Web Appendix
For "Consumer Inertia and Firm Pricing in the Medicare Part D Prescription Drug Insurance Exchange"

Keith M Marzilli Ericson

A.1 Theory Appendix

A.1.1 Optimal Pricing for Multiproduct Firms

Firms offering multiple plans face the same invest-then-harvest pricing incentive as the single plans firms do. Section II shows the simple single product case; here we generalize to firms offering more than one plan. Let a firm offer plans A and B. The firm takes into account the effect plan A's price p_A has on profits from plan B.The firm's maximization problem is then:

$$\max_{p_A} \left[\left(p_A - c_A \right) s_A + \delta V_A \left(s_A \right) \right] + \left[\left(p_B - c_B \right) s_B + \delta V_B \left(s_B \right) \right]$$

(Note that I have dropped the j, t subscripts for clarity, and use s_i to refer to enrollment in plan i). The first order condition is given by

$$p_A - c_A = \frac{1}{-ds_A/dp_A} \left[s_A + \frac{ds_B}{dp_A} \left[p_B - c_B + \delta V_B' \right] \right] - \delta V_A' \left(s_A \right)$$

First, note that when the cross price elasticity $\frac{ds_B}{dp_A} = 0$, this reduces to the equation for the single product firm from Section II. Second, since the cross-price effect $\frac{ds_B}{dp_A} \geq 0$, this term leads to higher prices, as the firm internalizes the profits lost when enrollees switch away from plan B. But this term is present throughout the lifecycle of plan A, leading to higher initial prices and higher later prices. When inertia makes the demand curve ds_A/dp_A less elastic in later years, prices should still rise, unless the cross price effect $\frac{ds_B}{dp_A}$ or profitability per enrollee of plan B decreases enough to offset the effects of inertia. (The invest-then-harvest theory predicts that markups on plan B should also be rising over time.)

A firm already offering a plan has slightly lower gain to entry, compared to a new firm, as it could partially cannibalize its existing plan. However, the cost of entry will also be lower for existing firms if fixed costs for a second plan are lower than fixed costs for a first plan. So a firm already offering a plan may be more or less likely to introduce a new plan than a new firm is to enter, but the incentives facing both are similar. (However, if a firm can no longer demonstrate its existing plans are sufficiently distinct from a proposed new

plan, CMS will not permit it to introduce the new plan.)

A.1.2 Optimal Pricing with LIS Recipients

This section considers the theoretical predictions for firm pricing that result from acquiring LIS recipients. Consider two firms that are identical, except that one firm has acquired a number of LIS enrollees by pricing just below the price benchmark. This is the situation analyzed in the regression discontinuity design in Section IV. Both types of firms share a common component to their demand curves $s_{jt}(p_{jt})$, which captures the behavior of the standard (non-LIS) enrollees, as well as the potential to capture new LIS auto-enrollees if the firm prices below the benchmark in subsequent years. However, LIS recipients and standard enrollees face different prices and defaults, so acquiring LIS auto-enrollees will alter a firm's incentives when setting prices in subsequent years. The effect of acquiring an LIS recipient on subsequent pricing is theoretically ambiguous.

Firms that price below the benchmark have an additional component to their demand curve: the effective demand of the LIS auto-enrollees, $\tilde{L}(p_j - b)$. The LIS demand curve $\tilde{L}$ is a composite of individual preferences and the automatic switching default, as LIS auto-enrollees are defaulted into a different plan if $p_j > b$, but some of these auto-enrollees may actively choose to stay with their current firm even if defaulted elsewhere. Note than when $p_j < b$, the plan is free to LIS recipients who receive the full subsidy, and their enrollment is relatively insensitive to changes in the firm's price in that region. Hence the demand curve $\tilde{L}$ is relatively flat below b, falls discontinuously at b, and then is more price sensitive above b. However, because the benchmark is unknown when setting prices, firms with LIS recipients face an expected LIS demand curve. Write the demand curve from the firm's perspective as $L(p_j) = E\left[\tilde{L}(p_j - b)\right]$.Imperfect risk adjustment implies that the costs to the firm of non-LIS and LIS recipients may differ, which I refer to as c_N and c_L, respectively. I continue to assume one plan per firm.

Modifying Equation 1 from Section II, a firm with LIS recipients sets prices to maximize:

$$V_{jt} = (p_{jt} - c_N)\, s_{jt} + (p_{jt} - c_L)\left[L_{jt}(p_{jt})\right] + \delta V_{jt+1}(s_{jt}, L_{jt})$$

Then, the firm with LIS recipients has the first order condition:

$$p_{jt} = \frac{s_{jt} + L_{jt}}{-\left(s'_{jt} + L'_{jt}\right)} + \frac{s'_{jt}}{\left(s'_{jt} + L'_{jt}\right)}\left(c_N - \delta\frac{\partial V_{jt+1}(s_{jt}, L_{jt})}{\partial s_{jt}}\right) + \frac{L'_{jt}}{\left(s'_{jt} + L'_{jt}\right)}\left(c_L - \delta\frac{\partial V_{jt+1}(s_{jt}, L_{jt})}{\partial L_{jt}}\right)$$

where the derivatives s'_{jt} and L'_{jt} are taken with respect to price. This equation shows that price is equal to a markup term based on market share, plus a term for each type of

enrollee, weighted by the relative steepness of their expected demand curves, that captures that enrollee type's present costs and future profitability.

Comparing this condition to that for firms without LIS recipients (Equation 1) shows that acquiring LIS recipients has an ambiguous effect on firm pricing.[46] Consider the simplest case, in which firms are concerned only about this present period's profit ($\delta = 0$) and costs of the two types of individuals are the same ($c_N = c_L$). Then, theory predicts that the price will be higher for the firms with LIS recipients if the *expected* LIS enrollment is less price elastic than the enrollment of non-LIS individuals ($\frac{-L'_{jt}}{L_{jt}} > \frac{-s'_{jt}}{s_{jt}}$), and lower if the expected LIS enrollment is more elastic. This elasticity depends not only on the behavior of LIS recipients, but also on the firm's (unobserved) subjective probability distribution of the location of the benchmark.

The costs of LIS recipients are higher, due to a failure of risk adjustment, and so prices for firms with LIS recipients can be higher even if expected LIS enrollment is more price elastic (and vice versa). Moreover, firms may believe that acquiring an LIS recipient has less of an effect on their future profits, due to policies (such as the de minimis policy) that may make them less profitable in the future. In such a case, $\frac{\partial V_{jt+1}}{\partial L_{jt}} < \frac{\partial V_{jt+1}}{\partial s_{jt}}$ and optimal pricing is also higher.

A.2 Data Appendix

The Medicare Part D Landscape Source File lists premiums and characteristics for all PDP plans. Plans can be linked from year to year using a contract and plan identifier assigned by the Centers for Medicare & Medicaid Services (CMS). Each contract identifier is linkable to a particular firm, but a firm may have multiple contract identifiers. Crosswalk files describe whether plan is merged into another plan, or is terminated.

Total enrollment data, combining both standard enrollees and LIS recipients, is taken from the Monthly Enrollment by Plan file as of July 1 of each calendar year. The July date is chosen because for 2006 and 2007, only the July Monthly Enrollment by Plan was made public by CMS. CMS has also released figures for the enrollment of LIS recipients by plan, but not at regular intervals. Data on LIS enrollment by plan was available for July of 2006 and 2007 and February of 2008 and 2009.

[46] This discussion considers the case in which the first order condition is satisfied at a single point. However, the first order condition may be satisfied at multiple points, at prices above and below the benchmark, as the expected LIS demand curve is relatively flat above and below the region in which the benchmark is likely to be. Consider the limiting case in which the benchmark is known perfectly ex ante and a firm's existing LIS recipients will stay with their current plan if and only if its price is below benchmark. Then a firm may choose between setting a price just below the benchmark and keeping its LIS recipients, or setting a price substantially above the benchmark and maximizing profits on standard enrollees.

A plan's market share is simply a plan's total enrollment over total enrollment in the state, dropping plans with less than 10 enrollees. Plans with less than 10 enrollees have their enrollment suppressed by Medicare and may not be active. To construct plan market shares of standard (non-LIS enrollment), I subtract each plan's LIS enrollment from its total enrollment, even if these are not taken in the same month (i.e. for 2008 and 2009). Plans with less than 10 LIS enrollees have their LIS enrollment suppressed as well. In these cases, I impute an LIS enrollment of 5 and subtract that from the total enrollment. The resulting estimates of standard enrollment are negative in a small number of cases; these plan-year observations are dropped in the regressions using standard enrollment data.

Firm names are coded as follows. I take the enrollment files, which include PDPs as well as Medicare Advantage plans. For each contract identifier in the enrollment files, I identify the firm name as the CMS "organizational parent" listed for that contract in 2010, or the last year that the contract exists if it attrits before 2010. This system treats subsequently merged firms as one firm, since mergers may be anticipated in pricing. I then hand code the data to combine all forms of a given firm name (e.g. "Universal American Corp.", "Universal American Corporation", and "Universal American Financial Corporation" are all the same firm). These codings are available upon request from the author. Blue Cross and Blue Shield plans act individually to offer Medicare Advantage Plans, but act in alliance to offer PDP plans (e.g., one PDP parent is listed as "BCBS RI & BCBS MA & BCBS VT"). In these cases, I code individual Blue Cross plans in those states as part of that alliance.

The results are not sensitive to the method of firm codings. In regressions using firm fixed effects, coding each contract identifier as a separate firm gives similar results. I have also explored alternative firm codings based on CMS fields for "organizational marketing name" and a variety of treatments for the Blue Cross and Blue Shield plans; results are similar.

A.3 Additional Detail on Medicare Part D

This section gives additional detail on two features of the Medicare Part D program: the calculation of the LIS benchmark amount and the risk-adjustment system.

LIS program recipients receive a regionally determined premium subsidy amount. For each region (state or group of states), the subsidy amount is the greater of a weighted average firm bid or the lowest monthly beneficiary premium for a prescription drug plan that offers basic prescription drug coverage in that PDP region. (Due to the inclusion of Medicare Advantage plans in the calculation of the benchmark, it is possible that no standalone PDP could be below the benchmark). Appendix Figure A.7 shows the evolution of the average

benchmark across time. The average firm bid used in the calculation of the benchmark amount is a weighted average of the monthly beneficiary premiums in each region. For 2006, Medicare Advantage prescription drug (MA-PD) bids were assigned a weight based upon prior enrollment, while PDPs were all assigned equal weight as actual enrollment was not yet available. The same approach was used in 2007. In 2008, CMS began to transition to enrollment-weighting the PDP premiums, so PDP premiums were 50 percent weighted based on prior year's enrollment and 50 percent equal weighted. Beginning in 2009, the PDP premiums were all enrollment weighted. In 2010, the bids for MA-PD were used before they have been reduced by any applicable MA rebates.[47] This had the effect of raising the subsidy slightly.

I assess the accuracy of Medicare Part D risk adjustment by comparing the age-related adjustment factors to average prescription drug spending in the 2007 Medical Expenditure Panel Survey.[48] Because I do not have access to enrollee claim history, I do not evaluate the diagnosis-related risk adjustment model used for existing Medicare Part D enrollees. Instead, I evaluate the age-related adjustment factors for new enrollees who were not originally disabled.

Medicare sets adjustment factors for each sex separately, and for the following age categories: 65, 66, 67, 68, 69, 70-74, 75-79, 80-84, 85-89. (It also sets age adjustments for individuals above age 90, but I ignore these as the MEPS does not report spending for individuals above age 90). For each age category, I combine the male and female adjustment factors using a weight of 0.5747 for women and 0.4253 for men, which are the relative fractions of women and men over age 65 in the 2007 MEPS data.

To produce estimates of prescription drug spending, I use the 2007 MEPS data ("Table 2: Prescription Medicines"). I construct population figures and mean prescription drug spending per person in each of the same age categories used for Medicare Part D's age-related risk adjustment factor. These estimates are imperfect measures of insurer costs, as they give total prescription drug spending, rather than the total prescription drug spending covered by the insurer. However, these two quantities are likely to move together.

These data indicate that the average prescription drug spending for the population aged 65-89 is $2122, and that the average risk adjustment factor for a firm enrolling a representative sample of the non-disabled population aged 65-89 is 0.9425.

[47] For more details, see "Medicare Prescription Drug Benefit Manual: Chapter 13 - Premium and Cost-Sharing Subsidies for Low-Income Individuals." Rev. 9, Feb. 5, 2010. http://www.cms.gov/PrescriptionDrugCovContra/Downloads/R7PDB.pdf

[48] Agency for Healthcare Research and Quality. Prescription Medicines-Mean and Median Expenses per Person With Expense and Distribution of Expenses by Source of Payment: United States, 2007. Medical Expenditure Panel Survey Household Component Data. Generated interactively. (August 25, 2010)

Now consider a firm that has only enrollees aged 70 to 89, in their population relative weights. This would be the experience of a firm that initially introduced a plan 5 years prior, enrolled a representative fraction of the population aged 65-89, and subsequently acquired no new enrollees. Assuming average mortality, the firm's population distribution 5 years later would mirror that of the population, except it would have no individuals aged 65-69. The average prescription drug spending for that population (aged 70-89) is $2177, and the average risk adjustment factor is 0.9719.

Thus, these results indicate that as a population ages by five years and experiences average mortality, average prescription drug spending increases by 2.6 percent. This is matched by age-related risk adjustment that increases by 3.1 percent. There is no evidence that the age-related risk adjustment in Medicare Part D is insufficient.

A.4 Bounds on Elasticities

Chetty (2012) shows that in the presence of optimization frictions such as adjustment costs, elasticities are not point identified, but bounded. An optimization friction leads to some deviation from an individual's optimal choice. Chetty shows that if the utility loss of the deviation is bounded, bounds on structural elasticities can be derived from observed behavior. Consider an optimization friction that has utility costs of fraction γ of spending on health insurance. In this context, take $\gamma = 0.1$ since switching costs of $50 are about 10 percent of annual premiums.

Given an observed elasticity $\hat{\eta} < 0$ and optimization friction δ, the lower and upper bound elasticities η_L, η_U consistent with the observed elasticity are given by (Chetty 2012)[49]:

$$\begin{aligned} \eta_L &= \hat{\eta} - \frac{4\gamma}{(\Delta \ln p)^2}(1-\rho), \\ \eta_U &= \hat{\eta} - \frac{4\gamma}{(\Delta \ln p)^2}(1+\rho) \end{aligned}$$

with

$$\rho = \left(1 + \frac{1}{2}\frac{-\hat{\eta}}{\gamma}(\Delta \ln p)^2\right)^{1/2}$$

For a 50 percent tax, $\Delta \ln p = 0.41$. Take $\hat{\eta} = -0.07$. Then bounds are given by $\eta_L = -9.02 \times 10^{-4}$ and $\eta_U = -5.01$.

[49] These formulas differ slightly from those in Chetty (2012), as he uses η to represent the negative of the elasticity.

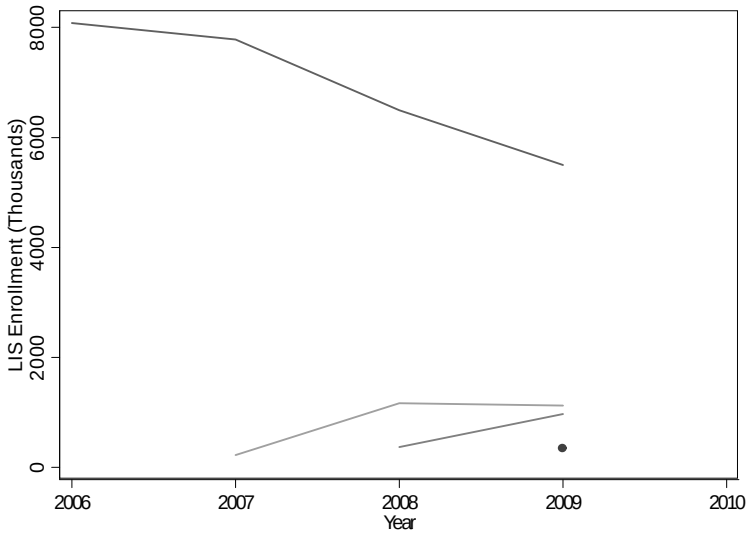

Figure A.1: Aggregate LIS Enrollment, by Year and Cohort of Plan. 2009 cohort indicated by circular marker. See Appendix Section A.2 for details on data construction.

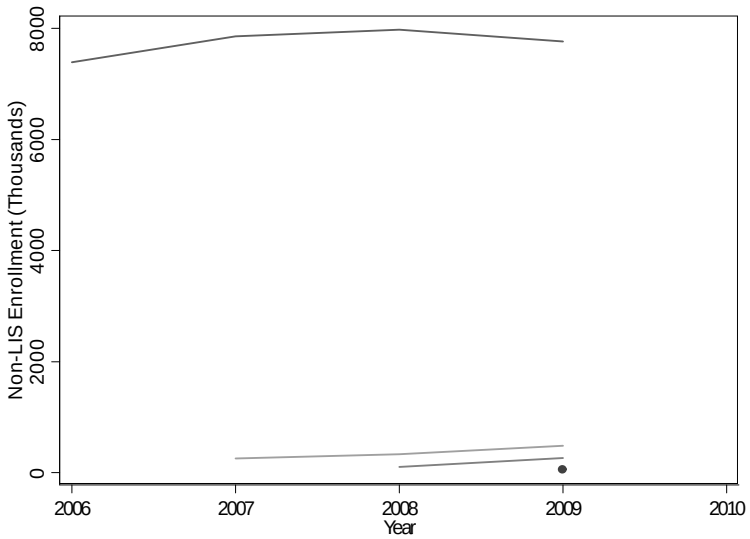

Figure A.2: Aggregate Non-LIS Enrollment, by Year and Cohort of Plan. 2009 cohort indicated by circular marker. See Appendix Section A.2 for details on data construction.

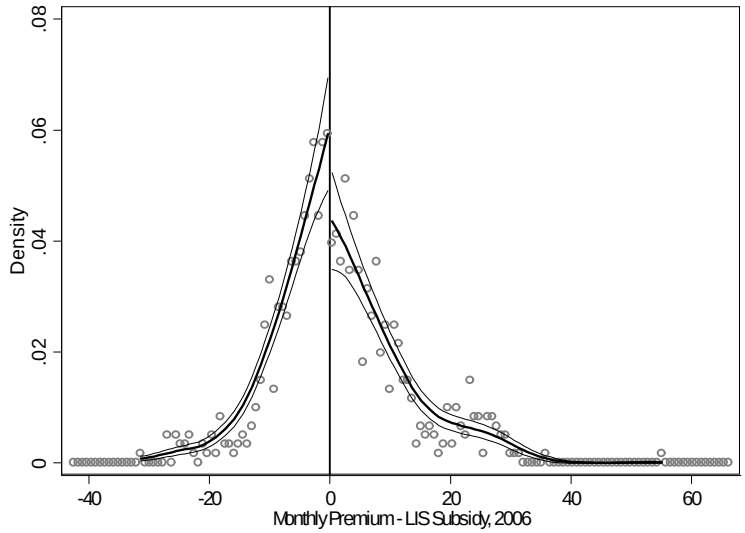

Figure A.3: Test for Density Discontinuity of the Forcing Variable. Dots are density with binsize of 0.74. Lines show smoothed density and standard errors as calculated in McCrary (2008).

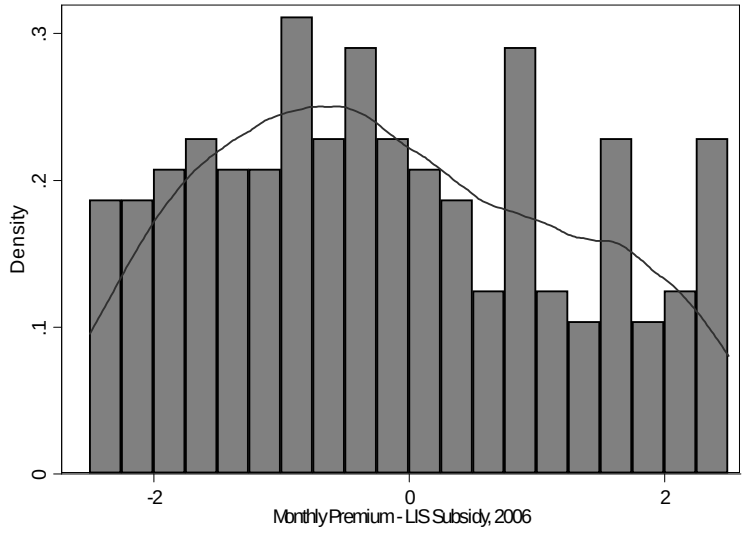

Figure A.4: Histogram of Forcing Variable. Bin width is 0.25. Overlaid with Epanechnikov kernel density. Sample: Basic Plans in 2006.

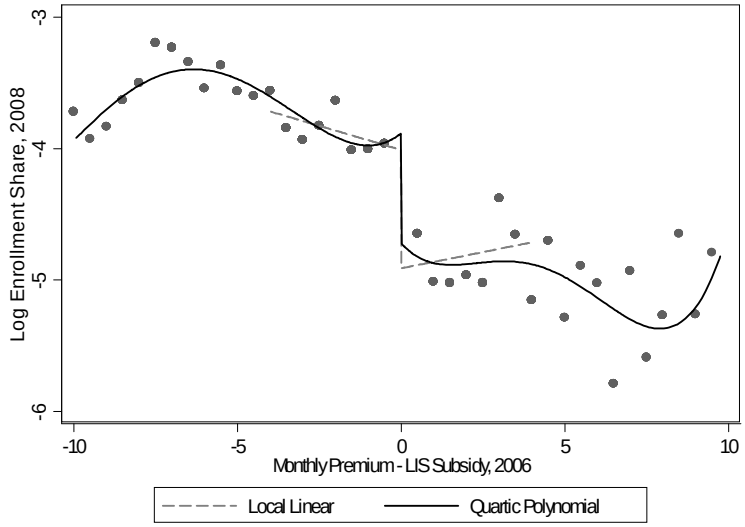

Figure A.5: The Effect of 2006 Benchmark Status on 2008 Enrollment. Dots are local averages with a binsize of $0.50. Dashed lines are predictions from local linear regressions with bandwidth of $6. Solid lines are predictions from regressions with a cubic polynomial with a bandwidth of $10.

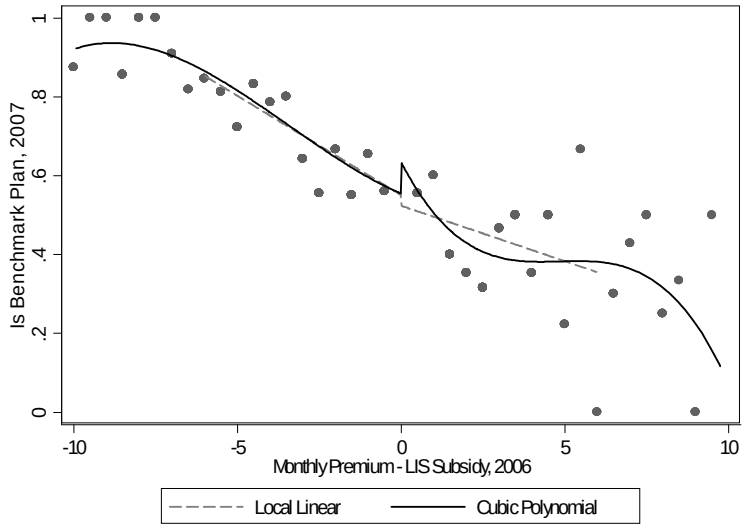

Figure A.6: The Effect of 2006 Benchmark Status on 2007 Benchmark Status. Dependent variable equals 1 if plan is below benchmark or is a de minimis plan in 2007. Dots are local averages with a binsize of $0.50. Dashed lines are predictions from local linear regressions with bandwidth of $6. Solid lines are predictions from regressions with a cubic polynomial with a bandwidth of $10.

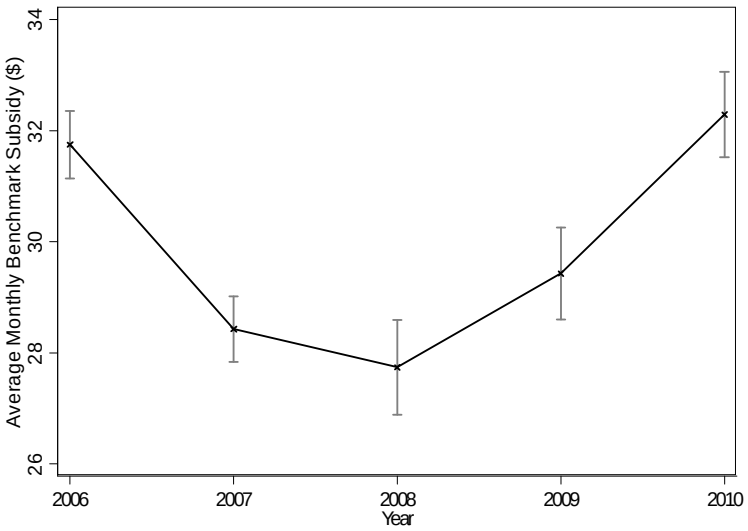

Figure A.7: Average LIS Benchmark Subsidy Level. Equal weighted average over each PDP region (state or group of states). Standard errors are in grey. Source: Author's calculations from CMS data.

Table A.1: Descriptive Statistics: Basic Part D Plans Only

	Cohort (Year of Plan Introduction)				
	2006	2007	2008	2009	2010
Mean monthly premium	$ 33	$ 31	$ 25	$ 30	$ 31
	(11)	(9)	(5)	(5)	(7)
Mean deductible	$ 156	$ 191	$ 262	$ 259	$ 310
	(116)	(118)	(56)	(97)	(0)
Fraction of plans offerred by firms already offering a plan...					
...in the U.S.	0.00	0.70	0.98	1.00	0.97
...in the same state	0.00	0.39	0.89	0.67	0.61
N Unique Firms	50	30	12	4	4
N Plans	821	374	84	66	33

Source: Author's calculations from CMS Landscape Source Files. Plan characteristics are taken from the year the plan was introduced (e.g. premium in plan's first year). Standard deviations in parentheses.

Table A.2: Response to Contemporaneous and Past Prices: 2009

	(1) $\ln s_{2009}$	(2) $\ln s_{2009}$	(3) $\ln s_{2006}$	(4) $\ln s_{2009}$	(5) $\ln s_{2009}$	(6) $\ln s_{2006}$
Premium in 2009	0.0120	-0.0103		-0.0628***	-0.0516**	
	(0.0211)	(0.0233)		(0.0106)	(0.0190)	
Premium in 2006	-0.0703***		-0.155***	-0.0620**		-0.233***
	(0.0151)		(0.0276)	(0.0245)		(0.0332)
Type of Basic Plan	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	Yes	Yes	Yes
N	308	308	301	308	308	301
R^2	0.707	0.460	0.639	0.888	0.803	0.848

OLS regression. Dependent variable: log of plan market share for non-LIS enrollees in a year. Sample: basic PDP plans that were introduced in 2006, and that do not attrit or switch to or from enhanced benefit type before 2009. Plans are dropped from the regression if they have fewer than 10 total enrollees or if estimated enrollment net of LIS is negative. See Appendix Section A.2 for more details. In all columns, state fixed effects and benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative) are included, and for Basic Alternative plans, deductible bins of \$0, \$1 to \$50,\$51 to \$100 ..., are included. In columns 1 and 4, controls are included separately for type of basic plan and deductible in both 2006 and 2009. Indicators for pricing below the LIS benchmark are also included, separately for 2006 and 2009. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A.3: Response to Contemporaneous and Previous Prices

	(1) $\ln s_{2009}$	(2) $\ln s_{2009}$	(3) $\ln s_{2009}$	(4) $\ln s_{2009}$
Premium in 2009	-0.0142	-0.0557***	-0.0137	-0.0382***
	(0.0233)	(0.0190)	(0.0126)	(0.00847)
Premium in 2008	0.0201	-0.0447	-0.00242	-0.00259
	(0.0242)	(0.0289)	(0.0267)	(0.00873)
Premium in 2007	0.0168	0.0155	0.0308	0.0319*
	(0.0403)	(0.0462)	(0.0253)	(0.0173)
Premium in 2006	-0.0630***	-0.0603**	-0.0706***	-0.0437**
	(0.0179)	(0.0290)	(0.0126)	(0.0164)
Type of Basic Plan: all lags	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	Yes	No	Yes
Enhanced Plans Included?	No	No	Yes	Yes
N	308	308	878	878
R^2	0.798	0.893	0.576	0.831

OLS regression. Dependent variable: log of plan market share for non-LIS enrollees in a year. Sample in columns 1 and 2: basic PDP plans that were introduced in 2006, and that do not attrit or switch to or from enhanced benefit type before 2009. Sample in columns 3 and 4: all plans that do not attrit from the sample before 2009. Plans are dropped from the regression if they have fewer than 10 total enrollees. See Appendix Section A.2 for more details. In all columns, state fixed effects and benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative) are included for a plan's characteristics in each year, and for Basic Alternative plans, deductible bins of \$0, \$1 to \$50,\$51 to \$100 ..., are included for each year. In columns 3 and 4, indicators for enhanced plan and level of deductible are also included. Indicators for pricing below the LIS benchmark are also included, separately for each year. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.4: Balanced Covariates at Cutoff

	Is AE	Is DS	Deductible	Is AE	Is DS	Deductible
	Bandwidth $10			Bandwidth $4		
Below Benchmark, 2006	-0.0776	0.0343	-2.038	-0.148	0.137*	-2.673
	(0.15)	(0.095)	(44.8)	(0.10)	(0.079)	(34.2)
Premium - Subsidy, 2006						
... Below Benchmark	0.0334	-0.0111	2.536	-0.0197	0.0286	-5.439
	(0.025)	(0.010)	(5.07)	(0.030)	(0.026)	(5.46)
... Above Benchmark	0.00829	-0.00154	5.920	0.00420	0.0229	10.40
	(0.024)	(0.016)	(5.72)	(0.045)	(0.023)	(6.64)
N | R^2	593 | 0.08	593 | 0.02	593 | 0.04	306 | 0.01	306 | 0.01	306 | 0.01
	Bandwidth $6			Bandwidth $2.50		
Below Benchmark, 2006	-0.101	0.0805	2.926	-0.182*	0.0560	-29.44
	(0.11)	(0.072)	(35.7)	(0.10)	(0.074)	(32.3)
Premium - Subsidy, 2006						
... Below Benchmark	0.0231	0.00122	0.383	-0.0928	0.0525	-10.37
	(0.028)	(0.013)	(4.14)	(0.058)	(0.058)	(13.5)
... Above Benchmark	-0.00129	0.00926	8.340*	0.0308	-0.0821	-16.05
	(0.030)	(0.020)	(4.51)	(0.067)	(0.049)	(16.5)
N | R^2	421 | 0.03	421 | 0.01	421 | 0.02	193 | 0.02	193 | 0.03	193 | 0.01

OLS regression. Dependent variables: Is AE =1 if plan is an Actuarially Equivalent basic plan. Is DS =1 if plan is a Defined Standard basic plan. Deductible: is each plan's yearly deductible. Sample: basic PDP plans with premiums within the bandwidth window in 2006. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.5: Attrition by Benchmark Status in 2006

	Fraction of Plans with Last Year of:				
		2006	2007	2008	2009
\$10 Window	Below Benchmark 2006:	0.197	0.204	0.253	0.305
	Above Benchmark 2006:	0.034	0.034	0.231	0.383
\$6Window	Below Benchmark 2006:	0.077	0.082	0.142	0.219
	Above Benchmark 2006:	0.004	0.004	0.235	0.370
\$4 Window	Below Benchmark 2006:	0.045	0.053	0.120	0.211
	Above Benchmark 2006:	0.006	0.006	0.254	0.382
\$2.50 Window	Below Benchmark 2006:	0.048	0.048	0.120	0.217
	Above Benchmark 2006:	0.000	0.000	0.236	0.336

A plan attrits if it is terminated or merged into another plan.

Table A.6: LIS Benchmark Status in 2006 Interacted with Subsequent Benchmark Status

$\ln s_t$	2007	2008	2009	2010
	Polynomial with controls, bandwidth \$4			
Benchmark or de minimis in:	(omitted category: not in 2006 or current year)			
...2006 and current year	2.301***	3.279***	2.198***	1.379***
	(0.409)	(0.674)	(0.270)	(0.383)
...2006 but not current year	0.906**	1.000**	0.728*	-0.0454
	(0.349)	(0.438)	(0.359)	(0.244)
...current year but not 2006	0.623**	2.187***	1.628***	1.471***
	(0.262)	(0.391)	(0.283)	(0.225)
Premium in Current Year	-0.0529**	0.0254*	-0.0561**	-0.0496***
	(0.0245)	(0.0144)	(0.0219)	(0.00752)
Premium - Subsidy, 2006	Quadratic	Quadratic	Quadratic	Quadratic
N	299	298	246	212
R^2	0.743	0.697	0.815	0.896

OLS regression. Dependent variable: log of total plan market share (including LIS enrollees) in a year. Sample: basic PDP plans with premiums within the bandwidth window (\$4 on either side of the benchmark) in 2006. In "Polynomial with controls", regressions include state and firm fixed effects, and 2006 benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative). For Basic Alternative plans, deductible bins of \$0, \$1 to \$50, \$51 to \$100 ..., are included. Premium minus subsidy is included as a polynomial separately above and below the benchmark. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses.*** p<0.01, ** p<0.05, * p<0.1.

Table A.7: Effect of LIS Benchmark Status in 2006 on Premiums in Later Years

Premium - Subsidy	2007	2008	2009	2010
	Local linear, bandwidth $6			
Below Benchmark, 2006	-1.172	1.202	-0.0503	-1.737
	(0.907)	(1.891)	(1.841)	(2.486)
Premium - Subsidy, 2006				
... Below Benchmark	0.119	0.162	0.159	-0.185
	(0.282)	(0.282)	(0.218)	(0.332)
... Above Benchmark	-0.247	0.787	0.735	0.541
	(0.452)	(0.577)	(0.567)	(0.869)
N	329	277	203	182
R^2	0.013	0.017	0.046	0.024
	Polynomial with controls, bandwidth $6			
Below Benchmark, 2006	-0.676	-1.307	-0.505	-4.767
	(1.371)	(1.305)	(1.480)	(3.313)
Premium - Subsidy, 2006	Quadratic	Quadratic	Quadratic	Quadratic
N	329	277	203	182
R^2	0.627	0.684	0.638	0.601

OLS regression. Dependent variable: monthly PDP premiums minus state-specific subsidy. Sample: basic PDP plans with premiums within the bandwidth window ($6 on either side of the benchmark) in 2006. In "Polynomial with controls", regressions include state and firm fixed effects, and 2006 benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative). For Basic Alternative plans, deductible bins of $0, $1 to $50, $51 to $100 ..., are included. Premium minus subsidy is included as a polynomial separately above and below the benchmark. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.8: Effect of LIS Benchmark Status in 2006 on Probability of Pricing Below the Benchmark in Later Years

Pr(Below Benchmark or De Minimis)	2007	2008	2009	2010
	Local linear, bandwidth $2.50			
Below Benchmark, 2006	-0.0689	-0.110	-0.165	-0.0984
	(0.0881)	(0.154)	(0.101)	(0.0765)
Premium - Subsidy, 2006				
... Below Benchmark	-0.0232	-0.0502	-0.0607	-0.00564
	(0.0447)	(0.0546)	(0.0645)	(0.0420)
... Above Benchmark	-0.123*	-0.106	-0.128	-0.108*
	(0.0708)	(0.0856)	(0.0873)	(0.0550)
N	189	189	157	138
R^2	0.027	0.020	0.033	0.019
	Polynomial with controls, bandwidth $2.50			
Below Benchmark, 2006	0.0105	-0.0146	-0.118	-0.00212
	(0.0858)	(0.0514)	(0.160)	(0.204)
Premium - Subsidy, 2006	Quadratic	Quadratic	Quadratic	Quadratic
N	189	189	157	138
R^2	0.768	0.778	0.679	0.584

OLS regression. Dependent variable: =1 if plan prices below the benchmark or is classified as a de minimis plan by CMS, =0 if else. Sample: basic PDP plans with premiums within the bandwidth window ($2.50 on either side of the benchmark) in 2006. In "Polynomial with controls", regressions include state and firm fixed effects, and 2006 benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative). For Basic Alternative plans, deductible bins of $0, $1 to $50, $51 to $100 ..., are included. Premium minus subsidy is included as a polynomial separately above and below the benchmark. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A.9: Fraction of Plans that Attrit, by Cohort and Year

Fraction Merged or Terminated					
	Year of Plan Introduction (Cohort)				
	2006	2007	2008	2009	2010
Year merged or terminated					
2006	0.15				
2007	0.07	0.23			
2008	0.06	0.12	0.18		
2009	0.09	0.10	0.09	0.06	
Available until 2010	0.62	0.56	0.73	0.94	1.00
Fraction Terminated					
	Year of Plan Introduction (Cohort)				
	2006	2007	2008	2009	2010
Year terminated:					
2006	0.001				
2007	0.008	0.114			
2008	0.005	0.062	0.173		
2009	0.008	0.011	0.015	0.029	
Never Terminated as of 2010	0.98	0.81	0.81	0.97	1.00

Unit of observation is a plan offered in a PDP-region in a year (state or group of states). A plan is merged if its unique identifier leaves the data, but is combined into another plan.

Table A.10: Medicare Part D Premiums By Plan Age: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)
	ln(Monthly Premium)				Monthly Premium ($)	
Year of Plan Existence						
...2nd Year	0.0382	-0.0324	-0.00244	0.0250	1.201	0.480
	(0.0234)	(0.0226)	(0.0491)	(0.0766)	(1.627)	(0.897)
...3rd Year	0.0925*	-0.00625	0.0340	0.167**	2.678	2.562***
	(0.0505)	(0.0341)	(0.0723)	(0.0738)	(2.064)	(0.711)
...4th Year	0.112	-0.00734	0.0820	0.219**	5.290***	4.711**
	(0.0739)	(0.0618)	(0.120)	(0.102)	(1.573)	(1.786)
...5th Year	0.143**	0.0640	0.119	0.229*	4.495**	3.999*
	(0.0618)	(0.0506)	(0.163)	(0.123)	(1.706)	(2.057)
Type of Plan	Yes	Yes	Yes	Yes	Yes	Yes
Additional Fixed Effects	Firm x Year	Firm x Year	Firm	Firm	Firm	Firm
Weighting	Equal	Enrollment	Equal	Enrollment	Equal	Enrollment
Includes Enhanced Plans	No	No	Yes	Yes	No	No
N	4,276	4,123	8,382	8,185	4,276	4,123
R^2	0.782	0.863	0.475	0.609	0.418	0.695

All regressions include state fixed effects interacted with year fixed effects. Controls for type of basic plan include benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative) interacted with year fixed effects. For basic alternative and enhanced plans, controls for deductible in bins of $0, $1 to $50,$51 to $100 ..., are also included and interacted with year fixed effects. In regressions with enhanced plans, indicators for enhanced benefit type are also included. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A.11: Medicare Part D Premiums By Plan Age: Robustness

	(1)	(2)	(3)	(4)	(5)	(6)
	ln(Monthly Premium)					
Year of Plan Existence						
...2nd Year	0.0911	0.0183	0.0456	0.0130	0.0229	0.0663
	(0.0672)	(0.0438)	(0.0441)	(0.0611)	(0.0690)	(0.0583)
...3rd Year	0.130	0.0960***	0.0985*	0.0530	0.0865	0.0932
	(0.0976)	(0.0307)	(0.0524)	(0.0739)	(0.137)	(0.0787)
...4th Year	0.121**	0.134***	0.147***	0.129**	0.182	
	(0.0595)	(0.0479)	(0.0537)	(0.0579)	(0.250)	
...5th Year	0.337***	0.0884	0.0905	0.0805	0.308	
	(0.104)	(0.0636)	(0.0567)	(0.0711)	(0.354)	
Fixed Effects	Firm	Firm	Firm	Firm	Firm	Firm
N	1,043	3,233	4,103	3,522	4,106	2,699
R^2	0.660	0.438	0.435	0.399	0.101	0.177
Sample	Never benchmark	Ever benchmark	Excludes Humana	Excludes 3 "gamers"	Enhanced only	2006-08 only

All regressions include state fixed effects interacted with year fixed effects. Controls for type of basic plan include benefit type indicators (Defined Standard, Actuarially Equivalent Standard, or Basic Alternative) interacted with year fixed effects. For basic alternative and enhanced plans, controls for deductible in bins of \$0, \$1 to \$50,\$51 to \$100 ..., are also included and interacted with year fixed effects. Never/ever benchmark regressions split the sample based on whether a plan was every below the LIS benchmark. Excludes 3 "gamers" regression excludes Aetna, CVS, and Medco, identified by Decarolis (2012) as displaying suspicious behavior. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.