous variables are indicators for enrollment in any plan in each set, and the instruments are indicators for assignment to any plan in each set. See Eq. (4) in Section 3.1. Specifications otherwise follow Table A8. See Table A8 notes for additional details. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A14: IV Results Stratifying by Beneficiary Characteristics

	(1)	(2)	(3)
	By Sex	By Age	By Baseline Spending
Low-Cost Plans	-0.155**	-0.152**	-0.110**
	(0.026)	(0.024)	(0.024)
Female=1 × Low-Cost Plans=1	-0.011		
	(0.038)		
Above Age 33=1 × Low-Cost Plans=1		-0.016	
		(0.042)	
Baseline Spending=1 × Low-Cost Plans=1			-0.067$^+$
			(0.036)
Observations	393570	393570	393570

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan grouping's causal effect on utilization, using a modification to the IV regression in Equation 3. We divide the ten plans into three sets: low- (Plans A, B, C, G, H, I), medium- (Plans E, F, and X), and high- (Plan D) spending plans. Medium plans are the omitted category. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A15: Robustness of IV Plan Spending Results to the Inclusion of Controls for Network Breadth and Provider Fixed Effects

	Full Sample		Physician/Hospital Sample			
	(1)	(2)	(3)	(4)	(5)	(6)
High-Cost Plans	0.120**	0.100**	0.095$^+$	0.078	0.075	0.056
	(0.038)	(0.038)	(0.049)	(0.062)	(0.049)	(0.061)
Low-Cost Plans	-0.160**	-0.164**	-0.125**	-0.103**	-0.130**	-0.107**
	(0.021)	(0.021)	(0.027)	(0.028)	(0.027)	(0.028)
Physician/Hospital FEs				X		X
Network Breadth		X			X	X
Observations	393570	393570	232956	232956	232956	232956

Standard errors in parentheses

$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan-group's causal effect relative to the omitted, medium-cost plan group, using a modified version of the IV regression in Equation 3. Column 1 reproduces our primary result. Column 2 instruments for provider network breadth using the network breadth of plan of assignment—in addition to instrumenting for plan with plan of assignment (see Appendix Section D.1 for additional details). Columns 3-6 restrict the sample to enrollees we could attribute to a provider (based on the plurality of their healthcare spending). Column 3 presents the results of estimating a modified version of the IV regression in Equation 3 on this subsample of enrollees. Columns 4 and 6 include fixed effects for enrollees' attributed provider. Columns 5 and 6 include instruments for provider network breadth using the network breadth of plan of assignment. The dependent variable is log spending, as in the main specification in Table 2. All regressions control for county × year × month-of-assignment and the count of months since plan assignment, both as indicators. Person level controls, as described in Table 2 are included as well in all columns. Observations are enrollee × months. Standard errors in parentheses are clustered at the county × year × month-of-assignment level. This is the level at which the randomization operates. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A16: Robustness of IV Plan Spending Results to the Inclusion of Controls for Network Breadth and Provider Fixed Effects

	Full Sample		Physician/Hospital Sample			
	(1)	(2)	(3)	(4)	(5)	(6)
A	-0.097**	-0.020	-0.017	0.005	0.075	0.085^{+}
	(0.035)	(0.039)	(0.048)	(0.047)	(0.051)	(0.051)
B	-0.162**	-0.097**	-0.153**	-0.126*	-0.076	-0.059
	(0.036)	(0.037)	(0.051)	(0.053)	(0.052)	(0.053)
C	-0.158**	-0.173**	-0.156**	-0.104*	-0.172**	-0.117*
	(0.036)	(0.036)	(0.047)	(0.050)	(0.047)	(0.049)
D	0.130**	0.151**	0.109*	0.101	0.134**	0.122^{+}
	(0.041)	(0.041)	(0.052)	(0.063)	(0.052)	(0.063)
E	0.050	0.085*	0.064	0.100*	0.109*	0.139**
	(0.033)	(0.033)	(0.046)	(0.050)	(0.047)	(0.051)
F	-0.024	0.116**	-0.013	-0.018	0.152**	0.126*
	(0.031)	(0.037)	(0.043)	(0.045)	(0.054)	(0.055)
G	-0.123**	-0.055	-0.065	-0.041	0.016	0.030
	(0.034)	(0.036)	(0.047)	(0.049)	(0.051)	(0.053)
H	-0.182**	-0.168**	-0.126*	-0.089^{+}	-0.111*	-0.075
	(0.038)	(0.038)	(0.051)	(0.052)	(0.050)	(0.052)
I	-0.202**	-0.089	-0.201^{+}	-0.139	-0.066	-0.022
	(0.069)	(0.073)	(0.103)	(0.106)	(0.106)	(0.108)
Physician/Hospital FEs				X		X
Network Breadth		X			X	X
Observations	393570	393570	232956	232956	232956	232956
Plan Effect SD	0.105	0.108	0.097	0.081	0.105	0.087
Corrected SD	0.098	0.100	0.080	0.058	0.089	0.065
Plan Effect Range	0.33	0.32	0.31	0.24	0.32	0.26
F-Stat	12.172	14.565	5.655	3.445	7.523	4.703

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan's causal effect relative to an omitted plan (X), using a modified version of the IV regression in Equation 3. Column 1 reproduces our primary result. Column 2 instruments for provider network breadth using the network breadth of plan of assignment—in addition to instrumenting for plan with plan of assignment (see Appendix Section D.1 for additional details). Columns 3-6 restrict the sample to enrollees we could attribute to a provider (based on the plurality of their healthcare spending). Column 3 presents the results of estimating a modified version of the IV regression in Equation 3 on this subsample of enrollees. Columns 4 and 6 include fixed effects for enrollees' attributed provider. Columns 5 and 6 include instruments for provider network breadth using the network breadth of plan of assignment. The dependent variable is log spending, as in the main specification in Table 2. All regressions control for county $\times$ year $\times$ month-of-assignment and the count of months since plan assignment, both as indicators. Person level controls, as described in Table 2 are included as well in all columns. Observations are enrollee $\times$ months. Standard errors in parentheses are clustered at the county $\times$ year $\times$ month-of-assignment level. This is the level at which the randomization operates. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A17: Robustness of Reduced Form Plan Satisfaction Results to the Inclusion of Controls for Network Breadth and Provider Fixed Effects

	Full Sample		Physician/Hospital Sample			
	(1)	(2)	(3)	(4)	(5)	(6)
High-Cost Plans	0.029**	0.021**	0.046**	0.067**	0.034**	0.056**
	(0.005)	(0.005)	(0.007)	(0.008)	(0.007)	(0.008)
Low-Cost Plans	-0.032**	-0.034**	-0.052**	-0.060**	-0.055**	-0.063**
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)
Constant	0.924**	0.868**	0.888**	0.891**	0.792**	0.812**
	(0.002)	(0.005)	(0.002)	(0.003)	(0.008)	(0.010)
Physician/Hospital FEs				X		X
Network Breadth		X			X	X
Observations	65595	65595	38826	38826	38826	38826

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports reduced form estimates of each plan-group's causal effect relative to the omitted, medium-cost plan group, using a modified version of a reduced form regression based on Equation 3. Column 1 reproduces our primary result. Column 2 instruments for provider network breadth using the network breadth of plan of assignment—in addition to instrumenting for plan with plan of assignment (see Appendix Section D.1 for additional details). Columns 3-6 restrict the sample to enrollees we could attribute to a provider (based on the plurality of their healthcare spending). Column 3 presents the results of estimating a modified version of the IV regression in Equation 3 on this subsample of enrollees. Columns 4 and 6 include fixed effects for enrollees' attributed provider. Columns 5 and 6 include instruments for provider network breadth using the network breadth of plan of assignment. The dependent variable is willingness-to-stay (i.e., consumer satisfaction), as in the main specification in Table 2. All regressions control for county $\times$ year $\times$ month-of-assignment and the count of months since plan assignment, both as indicators. Person level controls, as described in Table 2 are included as well in all columns. Observations are enrollee $\times$ months. Standard errors in parentheses are clustered at the county $\times$ year $\times$ month-of-assignment level. This is the level at which the randomization operates. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A18: Robustness of Reduced Form Plan Satisfaction Results to the Inclusion of Controls for Network Breadth and Provider Fixed Effects

	Full Sample		Physician/Hospital Sample			
	(1)	(2)	(3)	(4)	(5)	(6)
A	-0.041**	-0.024**	-0.067**	-0.073**	-0.039**	-0.046**
	(0.004)	(0.004)	(0.007)	(0.007)	(0.008)	(0.008)
B	-0.068**	-0.055**	-0.103**	-0.104**	-0.081**	-0.083**
	(0.004)	(0.004)	(0.006)	(0.007)	(0.006)	(0.007)
C	-0.015**	-0.018**	-0.018*	-0.011	-0.022**	-0.015+
	(0.005)	(0.005)	(0.007)	(0.009)	(0.007)	(0.009)
D	0.019**	0.023**	0.031**	0.059**	0.038**	0.065**
	(0.005)	(0.005)	(0.007)	(0.008)	(0.007)	(0.008)
E	-0.028**	-0.020**	-0.043**	-0.043**	-0.030**	-0.030**
	(0.004)	(0.004)	(0.007)	(0.008)	(0.007)	(0.008)
F	-0.006	0.025**	-0.011*	0.008	0.039**	0.056**
	(0.004)	(0.005)	(0.005)	(0.007)	(0.008)	(0.010)
G	-0.056**	-0.041**	-0.090**	-0.084**	-0.064**	-0.059**
	(0.004)	(0.004)	(0.006)	(0.008)	(0.007)	(0.008)
H	-0.030**	-0.027**	-0.051**	-0.057**	-0.047**	-0.053**
	(0.005)	(0.005)	(0.008)	(0.009)	(0.008)	(0.009)
I	-0.047**	-0.023**	-0.082**	-0.083**	-0.044**	-0.047**
	(0.008)	(0.008)	(0.014)	(0.015)	(0.015)	(0.016)
Constant	0.935**	0.852**	0.905**	0.902**	0.770**	0.771**
	(0.002)	(0.010)	(0.004)	(0.004)	(0.015)	(0.017)
Physician/Hospital FEs				X		X
Network Breadth		X			X	X
Observations	65595	65595	38826	38826	38826	38826
Plan Effect SD	0.026	0.024	0.041	0.049	0.038	0.047
Corrected SD	0.025	0.024	0.040	0.048	0.037	0.046
Plan Effect Range	0.09	0.08	0.13	0.16	0.12	0.15
F-Stat	62.134	60.882	66.476	66.530	64.408	62.083

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports reduced form estimates of each plan's causal effect relative to an omitted plan (X), using a modified version of a reduced form regression based on Equation 3. Column 1 reproduces our primary result. Column 2 instruments for provider network breadth using the network breadth of plan of assignment—in addition to instrumenting for plan with plan of assignment (see Appendix Section D.1 for additional details). Columns 3-6 restrict the sample to enrollees we could attribute to a provider (based on the plurality of their healthcare spending). Column 3 presents the results of estimating a modified version of the IV regression in Equation 3 on this subsample of enrollees. Columns 4 and 6 include fixed effects for enrollees' attributed provider. Columns 5 and 6 include instruments for provider network breadth using the network breadth of plan of assignment. The dependent variable is willingness-to-stay (i.e., consumer satisfaction), as in the main specification in Table 2. All regressions control for county × year × month-of-assignment and the count of months since plan assignment, both as indicators. Person level controls, as described in Table 2 are included as well in all columns. Observations are enrollee × months. Standard errors in parentheses are clustered at the county × year × month-of-assignment level. This is the level at which the randomization operates. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A19: Main IV Results for Utilization by Category

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Inpatient	Emergency Dept	Clinic	Pharmacy	Outpatient	Office Visits	All Other
High-Cost Plans	0.005*	-0.002	-0.019**	0.008	0.034**	-0.002	0.010*
	(0.002)	(0.003)	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)
Low-Cost Plans	-0.002**	-0.005**	-0.008**	-0.013**	-0.010**	-0.010**	-0.011**
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Mean	0.022	0.055	0.094	0.210	0.082	0.083	0.195
Observations	393570	393570	393570	393570	393570	393570	393570

Standard errors in parentheses
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV regression results for category or place of service, using a modification to the IV regression in Equation 3. The dependent variables, corresponding to the column headers, are binary variables for whether there was any use of the indicated category/place of service in the enrollee $\times$ month. To construct the plan group regressors, we divide the ten plans into three sets: low- (Plans A, B, C, G, H, I), medium- (Plans E, F, and X), and high- (Plan D) spending plans. Medium plans are the omitted category. The endogenous variables are indicators for enrollment in any plan in each set, and the instruments are indicators for assignment to any plan in each set. See Equation 4 in Section 3.1. All regressions control for county $\times$ year $\times$ month-of-assignment and the count of months since plan assignment, both as sets of indicators. Person level controls, as described in Table 2 are included as well in all columns. Observations are enrollee $\times$ months. Standard errors in parentheses are clustered at the county $\times$ year $\times$ month-of-assignment level. This is the level at which the randomization operates. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A20: Main IV Results for High-Value Care Measures

	(1)	(2)	(3)	(4)	(5)
	Primary Care	HbA1c Testing	Breast Cancer Screening	Cervical Cancer Screening	Chlamydia Screening
High-Cost Plans	0.029**	-0.000	0.000	0.002*	0.000
	(0.005)	(0.001)	(0.000)	(0.001)	(0.001)
Low-Cost Plans	-0.001	-0.001**	0.000	-0.001*	-0.001**
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Mean	0.103	0.005	0.001	0.007	0.007
Observations	393570	393570	393570	393570	393570

Standard errors in parentheses
$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV regression results for use of "high-value care," using a modification to the IV regression in Equation 3. The dependent variables, corresponding to the column headers, are binary variables for whether the indicated care was provided, conditional on the demographic and clinical qualifications that would warrant that care, in the given enrollee $\times$ month. See Appendix B for detailed descriptions of the inclusion criteria for each measure. Specification details follow Table A19. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A21: Main IV Results for Utilization of Select Drug Categories

	(1) Diabetes	(2) Statins	(3) Anti- Depressants	(4) Anti- Psychotics	(5) Anti- Hypertension	(6) Anti- Stroke	(7) Asthma	(8) Contra- ceptives
High-Cost Plans	0.001	0.005*	0.002	-0.002	0.003	0.001	-0.000	-0.001
	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.001)	(0.002)	(0.001)
Low-Cost Plans	-0.002*	0.000	-0.004*	-0.002	-0.001	0.000	-0.002+	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Mean	0.022	0.024	0.034	0.038	0.033	0.003	0.016	0.008
Observations	393570	393570	393570	393570	393570	393570	393570	393570

Standard errors in parentheses
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV regression results for prescription drug fills, using a modification to the IV regression in Equation 3. The dependent variables, corresponding to the column headers, are binary variables for whether there was any use of the indicated drug group in the enrollee × month. Drug groups are supersets of REDBOOK therapeutic classes. Diabetes includes: Anti-diabetic agents, Sulfonylureas; Anti-diabetic agents, misc; Anti-diabetic agents, Insulins. Statins include: Anti-hyper-lipidemic Drugs. Anti-depressants include: Psychother, Anti-depressants. Anti-psychotics include: Psychother, Tranq/Antipsychotic; ASH, Benzodiazepines; Anticonvulsant, Benzodiazepine. Anti-hypertension includes: Cardiac, ACE Inhibitors; Cardiac, Beta Blockers; Cardiac, Alpha-Beta Blockers. Anti-stroke includes: Coag/Anticoag, Anticoagulants. Asthma/COPD includes: Adrenals & Comb, NEC. Specification details follow Table A19. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A22: Main IV Results for Low-Value Care Measures

	(1) Abdomen CT	(2) Thorax CT	(3) Imaging and Lab	(4) Head Imaging for Uncomp. HA	(5) Avoidable Hosp.	(6) All-Cause Readmission	(7) Avoidable ED Visit
High-Cost Plans	0.000	0.000	0.006	0.000	0.001	10.072	0.009
	(0.000)	(0.000)	(0.005)	(0.000)	(0.001)	(18.268)	(0.014)
Low-Cost Plans	0.000	0.000	-0.009**	-0.000	0.001+	-7.723	0.005
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(7.672)	(0.003)
Mean	0.000	0.000	0.144	0.002	0.005	29.474	0.014
Observations	393570	393570	393570	393570	393570	393570	393570

Standard errors in parentheses
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV regression results for use of "low-value care," using a modification to the IV regression in Equation 3. The dependent variables, corresponding to the column headers, are binary variables for whether the indicated category of low-value care was provided in the enrollee × month. See Appendix B for detailed descriptions of the low-value care measures. Specification details follow Table A19. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A23: Main IV Results for Enrollee Satisfaction

	(1) WTS, 3 Months	(2) WTS, 6 Months	(3) Attrition, 6 Months	(4) Attrition, 12 Months	(5) Attrition, 18 Months	(6) Attrition, 24 Months
High-Cost Plans	0.020**	0.029**	0.000	0.018	0.018	0.014
	(0.004)	(0.005)	(0.005)	(0.012)	(0.012)	(0.012)
Low-Cost Plans	-0.023**	-0.032**	0.001	0.000	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.006)	(0.005)	(0.005)
Mean	0.930	0.906	0.955	0.344	0.269	0.197
Observations	65595	65595	33902	33902	33902	33902

Standard errors in parentheses
$^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV regression results for use of "enrollee satisfaction," using a modification to the IV regression in Equation 3. Specification details follow Table A19. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.

Appendix Table A24: Additional OLS Estimates of Plan Effects

Plan	Active Choosers Only		Active Choosers and Auto-Assignees Pooled	
	Log Spending (Table 1) (1)	Log Spending (Table 1) (2)	Log Spending (3)	Log Spending (4)
A	-0.265** (0.035)	-0.290** (0.029)	-0.298** (0.029)	-0.313** (0.026)
B	-0.551** (0.046)	-0.459** (0.035)	-0.542** (0.034)	-0.537** (0.032)
C	0.066+ (0.037)	-0.142** (0.031)	-0.125** (0.031)	-0.220** (0.029)
D	0.165** (0.027)	-0.111** (0.023)	0.365** (0.022)	0.260** (0.020)
E	0.076* (0.033)	-0.084** (0.027)	0.023 (0.028)	-0.038 (0.025)
F	0.286** (0.030)	-0.126** (0.025)	0.296** (0.023)	0.084** (0.020)
G	-0.003 (0.038)	-0.225** (0.031)	-0.289** (0.026)	-0.413** (0.023)
H	-0.100* (0.042)	-0.125** (0.034)	-0.252** (0.037)	-0.288** (0.038)
I	-0.522** (0.046)	-0.375** (0.040)	-0.447** (0.040)	-0.321** (0.041)
Mean (dollars)	$466	$466	$483	$483
County x Year x Month FEs	X	X	X	X
Person-Level Controls		X		X
F-Statistic	111.520	30.515	213.498	151.810
Plan Effect SD	0.265	0.135	0.284	0.234
Corrected SD	0.263	0.132	0.282	0.232
Obs: Enrollee X Months	592692	592692	986262	986262

Note: Table displays OLS results in which the dependent variable is the log of total plan spending in the enrollee-month. Columns 1 and 2 repeat specifications from Table 2. Columns 3 and 4 expand the sample to include the auto-assignees. The plan indicator regressors are defined as the plan initially chosen for the active choosers and as the plan initially assigned for the auto-assignees. See Table 2 for additional details on the specifications. $^+$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Appendix Table A25: Alternative Specifications for Main IV: Aggregate Spending, Plan Groups

	(1) Log Total	(2) Inverse Hyperbolic Sine	(3) Winsorized	(4) Any Spending	(5) Log Std. Pay	(6) Winsorized Std. Pay
High-Cost Plans	0.153*	0.166*	488.483**	0.122**	0.199**	523.924**
	(0.069)	(0.075)	(163.239)	(0.036)	(0.069)	(153.727)
Low-Cost Plans	-0.317**	-0.341**	-204.480**	-0.133**	-0.301**	-173.038**
	(0.031)	(0.034)	(63.267)	(0.019)	(0.031)	(58.787)
Mean	4.41	4.84	2732.90	2.09	4.40	2600.59
Observations	65595	65595	65595	65595	65595	65595

Standard errors in parentheses

$^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$

Note: Table reports IV estimates of each plan grouping's causal effect on utilization, using a modification to the IV regression in Equation 3. We divide the ten plans into three sets: low- (Plans A, B, C, G, H, I), medium- (Plans E, F, and X), and high- (Plan D) spending plans. Medium plans are the omitted category. The endogenous variables are indicators for enrollment in any plan in each set, and the instruments are indicators for assignment to any plan in each set. See Eq. (4) in Section 3.1. The difference here compared to Table A13 is that spending and utilization outcomes are totalled over the full six-month enrollment spell. Specifications otherwise follow Tables A10 and A13. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$.