Preferred Pharmacy Networks and Drug Costs

Online Appendix

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A Background on Medicare Part D

Medicare's prescription drug benefit is provided through private health insurers. Plan enrollees pay a monthly premium for coverage, but 90 percent of plans' Part D revenues come in the form of payments from CMS (Decarolis (2015)): a risk-adjusted direct subsidy for each enrollee of any type; a low-income subsidy to cover low-income enrollees' premiums and cost-sharing (see below); reinsurance covering 80 percent of drug spending above the catastrophic threshold; and "risk corridor" transfers such that the issuers' profits/losses are within certain bounds.

Part D plans must meet standards for plan generosity in terms of actuarial value, types of drugs covered, and retail pharmacy accessibility. Each benefit year, CMS defines a "standard" plan, which determines the minimum actuarial value Part D plans must offer. The standard plan includes a deductible (no plan coverage of drug costs), an initial coverage region (75 percent plan coverage), another coverage gap known as the "donut hole," and a "catastrophic" region (95 percent plan coverage). There is no overall coverage limit. Prior to 2011, the donut hole in the standard plan involved no plan coverage of drug costs. The Patient Protection and Affordable Care Act of 2010 (ACA) stipulated that the donut hole be "filled in," with 75 percent plan coverage by 2020. The standard plan for the year 2014 had the following features: a deductible of $310; 75 percent plan coverage in the initial coverage region, until total spending reaches $2,850; 52.5 percent plan coverage of branded drug costs in the donut hole, until total spending reaches $6,455; and 95 percent plan coverage in the catastrophic region. Many plans use alternative cost-sharing arrangements, including non-standard deductibles and/or donut holes, drugs grouped into formulary tiers, and specific networks of pharmacies.

Part D plans are allowed to use formularies and pharmacy networks to favor and/or exclude certain drugs and pharmacies in their beneficiary cost structures. For drugs, coverage generosity standards require that a certain number of drugs be covered (i.e., on-formulary) in each of a set of drug classes. In some "protected" classes, such as antiretrovirals, plans must include all drugs on their formularies. For pharmacies,

CMS evaluates retail pharmacy networks against the "network adequacy" standards established for the U.S. military's TRICARE programs, which provide civilian health benefits for United States military personnel, military retirees, and their dependents. Under TRICARE standards, at least 90 percent of urban beneficiaries must reside within two miles of a network retail pharmacy. The analogous standards for suburban and rural areas are 90 percent within five miles, and 70 percent within fifteen miles, respectively CMS (2015*a*). Critically, retail pharmacy network adequacy standards apply to *overall* pharmacy networks but do not apply to *preferred* pharmacy networks, so *preferred* networks can be much more restrictive than plans' overall networks.

Unlike traditional Medicare, the private insurers participating in the Medicare Part D program are free to negotiate drug prices with upstream suppliers. Many insurers contract with PBMs to assist in these negotiations as part of determining plan formularies and networks. Some insurers rely on PBMs to contract with drug manufacturers and pharmacies on their behalf, while others use external PBMs only for administrative services (e.g., claims processing).[43]

B Price Variation Across Bargaining Pairs

Appendix Table A.1 summarizes the retail price variation in our sample in 2011 and 2014, separately by year, drug generic/branded status, and drug identifier. The rows indicated by "Brand" summarize variation across observations within a given brand name or generic name. The rows indicated by "NDC" summarize variation across observations within a national drug code. In the top two rows of Appendix Table A.1, we show the mean and standard deviation of retail price per 30 days supplied across all NDC-plan-chain combinations, weighted by quantity dispensed. There is substantial heterogeneity in drug prices, and the distribution of prices has a long upper tail within each generic status-year pair. The standard deviation of price across plans, within drug-year-pharmacy chain, is 14-23 percent of the mean for branded drugs, versus 32-42 percent of the mean for generic drugs. The coefficients of variation across chains, within drug-year-plan, are in a similar range. For generic drugs, the "across chain, within Brand" price dispersion is much larger than the "across chain, within NDC" price dispersion, reflecting the fact that different pharmacy chains may stock different generic NDCs, potentially from different pharmaceutical manufacturers, within a given drug.

[43]The PBM industry is highly concentrated, with the two largest PBMs accounting for 59 percent of industry revenues in 2013 (Danzon (2015)), and has accordingly received a great deal of attention as a potential driver of prescription drug costs.

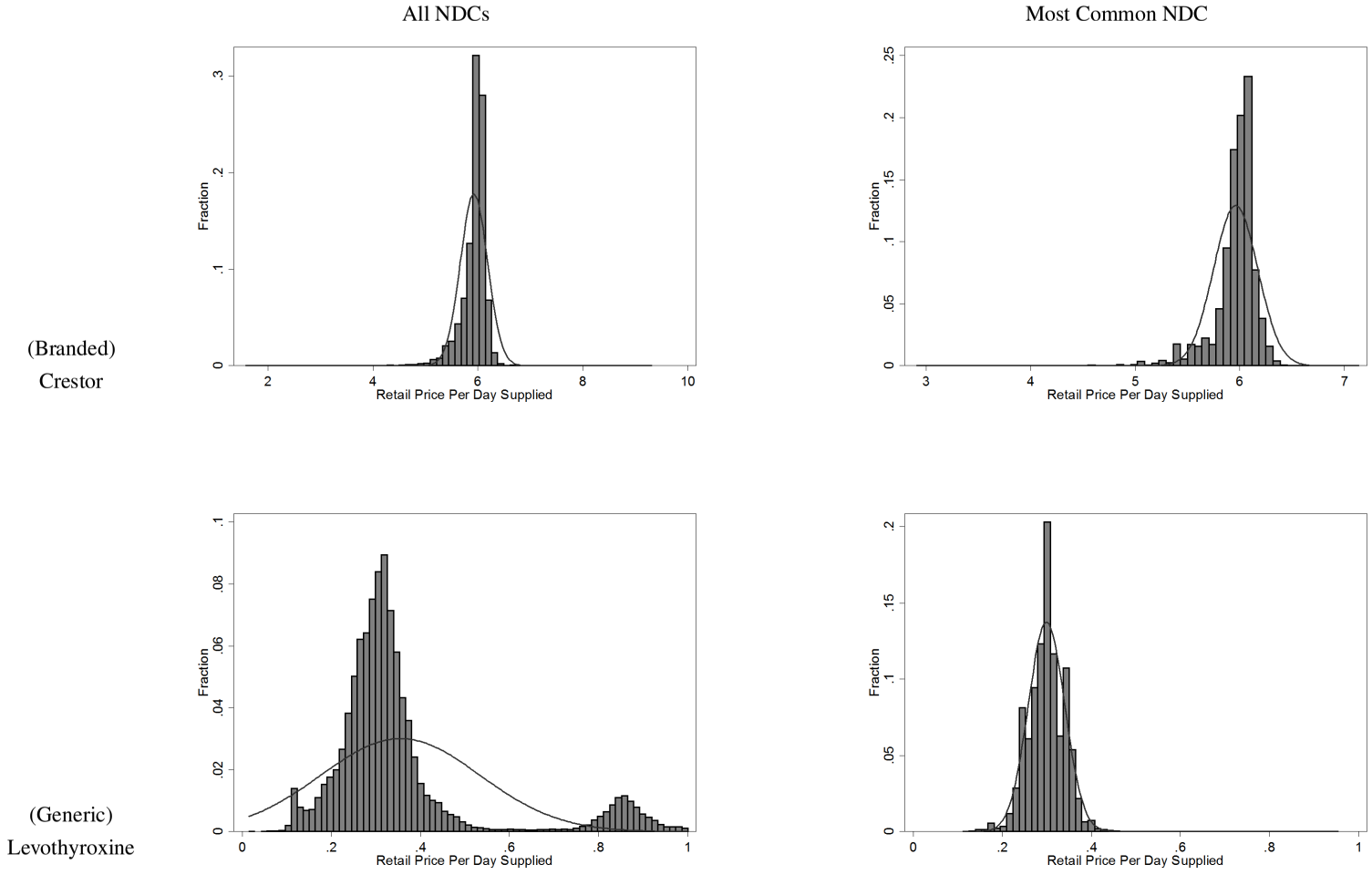
Table A.1: Price Summary Statistics

	2011			2014		
	Branded	Generic	All	Branded	Generic	All
Price	188.9	19.89	66.97	271.2	18.41	71.56
	(455.4)	(52.24)	(255.9)	(1002.1)	(56.83)	(473.6)
CV across Plan, w/in Brand	0.143	0.318	0.279	0.227	0.406	0.377
CV across Chain, w/in Brand	0.153	0.343	0.315	0.227	0.464	0.443
CV across Plan, w/in NDC	0.141	0.325	0.281	0.232	0.420	0.386
CV across Chain, w/in NDC	0.133	0.252	0.218	0.187	0.280	0.262
N	4,308,886	11,987,079	16,295,965	3,976,904	13,725,537	17,702,440

Notes: The number of observations is the number of NDC-plan-chain observations for each year-generic status. Pharmacy chains identified by the parent and relationship ID variables in the CMS pharmacy files. NDCs grouped into "Brands" using the brand name and generic name fields in the CMS prescription drug event files.

To more concretely show how price dispersion persists even within narrowly defined product categories, Appendix Figure A.1 summarizes the observed price variation for two drugs that are commonly used in our data. First, in the top two panels, we display prices for Crestor, a popular branded statin drug for hyperlipidemia. Among all NDCs, there is evidence of price dispersion (the coefficient of variation is 0.34), and even within the most popular single NDC – 10mg of the drug packaged in a 90 day supply – the interquartile range in price per day supply across plan-chain pairs is $1.23 (the mean is $5.15 and the coefficient of variation is 0.15). Among generics, there is even more dispersion in relative terms. In the bottom two panels, we display prices for levothyroxine, a popular drug used to treat hypothyroidism. Among all NDCs, we see substantial variation, though the bimodal price distribution could reflect variation across products and manufacturers. However, when we restrict attention to the highest volume NDC – 50 microgram tablets, manufactured by Mylan – we still see substantial variation in prices across plan-chain pairs (the coefficient of variation is 0.40).

Figure A.1: Retail Price Variation – Top Drugs



Notes: Figure reports quantity-weighted histograms of retail price per day supply in prescription drug event data. Drug names (Crestor and levothyroxine) identified using the brand name and generic name fields.

C Alternative Pharmacy Demand Specification

In an alternative set of pharmacy demand specifications, we instrument for π_{ijhqy} in equation 5 to address potential endogeneity, using an approach similar to that in Abaluck, Gruber and Swanson (2017). In order to illustrate the intuition underlying this approach, consider the simple example of individuals 1 and 2, who are identical in terms of observed characteristics, and each of whom prefers pharmacy X over other pharmacies, all else equal. In 2013, individual 1 enrolls in plan A, while individual 2 enrolls in plan B; both plans have pharmacy X in their preferred networks. For the moment, suppose that in 2014 both individuals remain in their 2013 plans for exogenous reasons (i.e., all enrollees are strictly inertial).[44] In 2014, plan A drops pharmacy X from its preferred network; plan B keeps pharmacy X in its preferred network. In this simple example, individual 1 in plan A faces a loss of preferred status (an out-of-pocket price increase) at her favorite pharmacy between 2013 and 2014, while individual 2 does not. Thus, any differential sorting of individuals 1 and 2 across pharmacy X, its competitors, and the outside option in 2014 will reflect a response to preferred status (out-of-pocket prices), rather than differences in unobserved preferences.

In adapting this identification intuition to our specification in equation 5, we first attempt to replicate the ideal experiment with "identical enrollees initially enrolled in identical plans" using controls. We control for lagged preferred network treatment of pharmacy h among enrollees in a given market using $\bar{\pi}^{lag}_{ijhqy} = \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} \pi_{ij(y-1,b)hq,y-1}$, where $\mathscr{I}(ijy)$ is the set of beneficiaries of type i in plan j in year y, and $j(y-1,b)$ indexes the plan chosen by beneficiary b in year $y-1$. Intuitively, $\bar{\pi}^{lag}_{ijhqy}$ controls for the average preferred status (out-of-pocket cost) of pharmacy h in year $y-1$ faced by beneficiaries in ijy. We also control for observed enrollee preferences over pharmacies using $FavShr_{izjhqy}$, a continuous variable that captures lagged preferences for pharmacy h in market $izjqy$. Formally, we measure these preferences by: $FavShr_{izjhqy} = \sum_{b \in \mathscr{I}(izjy)} \frac{1}{|\mathscr{I}(izjy)|} 1\left\{Favorite_{bhq,y-1}\right\}$, where $\mathscr{I}(izjy)$ is the set of beneficiaries of type i in ZIP z in plan j in year y, and $1\left\{Favorite_{bhq,y-1}\right\}$ is a dummy for pharmacy h belonging to enrollee b's most-frequented chain in quarter q of year $y-1$. Thus, in the IV specification, we control for lagged plan characteristics and lagged enrollee preferences.

In our IV specification, we must also relax the assumption of strict inertia, as 19.6 percent of enrollees switch Part D plans between years in our sample. In order to leverage variation induced by exogenous changes in preferred network treatment of pharmacies within plans between years, we instrument for π_{ijhqy}

[44] See Ericson (2014*a*) and Ho, Hogan and Morton (2017) for evidence on the well-documented pattern of inertia among Part D enrollees, and on insurers' strategic responses to inertia.

using $\bar{\pi}^{IV}_{ijhqy} = \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} \pi_{ij(y-1,b)hq,y}$. Here, $\mathscr{I}(ijy)$ and $j(y-1,b)$ are as before, but $\pi_{ij(y-1,b)hq,y}$ is the preferred network treatment of h in quarter q of year y that would have been faced by beneficiary b, had she remained in the plan she chose in year $y-1$.[45]

Putting this all together, our two-equation model becomes:

$$log\left(s_{izjhqy}\right) - log\left(s_{izj0qy}\right) = \delta_{ijy} + \delta_{ihy} + \delta_{iqry} + \pi_{ijhqy}\beta^{c}_{l(i)} + \bar{\pi}^{lag}_{ijhqy}\beta^{lag}_{l(i)} + FavShr_{izjhqy}\beta^{fav}_{l(i)} + dist_{zh}\beta^{d1}_{l(i)} + dist^{2}_{zh}\beta^{d2}_{l(i)} + \xi_{izjhqy}$$

$$\pi_{ijhqy} = \theta_{ijy} + \theta_{ihy} + \theta_{iqry} + \bar{\pi}^{IV}_{ijhqy}\beta^{FS}_{l(i)} + \bar{\pi}^{lag}_{ijhqy}\beta^{FS,lag}_{l(i)} + FavShr_{izjhqy}\beta^{FS,fav}_{l(i)} + dist_{zh}\beta^{FS,d1}_{l(i)} + dist^{2}_{zh}\beta^{FS,d2}_{l(i)} + v_{ijhqy}.$$

The key identifying assumption we make here is that, conditional on our rich controls for the contemporaneous preferences of enrollees of type i over different pharmacies, and on the additional control for lagged enrollee preferences over pharmacies specified above, the residual variation we observe in the preferred network treatment of pharmacy h in year y across plans with the same preferred network treatment of pharmacy h in year $y-1$ is exogenous with respect to enrollees' unobserved pharmacy preferences over pharmacies in year y. This assumption would fail if, for example, within the set of enrollees with similar lagged demand patterns and lagged preferred networks, enrollees with *particularly strong* preferences for pharmacy h disproportionately selected into plans in $y-1$ that *maintained* preferred status of pharmacy h into year y. It seems unlikely that enrollees would anticipate future year-to-year changes in preferred status of their favorite pharmacies. However, this assumption would also fail if, among plans with h preferred in $y-1$, plans with enrollees with particularly strong preferences for pharmacy h were less likely to drop h from their network, conditional on our controls.

The results are in Appendix Table A.2. This specification again documents strong evidence that non-LIS enrollees are more responsive to preferred network treatment than LIS enrollees, though the average steering implied is smaller in magnitude – e.g., compare the average non-LIS preferred dummy response of 0.394

[45] If $\pi_{ijhqy} = 1\left\{Preferred_{jhy}\right\}$ is simply a dummy for pharmacy h being preferred in plan j and year y, then we control for $\bar{\pi}^{lag}_{ijhqy} = \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} 1\left\{Preferred_{j(y-1,b)h,y-1}\right\}$ and we instrument for π_{ijhqy} using $\bar{\pi}^{IV}_{ijhqy} = \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} 1\left\{Preferred_{j(y-1,b)hy}\right\}$. Similarly, if $\pi_{ijhqy} = OOPC_{ijhqy}$ is the out-of-pocket cost of a 30-day supply for enrollees of type i purchasing drugs in quarter q at pharmacy h in plan j and year y, then we control for $\bar{\pi}^{lag}_{ijhqy} = \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} OOPC_{ij(y-1,b)hq,y-1}$ and we instrument for π_{ijhqy} using

$$\bar{\pi}^{IV}_{ijhqy} = \left\{ \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} 1\left\{\text{Preferred-Network Plan}_{j(y-1,b)y}\right\}, \sum_{b \in \mathscr{I}(ijy)} \frac{1}{|\mathscr{I}(ijy)|} 1\left\{\text{Preferred-Network Plan}_{j(y-1,b)y}\right\} * 1\left\{Preferred_{j(y-1,b)hy}\right\} \right\}.$$

in Table 8 to the 0.165 in Table A.2. Also, the responsiveness of enrollees' pharmacy demand to preferred network treatment is not always monotonically declining in drug tier. The difference in magnitudes between our baseline and instrumental variables specifications may be due to endogenous selection across plans based on their pharmacy networks; however, they may also capture other factors, such as a potential delayed response of enrollees to changes in preferred pharmacy status driven by inattention. Given our relatively short panel, our data and framework have little ability to capture such dynamics; thus, we proceed with the counterfactuals in the main text using the estimates in Table 8.

Lastly, we estimated how the counterfactuals in Section C would change if we instead used the parameters in Appendix Table A.2. As can be readily seen by comparing Table 10 in the main text to Appendix Table A.3 below, the counterfactual results are qualitatively and quantitatively unchanged.

D Plan Demand

We flexibly estimate Medicare Part D plan demand using a logit model that allows preference parameters to vary with LIS status and lagged drug spending quintile. A consumer's choice set is defined at the PDP region level and a product is a plan-region-specific insurance contract (contract-plan ID combination, as with the plan fixed effects in Sections II and III). For each enrollee type $l(i)$ defined by LIS status and lagged spending quintile, consumer utility for plan j in market m and year y is given by:

$$u_{l(i)jmy} = \overline{\xi_{l(i)j}} + \alpha^{p}_{l(i)} prem^{D}_{jmy} + \alpha^{x}_{l(i)} PrefNet_{jy} + \xi_{l(i)jmt} + \varepsilon_{ijmt}, \tag{8}$$

where $\overline{\xi_{l(i)j}}$ are time-invariant, vertical plan characteristics (i.e., contract-plan fixed effects) that vary across consumer types, $prem^{D}_{jmy}$ is the plan premium (in hundreds of dollars per year), $PrefNet_{jy}$ is an indicator for preferred-network plans, and $\xi_{l(i)jmt}$ represents time-varying shocks to unobservable vertical plan characteristics.

The outside option is Medicare Advantage plans. This model is consistent with consumers choosing a plan before they realize the exogenously given need to fill a prescription. To exposit expected utility, denote $\widetilde{u}_{l(i)jmy} = \overline{\xi_{l(i)j}} + \alpha^{p}_{l(i)} prem^{D}_{jmy} + \alpha^{x}_{l(i)} PrefNet_{jy} + \xi_{l(i)jmt}$. The predicted probability that a consumer chooses plan j in year y is given by:

$$\sigma_{l(i)jmy} = \frac{exp\left(\widetilde{u}_{l(i)jmy}\right)}{\sum_{k \in \mathscr{J}_{my}} exp\left(\widetilde{u}_{l(i)kmy}\right)},$$

Table A.2: Pharmacy Demand Parameter Estimates by LIS Status and Tier – Instrumenting to Address Endogenous Selection into Plans

	Non-LIS				LIS			
	Tier				Tier			
	1	2	3	All	1	2	3	All
Panel A								
1{Preferred}	0.173***	0.174***	0.112***	0.165***	0.0704***	0.0241**	0.000518	0.0403***
	(0.00815)	(0.00957)	(0.0121)	(0.00555)	(0.00929)	(0.00953)	(0.0100)	(0.00567)
Distance	-0.0502***	-0.0411***	-0.0414***	-0.0464***	-0.0613***	-0.0457***	-0.0393***	-0.0527***
	(0.000417)	(0.000598)	(0.000669)	(0.000304)	(0.00310)	(0.000389)	(0.00394)	(0.000208)
Distance^2	0.000367***	0.000318***	0.000350***	0.000349***	0.000506***	0.000374***	0.000328***	0.000433***
	(5.62e-06)	(8.20e-06)	(9.18e-06)	(4.13e-06)	(4.15e-06)	(5.29e-06)	(5.39e-06)	(2.80e-06)
$\overline{1\{Preferred\}}^{lag}$	-0.0145	0.0230*	0.0437***	0.00851	-0.0140	0.00612	-0.00227	-0.00480
	(0.0113)	(0.0124)	(0.0160)	(0.00747)	(0.0146)	(0.0143)	(0.0152)	(0.00869)
FavShr	3.062***	2.452***	2.393***	2.777***	3.180***	2.657***	2.485***	2.878***
	(0.00976)	(0.0129)	(0.0142)	(0.00686)	(0.00780)	(0.00918)	(0.00904)	(0.00504)
N Enrollee-Years	913,041	598,732	521,678	1,040,265	1,018,191	758,221	708,290	1,107,851
Panel B								
1{Preferred}	-2.114***	-1.268***	-1.425***	-1.832***	-4.339***	-3.637***	0.542	-3.734***
	(0.101)	(0.0671)	(0.125)	(0.0570)	(0.620)	(1.293)	(6.674)	(0.638)
Normalized Coef.	*0.171*	*0.188*	*0.202*	*0.200*	*0.072*	*0.030*	*-0.001*	*0.042*
Distance	-0.0502***	-0.0411***	-0.0413***	-0.0464***	-0.0614***	-0.0457***	-0.0393***	-0.0527***
	(0.000417)	(0.000598)	(0.000686)	(0.000306)	(0.000310)	(0.000389)	(0.000394)	(0.000208)
Distance^2	0.000367***	0.000318***	0.000348***	0.000349***	0.000506***	0.000374***	0.000328***	0.000433***
	(5.62e-06)	(8.21e-06)	(9.42e-06)	(4.16e-06)	(4.15e-06)	(5.29e-06)	(5.39e-06)	(2.80e-06)
$\overline{OOPC}^{lag}$	0.302***	-0.0653	0.886***	0.705***	0.392	0.612	3.671	-0.162
	(0.115)	(0.0766)	(0.124)	(0.0591)	(0.659)	(1.229)	(5.149)	(0.597)
FavShr	3.063***	2.456***	2.402***	2.786***	3.180***	2.657***	2.485***	2.878***
	(0.00974)	(0.0129)	(0.0145)	(0.00688)	(0.00780)	(0.00918)	(0.00903)	(0.00504)
N Enrollee-Years	913,041	598,732	521,678	1,040,265	1,018,191	758,221	708,290	1,107,851

Notes: Table reports coefficient estimates from pharmacy demand analysis; preferred network treatment variable π_{ijhqy} instrumented with $\bar{\pi}^{IV}_{ijhqy}$ as described in text. Panel A: each column of coefficients is from a separate regression of demand dependent variable on *Preferred* dummy, distance and distance-squared, plus plan-year-enrollee type, pharmacy-year-enrollee type, and quarter-year-region-enrollee type fixed effects, and controls for lagged preferred network treatment variable ($\overline{1\{Preferred\}}^{lag}$) and lagged preference variable (*FavShr*), within relevant sample defined by LIS status and formulary tier. Panel B: same as Panel A, but steering captured using *OOPC* rather than *Preferred* dummy. Normalized Coef. divides the *OOPC* coefficient by the average difference between the preferred and non-preferred *OOPC* in preferred-network plans in the given column.

Table A.3: Counterfactual Policy Impact Using IV Estimates

	Non-LIS	LIS	All
ΔShare Preferred (pp)	-3.42	-0.36	-2.31
%Δ OOPC, No Behavioral Response	4.32	-2.23	3.64
%Δ OOPC, Inc. Behavioral Response	3.91	-2.24	3.26
Δ in Consumer Surplus ($)	-33.78	4.05	-20.05
%Δ in Consumer Surplus	-2.72	-0.90	-3.19
%Δ in Spend/Year	2.02	0.59	1.16

Notes: Each cell reports the change induced by moving to the counterfactual scenario, for the average enrollee in each column, using pharmacy demand parameter estimates from Table A.2. "ΔShare Preferred" indicates the change in "preferred" pharmacy market share, in percentage points. "Δ in Consumer Surplus ($)" is in dollars per enrollee-year. All other cells are percentage changes; e.g., comparing simulated counterfactual OOP spending per enrollee-year to baseline observed OOP spending per enrollee-year. For illustrative purposes, OOP spending shown without the behavioral demand response (i.e., counterfactual OOP prices, but observed shares), and with the behavioral response (counterfactual prices *and* shares).

Table A.4: Plan Demand Sample

	Non-LIS Enrollees		LIS Enrollees		All Enrollees	
	Mean	SD	Mean	SD	Mean	SD
N plans in choice set	27.8130	2.6320	27.2430	3.7840	27.5360	3.2570
Premium (hundreds of $)	4.9850	2.1620	0.2460	0.6730	2.6750	2.8690
Preferred-Network Plans	0.6790	0.4670	0.3180	0.4660	0.5030	0.5000

Notes: Table describes baseline (observed) choice sets defined at the PDP region-year level. Plans are defined as unique contract ID-plan ID combinations. Premiums are in hundreds of dollars per year; LIS premiums assume that the beneficiary receives the full subsidy amount.

where $\mathscr{J}_{my}$ is the set of all available plans in market m in year y. Following the approach in Section III, we define as a unique combination of enrollee type-enrollee ZIP code-year. The plan demand sample is reported in Table A.4. The average sample enrollee-year chose from among 28 plans. The average non-LIS enrollee chose a plan with an annual premium of $499, versus the subsidized premium of $25 for LIS enrollees. Non-LIS enrollees were more likely to enroll in preferred-network plans (68 percent, versus 32 percent for LIS enrollees). The higher observed enrollment in preferred-network plans in this sample, relative to the pharmacy demand sample in Table 7, reflects the fact that we only estimate plan demand in the 2012-2014 sample, for which we observe lagged cost. Our incorporation of lagged cost to characterize enrollee type is intended as a replacement for our conditioning on drug formulary tier in Section III. In analyzing plan demand, we must aggregate to the enrollee level: to condition on variation in enrollees' expected drug needs, we use total lagged drug expenditure and bin enrollees into quintiles.

Our estimates will be biased if $\xi_{l(i)jmy}$ is correlated with premiums or product characteristics. We address this issue via a two-pronged approach. First, we include contract-plan fixed effects, $\overline{\xi_{l(i)j}}$, that are allowed

to vary with consumer type: the unobserved product characteristic is the deviation from the plan mean for the LIS-cost quintile group in question. Second, we instrument for premiums. As is common in this setting, we use Hausman-style instruments: we instrument for the premium for a given insurer-market-consumer type-year using the average premium for the same insurer-consumer type-year in all other PDP regions.

We estimate pooled coefficients within non-LIS and LIS enrollees; these results are summarized in Table A.5. For each group as defined by LIS status, we show results for several different specifications of controls: columns (1), (4), and (7) include plan-LIS-lagged cost quintile fixed effects; columns (2), (5), and (8) add in year-LIS-lagged cost quintile fixed effects, and columns (3), (6), and (9) add in ZIP-LIS-lagged cost quintile fixed effects. The premium coefficients are generally quite stable with respect to the fixed effects specification employed. However, the coefficients on the preferred-network plan dummy are more sensitive: the controls for year are necessary to ensure a negative coefficient for non-LIS enrollees.

We observe that LIS enrollees are more sensitive to variation in their effective (post-subsidy) premiums than are non-LIS enrollees: this is not unexpected given the tendency of low-income individuals to be highly price-sensitive. LIS enrollees appear to have a stronger distaste for preferred network plans than non-LIS enrollees within each measure. At first glance it may seem surprising that LIS enrollees dislike preferred network plans, given that they are not subject to most preferred-pharmacy copay differentials. However, to quantify the trade-offs between preferred pharmacy contracting and ex ante consumer surplus, we must quantify enrollee preferences over preferred pharmacy contracting in dollar terms. For any enrollee type i, this can be calculated as the ratio of α_i^x to α_i^p. Our preferred specification uses the results in columns (3) and (6) in Table A.5, which imply that non-LIS enrollees are willing to pay \$135 in additional annual premiums to avoid preferred-network plans, whereas LIS enrollees are willing to pay only \$103. This may seem surprising, as preferred-network plans "save" non-LIS consumers money ex post in the form of reduced out-of-pocket costs. However, several factors – including non-pecuniary hassle or switching costs, choice inconsistency as in Abaluck and Gruber (2011), and learning – could rationalize this discrepancy. We believe this is an interesting avenue for future research.

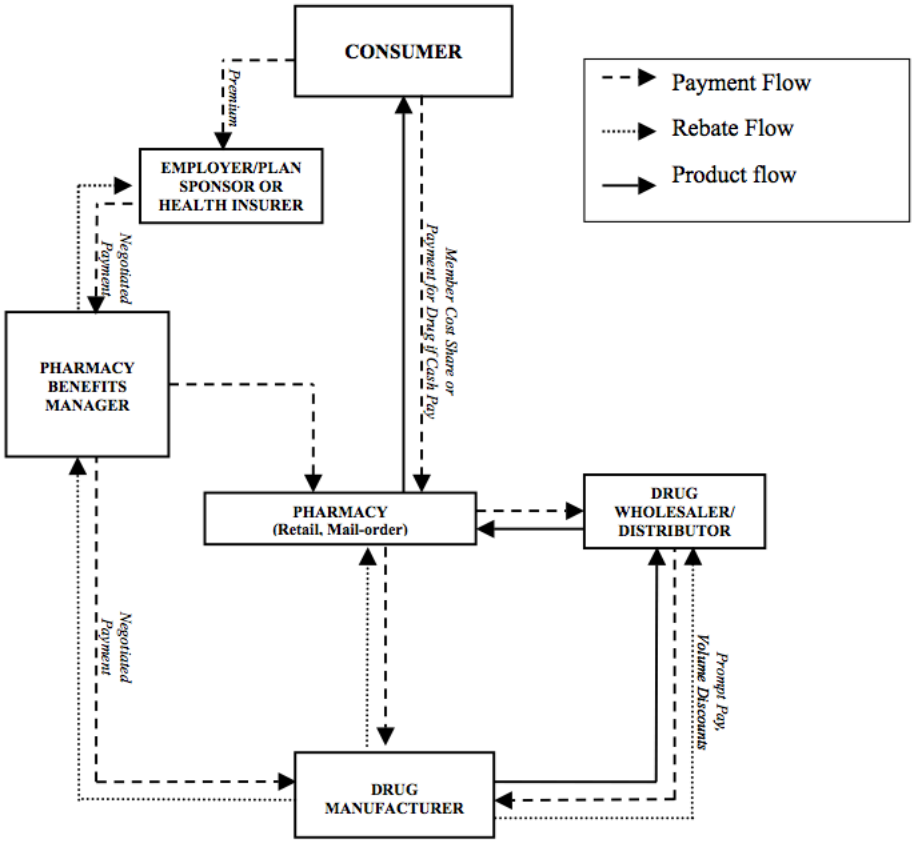
E Other Tables and Figures

Table A.5: Plan Demand

	Non-LIS Enrollees			LIS Enrollees			All Enrollees		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Premium	-0.189***	-0.271***	-0.0688***	-0.375***	-0.408***	-0.293***	-0.232***	-0.300***	-0.297***
	(0.00712)	(0.0111)	(0.00374)	(0.0147)	(0.0163)	(0.0106)	(0.00639)	(0.00862)	(0.00861)
1{Preferred-Network Plan}	0.0320***	-0.151***	-0.0926***	-0.0933***	-0.170***	-0.302***	-0.0307***	-0.172***	-0.163***
	(0.00863)	(0.0130)	(0.00800)	(0.0105)	(0.0114)	(0.0117)	(0.00656)	(0.00844)	(0.00846)
N (enrollee-years)	1,763,069	1,763,069	1,764,037	1,709,130	1,709,130	1,711,403	3,472,199	3,472,199	3,470,693
Plan-LIS-Lagcost FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-LIS-Lagcost FEs	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
ZIP-LIS-Lagcost FEs	No	No	Yes	No	No	Yes	No	No	Yes

Notes: Table reports coefficient estimates from plan demand analysis described in Appendix text. Each column represents an alternative specification (with fixed effects as described in the final rows) and sample. The market is defined at the geography-consumer type-year level.

Figure A.2: Pharmaceutical Supply Chain



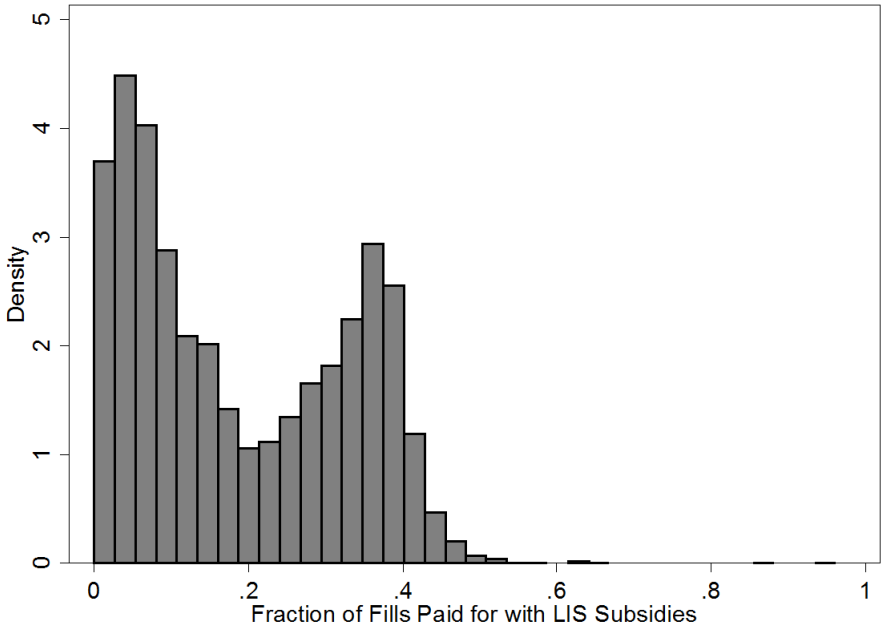
Notes: Reproduced from The Health Strategies Consultancy LLC (2005)

Table A.6: Cost Sharing by Year, Formulary Tier, and Preferred Status

		Copay ($)			Coinsurance (%)		
Year	Tier	N	Preferred	Non-Preferred	N	Preferred	Non-Preferred
2011	1	143	3.71	8.64	1	15	20
			(2.14)	(2.98)			
	2	109	25.21	30.21	1	25	30
			(15.00)	(15.00)			
	3	74	62.49	67.49	36	20.78	37.11
			(19.21)	(19.21)		(3.25)	(0.46)
2012	1	211	2.36	8.13	-	-	-
			(2.66)	(3.02)			
	2	156	26.85	33.21	32	25.22	37.41
			(15.04)	(13.69)		(0.49)	(0.87)
	3	122	67.89	74.08	66	29.61	47.71
			(20.13)	(18.18)		(10)	(11.34)
2013	1	395	1.43	6.44	-	-	-
			(1.30)	(1.82)			
	2	387	14.54	21.46	7	20	25
			(14.24)	(15.48)		(0)	(0)
	3	223	45.09	53.81	108	29.78	38.16
			(16.05)	(20.41)		(6.94)	(9.25)
2014	1	760	1.00	6.9	-	-	-
			(1.01)	(2.85)			
	2	711	7.76	19.75	34	14.97	16.09
			(7.4)	(11.31)		(0.17)	(0.51)
	3	563	35.96	43.73	138	29.38	34.62
			(7.69)	(6.19)		(10.4)	(10.16)

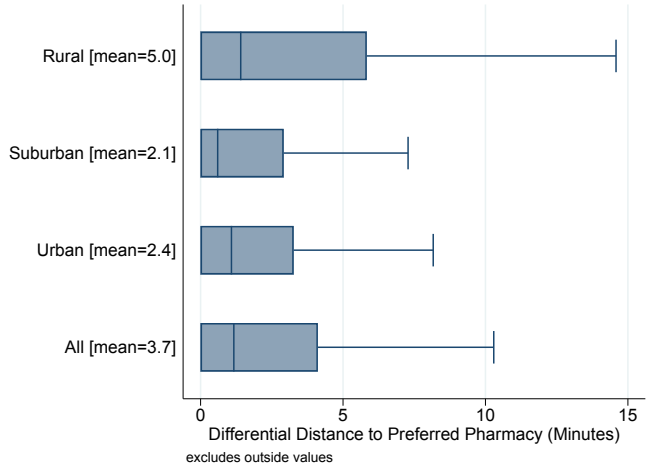
Notes: Cost-sharing statistics summarized across plans within each year and tier, preferred-network plans only. Cost-sharing reported for one-month supplies, retail fills, initial coverage phase. Standard deviations reported in parentheses.

Figure A.3: Distribution of LIS Coverage



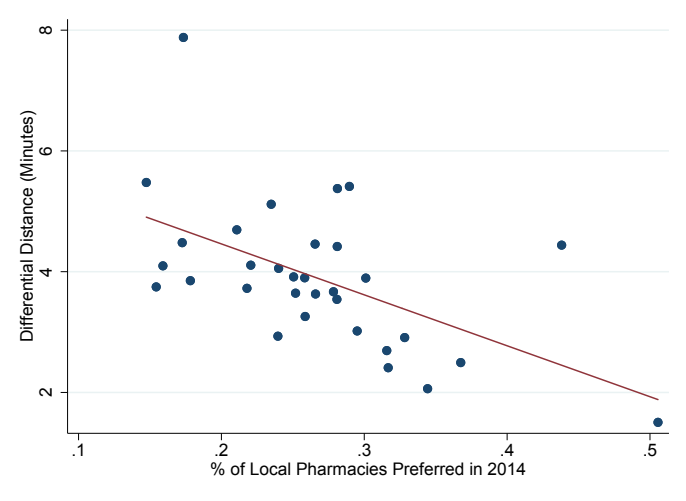
Notes: Figure reports histogram of "% LIS" across sample plan-years. "% LIS" is the percentage of the total drug spending paid for by the federal government in the form of cost-sharing subsidies for low-income beneficiaries.

Figure A.4: Differential Distance to Preferred Pharmacies



Notes: Driving distance to nearest preferred retail pharmacy, minus driving distance to nearest in-network retail pharmacy. Statistics are enrollment-weighted, for sample enrollees in preferred-network plans in 2014. Urban/suburban/rural flags for enrollee ZIP codes based on US Census data for 2010.

Figure A.5: Access Across Regions



Notes: Both Differential Distance to Preferred Pharmacy (calculated as in Appendix Figure A.4) and "% Preferred" (calculated as in Table 1) are enrollment-weighted averages within preferred-network plans in each PDP region in 2014.

Table A.7: Top Chains Preferred Status Transition Matrix, 2012-3

Chain A

Preferred Status y	Preferred Status $y+1$			
	Exit_{y+1}	Non-Pref	Pref	Total
Entry_{y+1}	0.0%	35.4%	20.7%	56.0%
Non-Pref	4.7%	14.9%	0.2%	19.8%
Pref	0.0%	7.0%	17.2%	24.1%
Total	4.7%	57.3%	38.0%	100.0%

Chain B

Preferred Status y	Preferred Status $y+1$			
	Exit_{y+1}	Non-Pref	Pref	Total
Entry_{y+1}	0.0%	55.4%	0.6%	56.0%
Non-Pref	1.0%	29.4%	0.2%	30.7%
Pref	3.7%	5.3%	4.3%	13.3%
Total	4.7%	90.2%	5.1%	100.0%

Chain C

Preferred Status y	Preferred Status $y+1$			
	Exit_{y+1}	Non-Pref	Pref	Total
Entry_{y+1}	0.0%	34.2%	21.9%	56.0%
Non-Pref	4.7%	6.1%	6.1%	17.0%
Pref	0.0%	0.0%	27.0%	27.0%
Total	4.7%	40.3%	55.0%	100.0%

Chain D

Preferred Status y	Preferred Status $y+1$			
	Exit_{y+1}	Non-Pref	Pref	Total
Entry_{y+1}	0.0%	21.7%	34.4%	56.0%
Non-Pref	4.7%	20.0%	0.2%	24.9%
Pref	0.0%	0.0%	19.0%	19.0%
Total	4.7%	41.7%	53.6%	100.0%

Notes: Transition matrices regarding top retail chains' preferred network status for $N = 489$ plans with preferred networks in 2012-3. Top retail chains identified as those with the highest aggregate spending across all years 2011-4. Rows identify chain's preferred status in each plan in 2012 (except for plans adopting preferred networks in 2013, identified by $Entry_{y+1}$). Columns identify chain's preferred status in each plan in 2013 (except for plans dropping preferred networks in 2013, identified by $Exit_{y+1}$).

Table A.8: Correlation between Preferred Pharmacy Contracting and Retail Prices

Dependent Variable: Retail Price / Days Supply					
	(1)	(2)	(3)	(4)	(5)
Panel A: All Drugs					
1{<50% Preferred}	-0.560***	-0.151***	-0.0672***	-0.0600***	-0.0583***
	(0.0410)	(0.0134)	(0.00772)	(0.00766)	(0.00771)
	-0.250	*-0.067*	*-0.030*	*-0.027*	*-0.026*
1{Top Quartile	0.441***	0.104***	0.0568***	0.0510***	0.0488***
% Preferred}	(0.0372)	(0.0113)	(0.00580)	(0.00566)	(0.00574)
	0.197	*0.046*	*0.025*	*0.023*	*0.022*
Panel B: Generic Drugs					
1{<50% Preferred}	-0.170***	-0.0590***	-0.0309***	-0.0278***	-0.0275***
	(0.0139)	(0.00614)	(0.00527)	(0.00526)	(0.00508)
	-0.256	*-0.089*	*-0.047*	*-0.042*	*-0.041*
1{Top Quartile	0.117***	0.0486***	0.0281***	0.0256***	0.0248***
% Preferred}	(0.0125)	(0.00470)	(0.00374)	(0.00367)	(0.00358)
	0.176	*0.073*	*0.042*	*0.039*	*0.037*
Quarter-Region FE	Yes	Yes	Yes	Yes	Yes
Plan FE	No	Yes	Yes	Yes	Yes
NDC FE	No	No	Yes	Yes	Yes
Pharmacy Chain FE	No	No	No	Yes	Yes
Contract-Pharmacy Chain FE	No	No	No	No	Yes

Notes: Each coefficient is estimated $\hat{\beta}$ from a separate regression of p_{djhqy} on the relevant preferred network contracting variable for the row: 1{<50% Preferred} or 1{Top Quartile % Preferred}, for a given sample (All Drugs [N=131,091,890] or Generic Drugs Only [N=100,115,691]) and fixed effects specification. Quarter-Region, NDC, Plan, and Contract-Pharmacy Chain fixed effects are included in the richest specification. Standard errors clustered by plan are reported in parentheses. In italics below each coefficient and standard error (in parentheses), we normalize the coefficient by dividing through by the weighted average retail price per day supply for the regression sample. Mean retail price is $\bar{p} = 2.238$ across all drugs and $\bar{p}$ =0.663 for generic drugs.

Table A.9: Correlation between Preferred Pharmacy Contracting and Retail Prices, by LIS Quartile

Dependent Variable: Retail Price / Days Supply					
	(1)	(2)	(3)	(4)	(5)
Panel A: Contemporaneous % LIS					
% Preferred	0.311***	0.163***	0.137***	0.128***	0.121***
	(0.0765)	(0.0366)	(0.0136)	(0.0136)	(0.0134)
% Preferred*	0.0857	0.0839**	-0.0279*	-0.0322**	-0.0291**
1{2^{nd} Quartile, % LIS}	(0.0750)	(0.0389)	(0.0151)	(0.0147)	(0.0143)
% Preferred*	0.386***	-0.000832	-0.0632***	-0.0624***	-0.0620***
1{3^{rd} Quartile, % LIS}	(0.0956)	(0.0474)	(0.0196)	(0.0195)	(0.0190)
% Preferred*	0.172	-0.0810	-0.143***	-0.141***	-0.138***
1{4^{th} Quartile, % LIS}	(0.131)	(0.0522)	(0.0243)	(0.0235)	(0.0229)
Normalized Coef., 1^{st} Quartile	*0.1759*	*0.0922*	*0.0775*	*0.0724*	*0.0685*
Normalized Coef., 2^{nd} Quartile	*0.1933*	*0.1203*	*0.0532*	*0.0467*	*0.0448*
Normalized Coef., 3^{rd} Quartile	*0.2638*	*0.0614*	*0.0279*	*0.0248*	*0.0223*
Normalized Coef., 4^{th} Quartile	*0.1877*	*0.0319*	*-0.0023*	*-0.0051*	*-0.0066*
Panel B: 2011 % LIS					
% Preferred	0.0516	0.201***	0.167***	0.160***	0.155***
	(0.106)	(0.0481)	(0.0174)	(0.0175)	(0.0173)
% Preferred*	0.554***	0.0793*	-0.0256	-0.0319*	-0.0297*
1{2^{nd} Quartile, % LIS}	(0.107)	(0.0478)	(0.0168)	(0.0166)	(0.0160)
% Preferred*	0.576***	-0.0162	-0.104***	-0.111***	-0.101***
1{3^{rd} Quartile, % LIS}	(0.125)	(0.0607)	(0.0226)	(0.0227)	(0.0222)
% Preferred*	0.601***	-0.0694	-0.145***	-0.147***	-0.154***
1{4^{th} Quartile, % LIS}	(0.147)	(0.0593)	(0.0279)	(0.0270)	(0.0254)
Normalized Coef., 1^{st} Quartile	*0.0288*	*0.1123*	*0.0933*	*0.0894*	*0.0866*
Normalized Coef., 2^{nd} Quartile	*0.2849*	*0.1319*	*0.0665*	*0.0603*	*0.0589*
Normalized Coef., 3^{rd} Quartile	*0.2484*	*0.0731*	*0.0249*	*0.0194*	*0.0214*
Normalized Coef., 4^{th} Quartile	*0.2505*	*0.0505*	*0.0084*	*0.0050*	*0.0004*
Quarter-Region FE	Yes	Yes	Yes	Yes	Yes
Plan FE	No	Yes	Yes	Yes	Yes
NDC FE	No	No	Yes	Yes	Yes
Pharmacy Chain FE	No	No	No	Yes	Yes
Contract-Pharmacy Chain FE	No	No	No	No	Yes

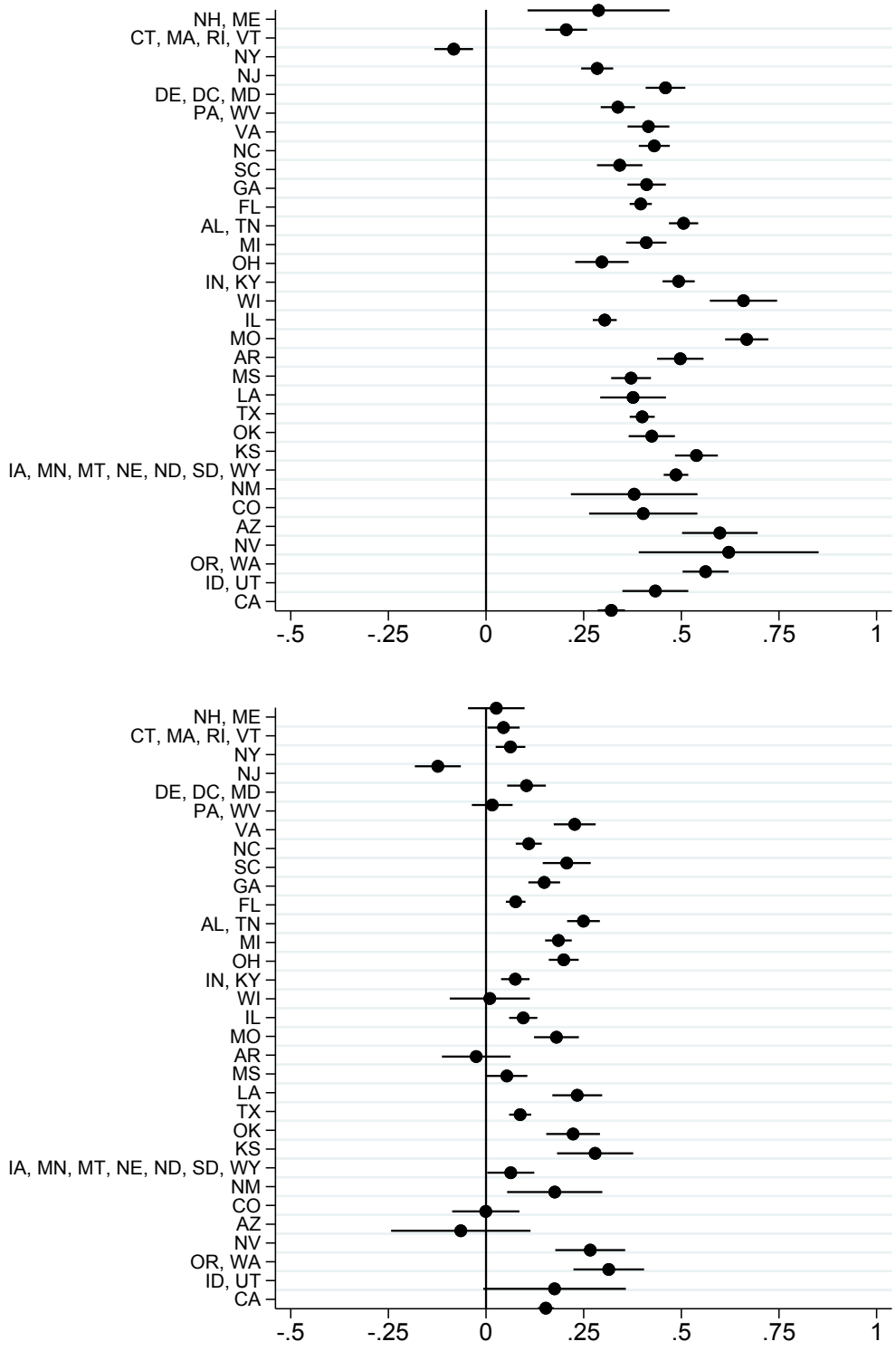
Notes: Each coefficient is estimated $\hat{\beta}$ from a separate regression of p_{djhqy} on % Preferred, alone and interacted with indicators for the $2^{nd} - 4^{th}$ quartiles of % LIS (coefficients on uninteracted indicators for % LIS omitted for brevity), and fixed effects indicated in each column (Quarter-Region, NDC, Plan, and Contract-Pharmacy Chain fixed effects are included in the richest specification). Panel A (N=131,091,890): % LIS calculated for each plan-year. Panel B (N=123,410,043): % LIS calculated for each plan in 2011. Standard errors clustered by plan are reported in parentheses. The coefficient normalized by the mean retail price per day supply for each group is shown in italics. Contemporaneous "% LIS" averages for plan-years in each quartile are 6 percent, 19 percent, 32 percent, and 40 percent in quartiles 1, 2, 3, and 4, respectively.

Table A.10: Pharmacy Demand Estimates – All *OOPC* Variation

	Non-LIS				LIS			
	Tier				Tier			
	1	2	3	All	1	2	3	All
OOPC	-2.276***	-0.285***	-0.0533***	-0.221***	-3.389***	-3.707***	-0.894	-3.350***
	(0.0425)	(0.0157)	(0.00914)	(0.00873)	(0.225)	(0.473)	(0.885)	(0.186)
Normalized Coef.	*0.184*	*0.042*	*0.008*	*0.024*	*0.057*	*0.028*	*0.001*	*0.038*
Distance	-0.0524***	-0.0412***	-0.0437***	-0.0485***	-0.0651***	-0.0458***	-0.0417***	-0.0562***
	(0.000377)	(0.000530)	(0.000681)	(0.000280)	(0.000283)	(0.000349)	(0.000393)	(0.000194)
Distance^2	0.000387***	0.000321***	0.000361***	0.000366***	0.000528***	0.000359***	0.000337***	0.000452***
	(5.15e-06)	(7.37e-06)	(9.35e-06)	(3.85e-06)	(3.85e-06)	(4.81e-06)	(5.38e-06)	(2.65e-06)
N Enrollee-Years	1,265,909	789,981	546,879	1,409,862	1,428,054	1,025,857	789,377	1,532,655

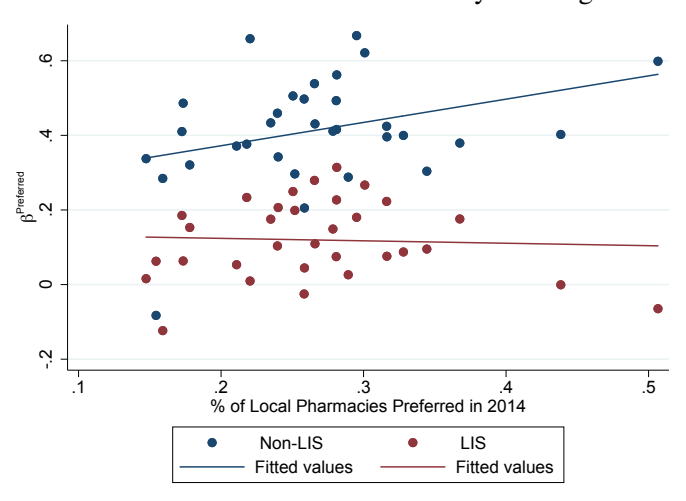
Notes: Table reports coefficient estimates from pharmacy demand analysis described in the text. Each column of coefficients is from a separate regression of demand dependent variable on *OOPC*, distance and distance-squared, plus plan-year-enrollee type, pharmacy-year-enrollee type, and quarter-year-region-enrollee type fixed effects, within relevant sample defined by LIS status and formulary tier. Normalized Coef. divides the *OOPC* coefficient by the average difference between the preferred and non-preferred *OOPC* in preferred-network plans in the given column.

Figure A.6: Pharmacy Demand Parameter Estimates by LIS Status and Region



Notes: Each marker represents a point estimate of the coefficient on the Preferred dummy from the pharmacy demand analysis described in the text, estimated for all non-LIS (Panel A) or LIS (Panel B) individuals within a given PDP region. Bars represent 95 percent confidence intervals based on plan-clustered standard errors.

Figure A.7: Correlation between Preferred Pharmacy Steering and "% Preferred"



Notes: $\beta^{Preferred}$ is the coefficient on the Preferred dummy from the pharmacy demand analysis described in the text (as in Appendix Figure A.7), estimated for all non-LIS or LIS individuals within a given PDP region. On the x-axis, "% Preferred" (calculated as in Table 1) is enrollment-weighted average within preferred-network plans in each PDP region in 2014.

Table A.11: Pharmacy Demand – ZIP-Interacted Fixed Effects

	Non-LIS				LIS			
	Tier				Tier			
	1	2	3	All	1	2	3	All
1{Preferred}	0.370***	0.243***	0.221***	0.304***	0.115***	0.0659***	0.0387***	0.0816***
	(0.00244)	(0.00262)	(0.00343)	(0.00161)	(0.00348)	(0.00319)	(0.00341)	(0.00204)
N Enrollee-Years	2,607,307	1,898,987	1,387,503	2,730,705	2,226,095	1,753,794	1,404,795	2,301,690

Notes: Table reports coefficient estimates from pharmacy demand analysis described in the text. Each column of coefficients is from a separate regression of demand dependent variable on *Preferred* dummy, plus plan-ZIP3-year-enrollee type, pharmacy-ZIP3-year-enrollee type, and quarter-year-region-ZIP3-enrollee type fixed effects, within relevant sample defined by LIS status and formulary tier.

Table A.12: Pharmacy Demand – Robustness Specifications

	Non-LIS	LIS	Non-LIS	LIS	Non-LIS	LIS
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Alternative Samples and Fixed Effects						
1{Preferred}	0.394***	0.118***	0.239***	-0.0398***	0.304***	0.0773***
	(0.00433)	(0.00406)	(0.00299)	(0.00310)	(0.00391)	(0.00454)
Distance	-0.0488***	-0.0562***	-0.0486***	-0.0567***	-0.0465***	-0.0456***
	(0.000280)	(0.000194)	(0.000268)	(0.000187)	(0.000375)	(0.000406)
$Distance^2$	0.000369***	0.000452***	0.000364***	0.000453***	0.000339***	0.000367***
	(3.84e-06)	(2.65e-06)	(3.65e-06)	(2.54e-06)	(5.03e-06)	(5.55e-06)
Fixed Effects	Plan-Year, Qtr, Pharmacy-Year		Plan, Quarter, Pharmacy		Plan, Quarter, Pharmacy	
Sample	Full		Full		Preferred Network Plans	
N Enrollees	1,409,862	1,532,655	1,425,435	1,543,276	717,212	346,917
Panel B: Alternative Outside Options						
1{Preferred}	0.394***	0.118***	0.387***	0.120***	0.452***	0.152***
	(0.00433)	(0.00406)	(0.00464)	(0.00407)	(0.00359)	(0.0162)
Distance	-0.0488***	-0.0562***	-0.0505***	-0.0565***	-0.0500***	-0.0571***
	(0.000280)	(0.000194)	(0.000292)	(0.000195)	(0.000240)	(0.000633)
$Distance^2$	0.000369***	0.000452***	0.000388***	0.000456***	0.000417***	0.000516***
	(3.84e-06)	(2.65e-06)	(4.00e-06)	(2.66e-06)	(3.30e-06)	(8.81e-06)
Outside Option	Independent Retail		Non-Preferred Independent		Mail-Order	
N Enrollees	1,409,862	1,532,655	1,287,369	1,516,983	1,422,365	224,642
Panel C: Alternative Distance Measure						
1{Preferred}	0.394***	0.118***	0.390***	0.116***	0.395***	0.119***
	(0.00433)	(0.00406)	(0.00434)	(0.00407)	(0.00433)	(0.00405)
Distance	-0.0488***	-0.0562***	-0.0241***	-0.0258***		
	(0.000280)	(0.000194)	(0.000112)	(7.65e-05)		
$Distance^2$	0.000369***	0.000452***				
	(3.84e-06)	(2.65e-06)				
Log(Distance)					-0.482***	-0.510***
					(0.00199)	(0.00132)
Distance Measure	Driving Time (Hours)		Driving Time (Hours)		Log(Driving Time (Hours))	
N Enrollees	1,409,862	1,532,655	1,409,862	1,532,655	1,409,862	1,532,655

Notes: Table reports coefficient estimates from pharmacy demand analysis described in the text. Each column of coefficients is from a separate regression of demand dependent variable (formed for indicated outside option) on $Preferred$ dummy, indicated distance variables, and indicated fixed effects, within relevant sample defined by LIS status.

Table A.13: Counterfactual Sample

	Non-LIS				LIS				All			
	Tier 1	Tier 2	Tier 3	All	Tier 1	Tier 2	Tier 3	All	Tier 1	Tier 2	Tier 3	All
Share Preferred	0.40	0.44	0.39	0.42	0.20	0.21	0.20	0.21	0.32	0.35	0.31	0.34
Share Non-Preferred	0.28	0.26	0.27	0.27	0.33	0.33	0.32	0.33	0.30	0.29	0.29	0.29
POS Spend/Year	163	294	1,619	2,077	232	696	4,298	5,226	189	444	2,621	3,254
OOP Spend/Year	103	135	389	627	24	22	35	81	74	92	257	423

Notes: Top panel reports baseline (observed) share of demand at preferred and non-preferred pharmacies, baseline (observed) point-of-sale spending, and baseline (observed) out-of-pocket spending, within preferred-network plans in 2014 only. Excluded category is non-chain retail pharmacies.

Table A.14: OOP Price Adjustments When Plans Adopt Preferred Pharmacy Networks

	Non-LIS				LIS			
	Tier				Tier			
	1	2	3	All	1	2	3	All
Panel A – Preferred Pharmacies								
1{Preferred-	-0.0554***	-0.0822***	-0.320***	-0.0881***	-0.0103***	-0.000395	0.00382***	-0.00583***
-Network Plan}	(0.00118)	(0.00439)	(0.0105)	(0.0144)	(0.000338)	(0.000244)	(0.000256)	(0.000460)
Panel B – Non-Preferred Pharmacies								
1{Preferred-	0.0455***	0.121***	-0.0455***	0.0562***	0.00959***	0.0109***	0.00523***	0.00894***
-Network Plan}	(0.00114)	(0.00445)	(0.0101)	(0.0147)	(0.000295)	(0.000198)	(0.000243)	(0.000411)

Notes: Estimates and standard errors from a regression of *OOPC* on 1{Preferred-Network Plan}, controlling for plan and quarter-year-region fixed effects. Each sample plan receives equal weight; quarters within each year are weighted by quantity based on the consumption patterns of the 1,000 random enrollees used to simulate prices. Panel A: preferred pharmacy prices only; Panel B: non-preferred pharmacy prices only. Prior to adoption of preferred pharmacy networks, pharmacies are neither preferred nor non-preferred, so pre-adoption regression sample is the same in panels A and B. As discussed in text, *OOPC* varies only with plan, quarter-year, enrollee type, drug tier, and pharmacy preferred status.

Table A.15: Counterfactual Policy Impact by LIS Status and Drug Formulary Tier

	Non-LIS				LIS				All			
	Tier 1	Tier 2	Tier 3	All	Tier 1	Tier 2	Tier 3	All	Tier 1	Tier 2	Tier 3	All
ΔShare Preferred (pp)	-6.84	-5.30	-8.08	-6.54	-1.86	-0.62	0.68	-0.87	-5.03	-3.60	-4.88	-4.48
%Δ OOP Spend, No Behavioral Response	5.24	0.94	5.17	4.30	-1.15	-3.58	-1.83	-2.16	3.81	0.25	4.77	3.62
%Δ OOP Spend, Inc. Behavioral Response	4.40	0.16	4.65	3.68	-1.15	-3.71	-1.93	-2.24	3.15	-0.43	4.28	3.06
Δ in Consumer Surplus ($)	-4.40	0.25	-26.91	-31.06	0.86	2.11	1.11	4.09	-2.49	0.93	-16.73	-18.30
%Δ in Consumer Surplus	-2.35	0.09	-13.26	-4.54	1.20	3.78	8.98	2.91	-1.71	0.45	-12.51	-3.76
%Δ POS Spend/Year	3.07	3.29	1.59	2.00	0.65	1.18	0.50	0.61	1.94	2.07	0.92	1.17

Notes: Each cell reports the change induced by moving to the counterfactual scenario, for the average enrollee in each column. "ΔShare Preferred" indicates the change in "preferred" pharmacy market share, in percentage points. "Δ in Consumer Surplus ($)" is in dollars per enrollee-year. All other cells are percentage changes; e.g., comparing simulated counterfactual OOP spending per enrollee-year to baseline observed OOP spending per enrollee-year. For illustrative purposes, OOP spending shown without the behavioral demand response (i.e., counterfactual OOP prices, but observed shares), and with the behavioral response (counterfactual prices *and* shares).

Table A.16: Policy Impact – Full Networks Counterfactuals

	Non-LIS	LIS	All
Panel A: Full Pharmacy Networks			
Δ in Consumer Surplus ($)	1.35	0.53	1.05
%Δ in Consumer Surplus	0.20	0.37	0.22
Panel B: Full Pharmacy Networks, No Preferred Contracting			
Δ in Consumer Surplus ($)	-28.32	4.77	-16.38
%Δ in Consumer Surplus	-4.15	3.33	-3.36

Notes: Each cell reports the change induced by moving to the counterfactual scenario indicated, for the average enrollee in each column. For each "Full Pharmacy Networks" counterfactual, we add to each market (plan-quarter-ZIP-LIS-age group-tier combination) the full set of *out-of-network* pharmacies frequented by *any enrollee* in that market's 3-digit ZIP code in the same calendar quarter. Panel A: counterfactual impact of adding all relevant excluded pharmacies to the plan's *non-preferred* pharmacy network. Panel B: counterfactual impact of adding all excluded pharmacies to the plan's overall pharmacy network and shutting down preferred pharmacy distinctions as in Table 10.

Table A.17: POS Price Adjustments When Plans Adopt Preferred Pharmacy Networks

	Tier 1	Tier 2	Tier 3	All
1{Preferred-Network Plan}	-0.0145***	-0.0772***	-0.270***	-0.0741**
	(0.00146)	(0.00931)	(0.0284)	(0.0331)
N	66,976	66,976	66,976	200,928

Notes: Estimates and standard errors from a regression of simulated POS price per day on 1{Preferred-Network Plan}, controlling for plan and quarter-year-region fixed effects. POS price per day simulated by applying average observed point-of-sale price per day supply for each plan-NDC-year and preferred status, to the claims of the same random sample of 1,000 enrollees in each LIS/age group/year used for *OOPC*, as described in text. POS price thus varies only with plan, quarter-year, enrollee type, drug tier, and pharmacy preferred status. Regression pools non-LIS and LIS beneficiaries, and considers preferred pharmacy prices only.