Consumer Inertia and Firm Pricing in the Medicare Part D Prescription Drug Insurance Exchange

Keith M. Marzilli Ericson

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- Medicare Part D established a marketplace in which firms compete to provide prescription drug insurance plans, a competitive insurance exchange.
- Premium growth in recent years has outpaced growth in drug cost.

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- Strategic firm responses to inertia can explain this pattern.

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How do firms interact with consumers on an insurance exchange (Stand-Alone Prescription Drug Plans) in the presence of inertia?

- **Theory:** firm pricing when individuals are subject to switching frictions.

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  - **Regression discontinuity** design to test for inertia among LIS recipients. ($\sim$ 52% of the market falls into Low-Income Subsidy Program)
- Tests the predictions of the theory for firm pricing.

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- In the presence of switching frictions initial defaults have lasting effects in the Medicare Part D prescription drug insurance exchange.

Preview of Findings

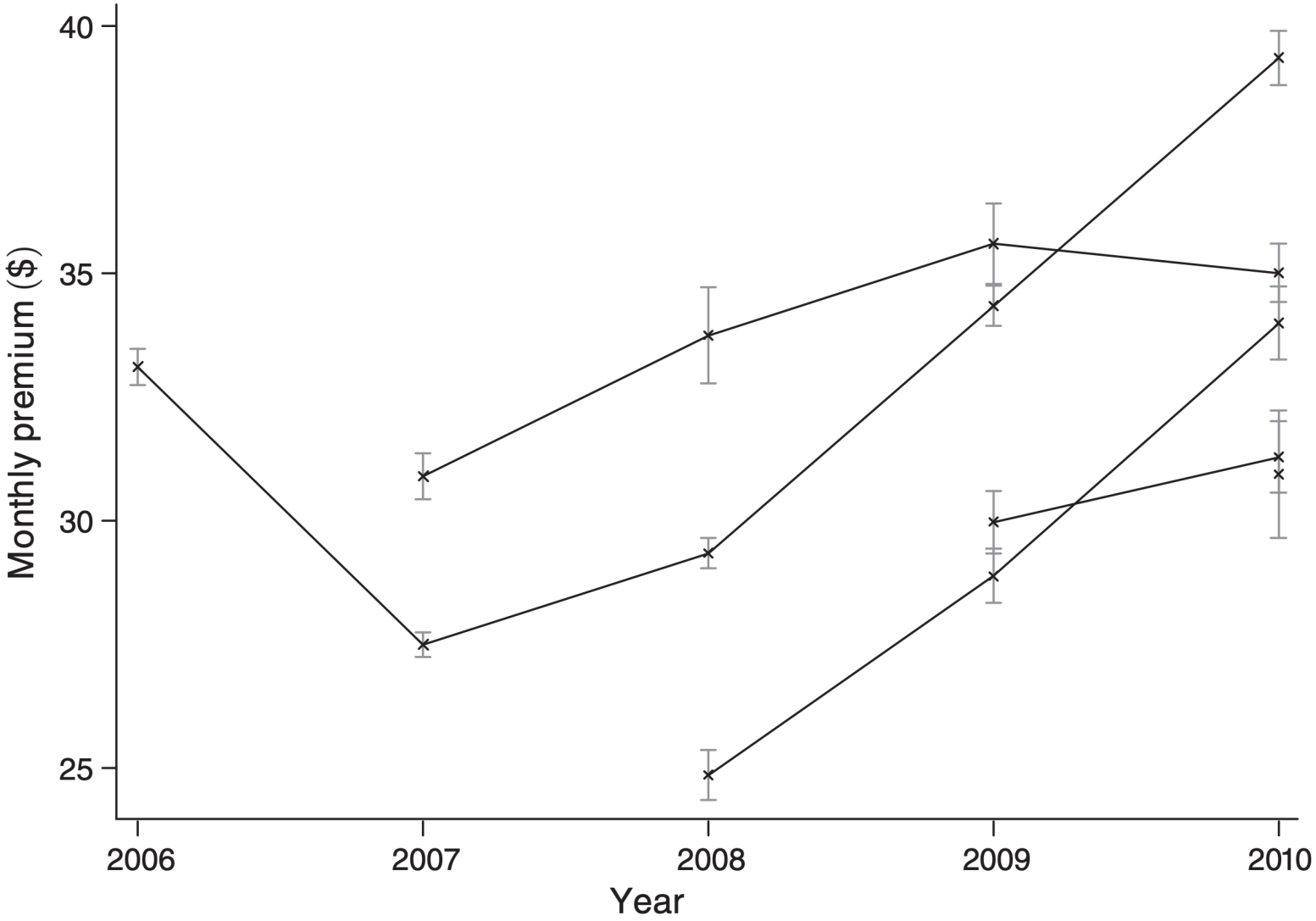

FIGURE 5. EVOLUTION OF COHORT PREMIUMS OVER TIME

Preview of Findings

- Since firms cannot commit to future prices, they should respond to inertia by raising prices on existing enrollees, while introducing cheaper alternative plans.
- Older plans in this market are about 10% more expensive than comparable newly introduced plans.

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Stand-Alone PDPs

- stay in the same plan from year-to-year regardless of firm price changes.

LIS

- defaulted into plans selected at random from the set of plans below a price benchmark.

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Expected behavior: "bargains-then-profits" pattern. Products initially sold at low (even below marginal) cost. $\Rightarrow$ jack up the prices in later periods.

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- Form of the insurance contract is fixed $\sim$ basic plans.
- Firms offer policies for one period. No commitment to future premiums levels.

Model

Firms seek to maximize the expected discounted present value of profits V_{jt}

$$\max_{p_{jt}} V_{jt} = (p_{jt} - c_{jt})\, s_{jt} + \delta V_{jt+1}(s_{jt})$$

- Value of the firm is given by flow profits and future profits in the recursive equation
- firms are infinitely lived with discount factor δ.

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- $p_{jt} \Rightarrow$ Price of firm's j plan at time t

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$$\max_{p_{jt}} V_{jt} = (p_{jt} - c_{jt})\, s_{jt} + \delta V_{jt+1}(s_{jt})$$

- $c_{jt} \Rightarrow$ Expected cost of enrollee, net of risk adjustment, of firm's j at time t

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- $s_{jt} \Rightarrow$ Quantity sold, function of current and past market share, of firm's j at time t

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$$p_{jt} - c_{jt} = \frac{s_{jt}}{-ds_{jt}/dp_{jt}} - \delta \frac{dV_{jt+1}(s_{jt})}{ds_{jt}}$$

- $ds_{jt}/dp_{jt} \Rightarrow$ firm's demand curve, which is the sum of three types of individual's demand

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- Potential repeated costumers likely have relatively inelastic demand. Thus, older plans will face more inelastic demand and optimally set higher prices than newer plans.

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- Variation:
  - Premiums for basic plans

Data

TABLE 1—DESCRIPTIVE STATISTICS OF MEDICARE PART D PLANS

	Cohort (Year of plan introduction)				
	2006	2007	2008	2009	2010
Mean monthly premium	$37	$40	$36	$30	$33
	(13)	(17)	(20)	(5)	(9)
Mean deductible	$92	$114	$146	$253	$118
	(116)	(128)	(125)	(102)	(139)
Fraction enhanced benefit	0.43	0.43	0.58	0.03	0.69
Fraction of plans offered by firms already offering a plan . . .					
…in the United States	0.00	0.76	0.98	1.00	0.97
…in the same state	0.00	0.53	0.91	0.68	0.86
Number of unique firms	51	38	16	5	6
Number of plans	1,429	658	202	68	107

Notes: Plan characteristics are taken from the year the plan was introduced (e.g., premium in plan's first year). Standard deviations in parentheses.

Source: Author's calculations from CMS Landscape Source Files.

Data

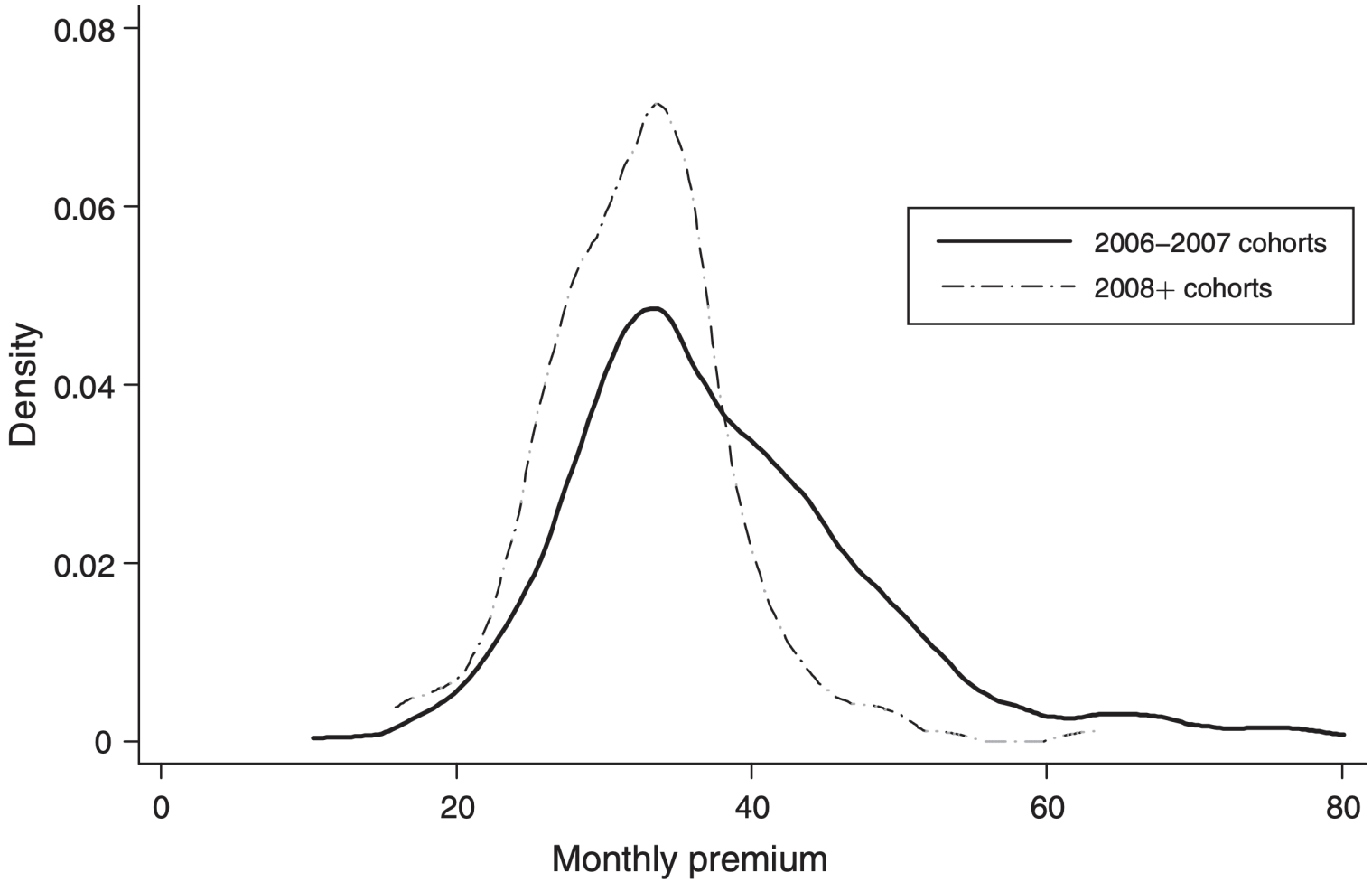

FIGURE 1. DISTRIBUTION OF BASIC PDP PLAN PREMIUMS IN 2010, BY YEAR OF PLAN INTRODUCTION

Note: Epanechnikov kernel density.

Data

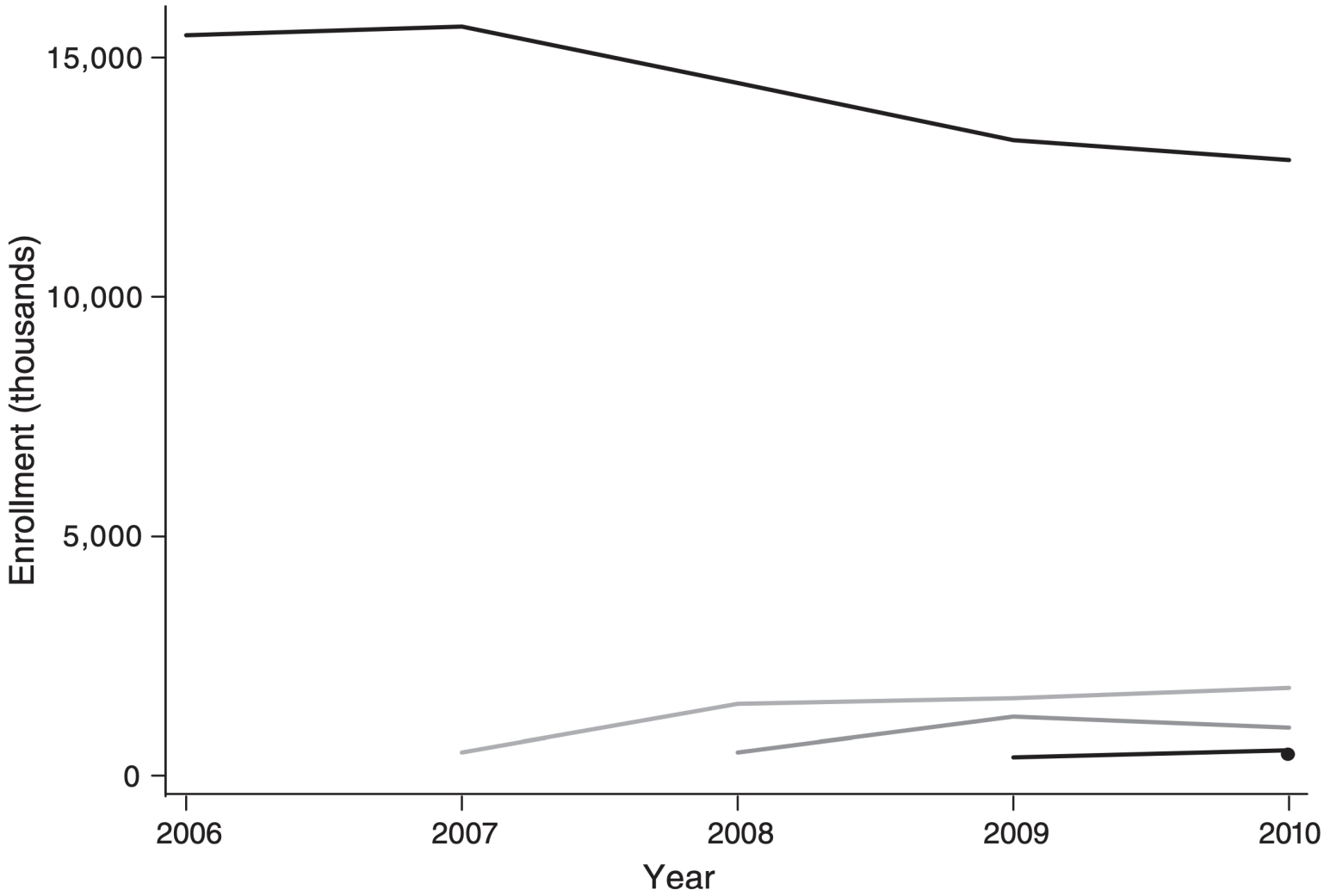

FIGURE 2. TOTAL PDP ENROLLMENT, BY YEAR AND COHORT OF PLAN

Notes: Each line traces the total enrollment of each cohort of plans over time. The enrollment of the 2010 cohort is indicated by a circular marker. Total enrollment includes both stan-

Identification: First half of the market

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Inertia predicts: $\alpha_2 < 0$. Higher past prices induce lower enrollment, which persists into later periods.

Identification: First half of the market

TABLE 2—RESPONSE OF ENROLLMENT TO CONTEMPORANEOUS AND PAST PRICES: 2007

	$\ln s_{2007}$ (1)	$\ln s_{2007}$ (2)	$\ln s_{2006}$ (3)	$\ln s_{2007}$ (4)	$\ln s_{2007}$ (5)	$\ln s_{2006}$ (6)
Premium in 2007	−0.0971***	−0.146***		−0.0899***	−0.105***	
	(0.0308)	(0.0447)		(0.0285)	(0.0335)	
Premium in 2006	−0.0773***		−0.140***	−0.0694***		−0.173***
	(0.0185)		(0.0281)	(0.0222)		(0.0254)
Type of basic plan	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Observations	560	560	553	560	560	553
R^2	0.648	0.484	0.552	0.827	0.800	0.757

Notes: 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 2007. Plans are dropped from the regression if they have fewer than 10 total enrollees or if estimated enrollment net of LIS is negative. See online 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 2007. Indicators for pricing below the LIS benchmark are also included, separately for 2006 and 2007. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Identification: Low-Income Subsidy Inertia

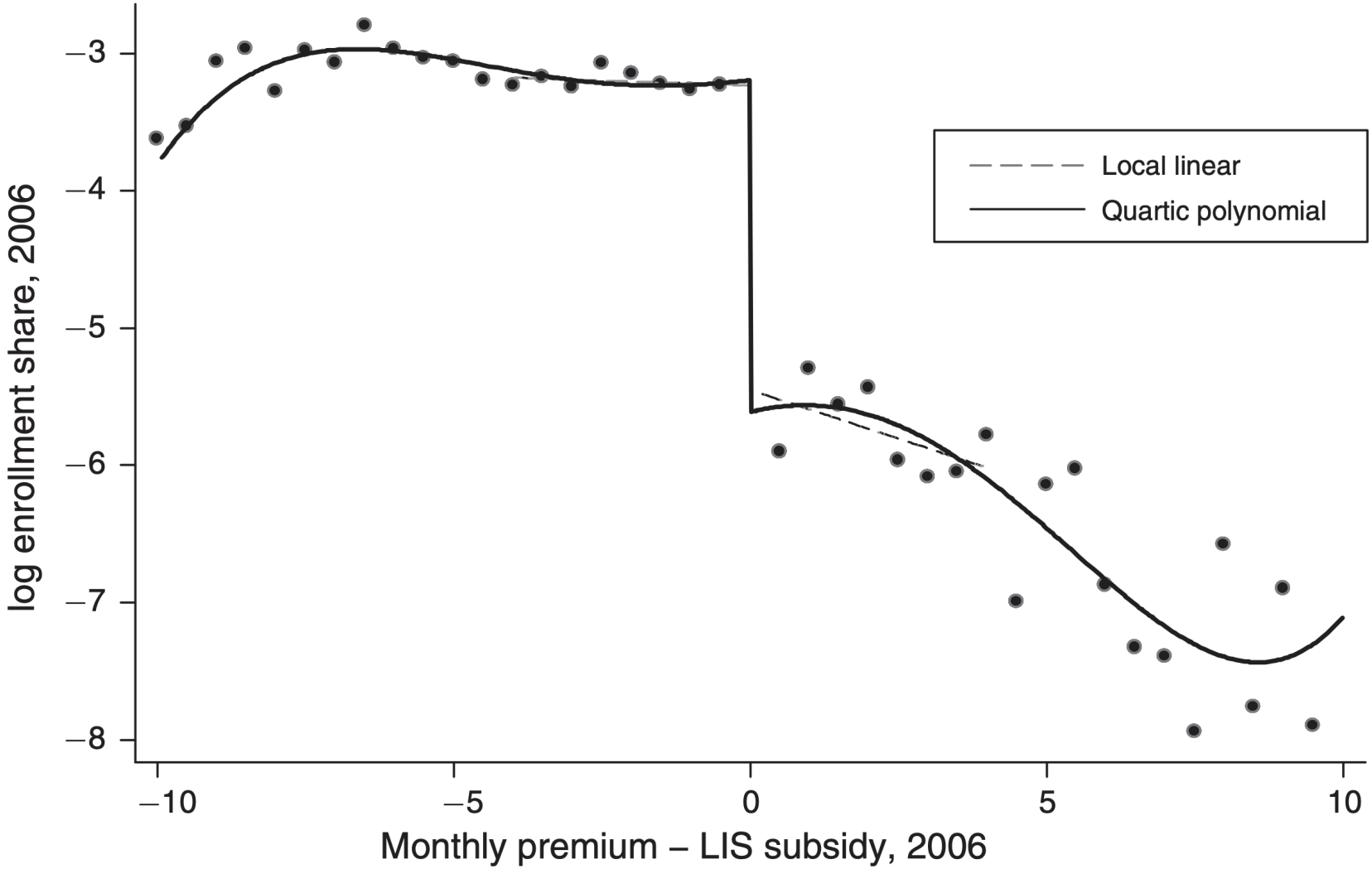

FIGURE 3. THE EFFECT OF 2006 BENCHMARK STATUS ON 2006 ENROLLMENT

Notes: Dots are local averages with a bin size of $0.50. Dashed lines are predictions from local linear regressions with bandwidth of $4. Solid lines are predictions from regressions with a

Identification: Low-Income Subsidy Inertia

TABLE 3—EFFECT OF LIS BENCHMARK STATUS IN 2006 ON PLAN ENROLLMENT

$\ln s_t$	2006	2007	2008	2009	2010
Panel A. Local linear, bandwidth $4					
Below benchmark, 2006	2.224***	1.332***	0.902***	0.803**	0.677
	(0.283)	(0.267)	(0.248)	(0.362)	(0.481)
Premium—subsidy, 2006					
Below benchmark	−0.0141	−0.0774	−0.0731	−0.170	−0.215**
	(0.0322)	(0.0882)	(0.116)	(0.105)	(0.0878)
Above benchmark	−0.142*	−0.0331	0.0494	0.0737	0.0488
	(0.0783)	(0.110)	(0.163)	(0.170)	(0.202)
Observations	306	299	298	246	212
R^2	0.576	0.325	0.131	0.141	0.124
Panel B. Polynomial with controls, bandwidth $4					
Below benchmark, 2006	2.464***	1.364***	0.872***	0.351	−0.277
	(0.222)	(0.321)	(0.246)	(0.324)	(0.301)
Premium—subsidy, 2006	Quadratic	Quadratic	Quadratic	Quadratic	Quadratic
Observations	306	299	298	246	212
R^2	0.794	0.576	0.472	0.535	0.685
Panel C. Past interactions, local linear, bandwidth $4					
Below benchmark or de minimis in:					
2006 and current year	2.224***	2.089***	2.377***	2.633***	2.443***
	(0.283)	(0.364)	(0.275)	(0.257)	(0.309)
2006 but not current year		0.628**	0.892**	1.068**	0.967
		(0.293)	(0.329)	(0.446)	(0.625)
Current year but not 2006		0.148	1.356***	2.107***	2.281***
		(0.290)	(0.293)	(0.242)	(0.259)
Premium—subsidy, 2006	Linear	Linear	Linear	Linear	Linear
Observations	306	299	298	246	212
R^2	0.576	0.480	0.426	0.498	0.467

Notes: Each panel is a separate 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 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.

Identification: Low-Income Subsidy Inertia

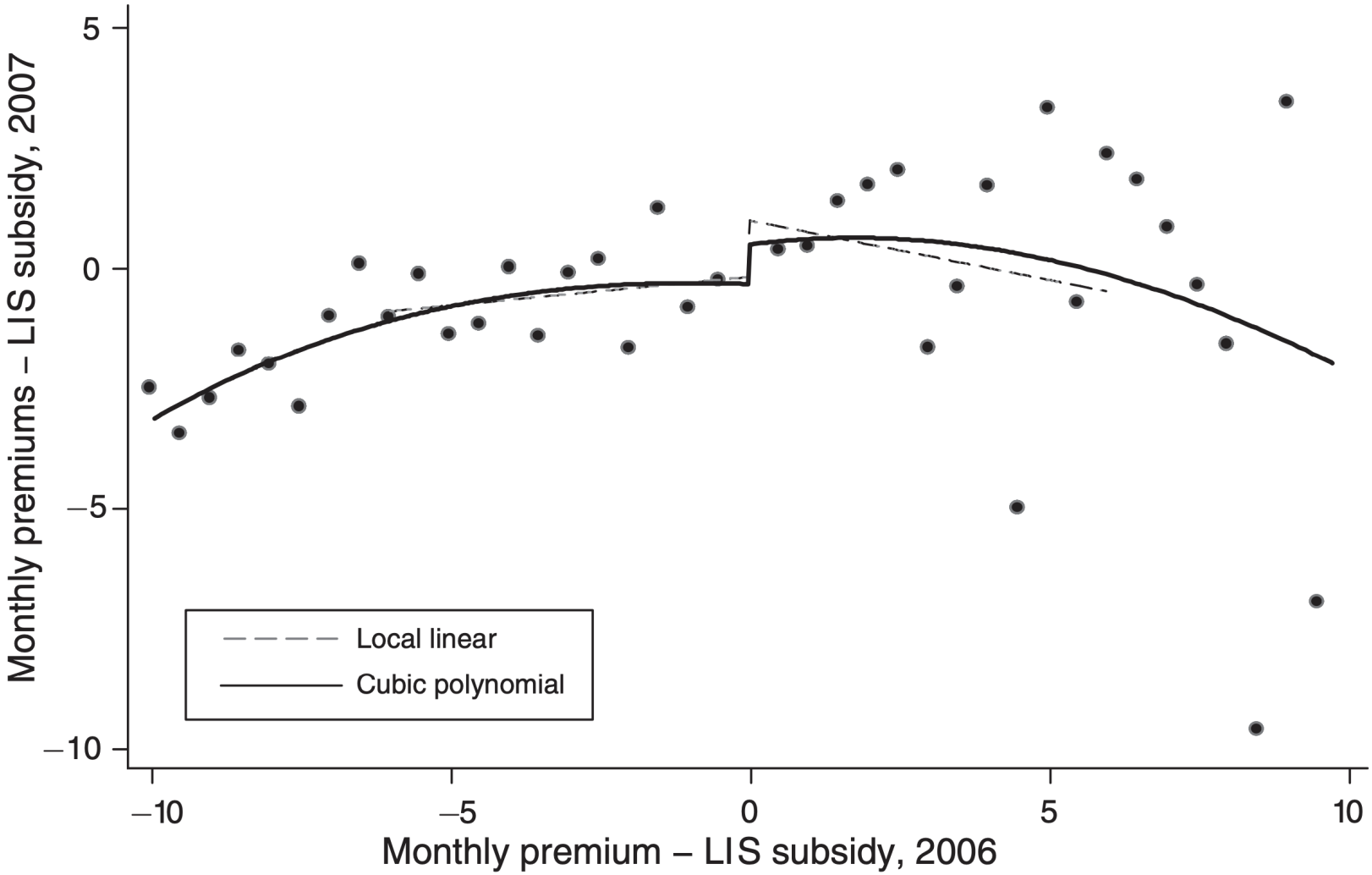

FIGURE 4. THE EFFECT OF 2006 BENCHMARK STATUS ON 2007 PREMIUMS

Notes: Dots are local averages with a bin size of $0.50. Dashed lines are predictions from local linear regressions with bandwidth of $6. Solid lines are predictions from regressions with a

Threats to Identification: Testing for discontinuity at the forcing variable

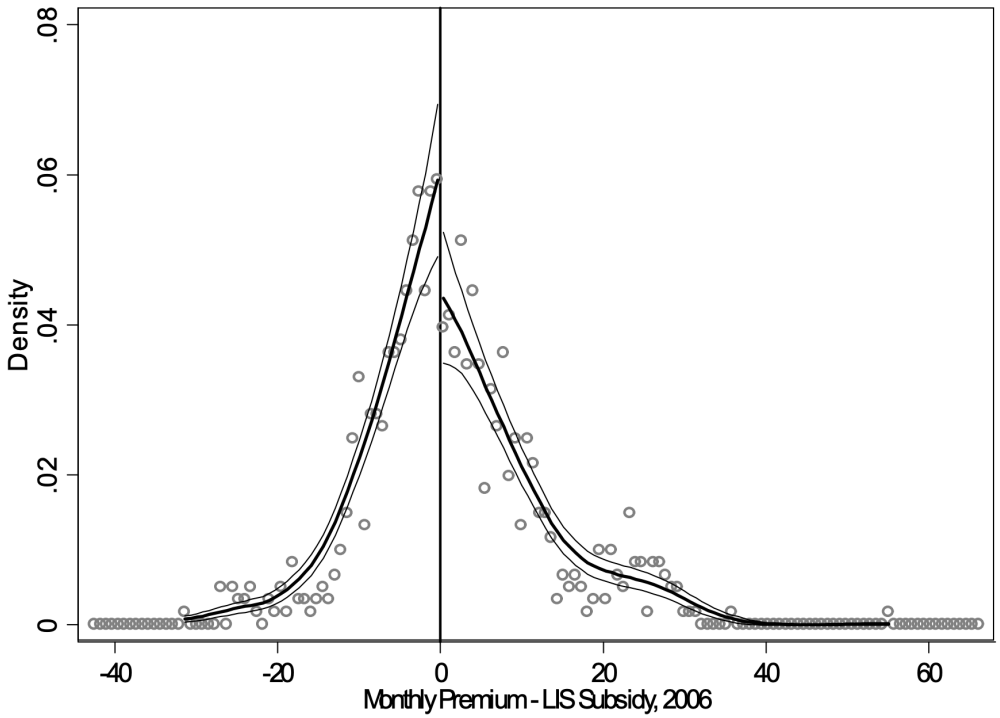

Figure A.3: Test for Density Discontinuity of the Forcing Variable. Dots are density with binsize of 0.74. Lines show smoothed density and standard errors as calculated in McCrary (2008).

Threats to Identification: Testing for discontinuity at the forcing variable

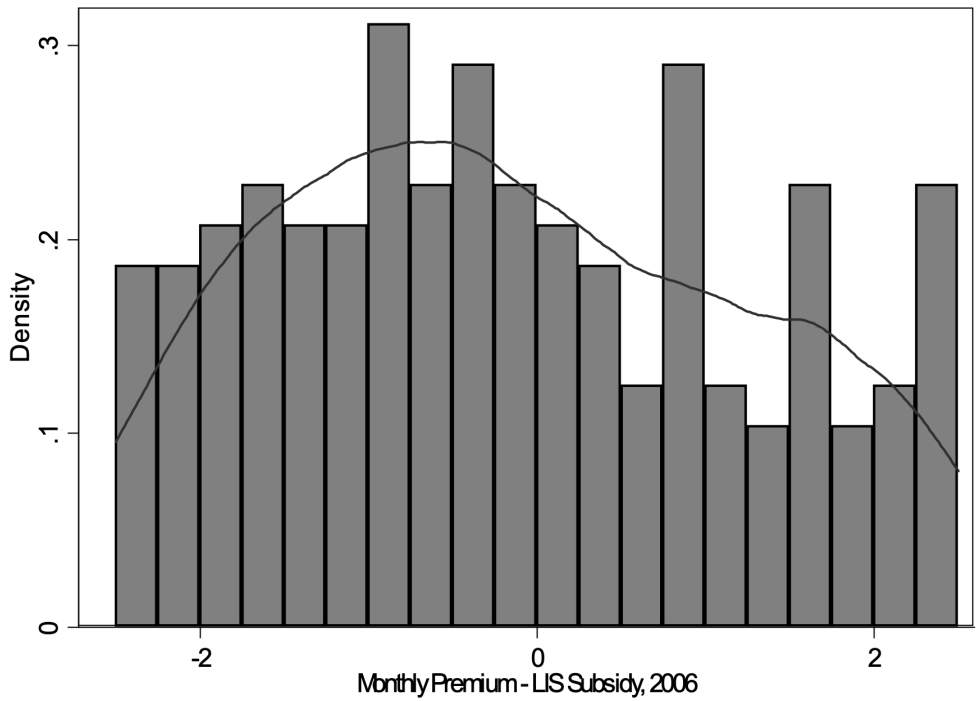

Figure A.4: Histogram of Forcing Variable. Bin width is 0.25. Overlaid with Epanechnikov kernel density. Sample: Basic Plans in 2006.

Results

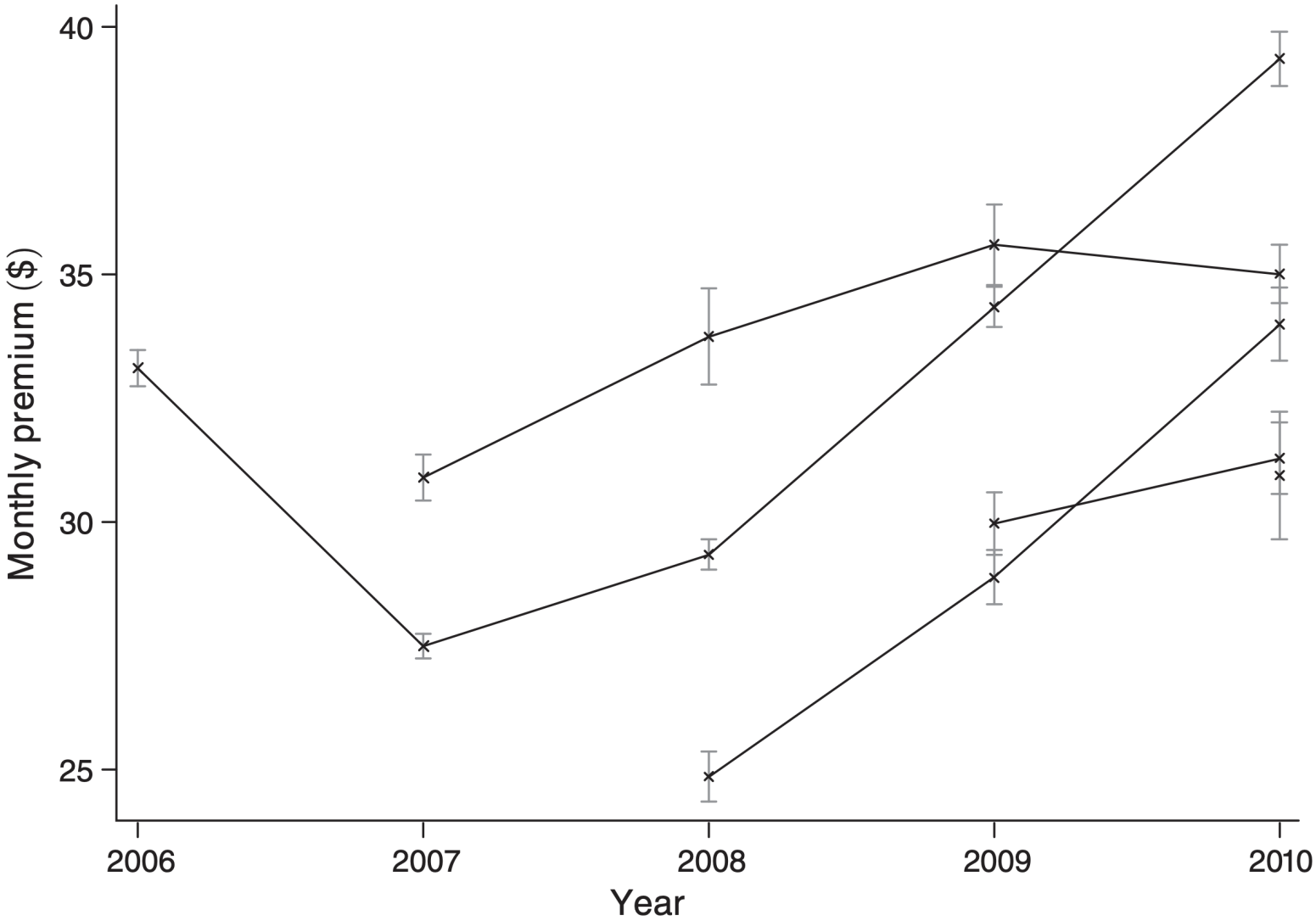

FIGURE 5. EVOLUTION OF COHORT PREMIUMS OVER TIME

Notes: Average monthly premiums for basic PDP plans, by plan cohort and year. Each line

Results

TABLE 4—MEDICARE PART D PREMIUMS BY PLAN AGE

	ln(monthly premium)					
	Equal weighted			Enrollment weighted		
	(1)	(2)	(3)	(4)	(5)	(6)
Year of plan existence						
…2nd year	−0.0167	−0.0103	0.0129	0.0183	−0.0229	0.0139
	(0.0508)	(0.0597)	(0.0511)	(0.0478)	(0.0446)	(0.0593)
…3rd year	0.0290	0.0585	0.0785	0.128**	0.0795**	0.133***
	(0.0808)	(0.0699)	(0.0519)	(0.0528)	(0.0326)	(0.0358)
…4th year	0.0690	0.117*	0.148***	0.199***	0.112**	0.191***
	(0.0660)	(0.0617)	(0.0496)	(0.0647)	(0.0522)	(0.0684)
…5th year	0.177**	0.147**	0.0960*	0.320***	0.154***	0.152*
	(0.0871)	(0.0593)	(0.0551)	(0.0861)	(0.0530)	(0.0764)
Firm offers M.A. plan		−0.145**			−0.0390	
		(0.0653)			(0.0350)	
Type of basic plan	No	Yes	Yes	No	Yes	Yes
Firm fixed effects	No	No	Yes	No	No	Yes
Observations	4,276	4,276	4,276	4,123	4,123	4,123
R^2	0.189	0.396	0.405	0.364	0.632	0.683

Notes: Dependent variable: log monthly PDP premium or monthly premium. Sample: basic PDP plans. 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 plans, deductible bins of \$0, \$1 to \$50, \$51 to \$100…, are also included and interacted with year fixed effects. Enrollment weighted regressions are weighted using the plan's total enrollment in July of each year. Plans with fewer than 10 enrollees are dropped from weighted regressions. See online Appendix Section A.2 for more details. Heteroskedasticity robust standard errors, clustered at the firm level, are in parentheses.

*** Significant at the 1 percent level.

Threats to Identification: Sources of variation in cost

The price difference between young and old plans can be decomposed into a difference in average costs and markups between cohorts:

$$\Delta p = \Delta c + \Delta m$$

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How much is attributable to difference in costs?

Limitation: absence of firm cost data. Thus, cannot directly identify Δc.

Plausible sources of cost variation

- Due to Risk-Adjustment Failures $\Longrightarrow$ Given the lack of diagnostic and claim history, uses a simple model on age and sex. There is no evidence of risk-adjustment failure in the simpler model.

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- Due to the LIS program $\Longrightarrow$ Estimated effects of plan age actually underestimate the increases in prices that would occur if risk adjustment were perfect.
- Due to Negotiated Prices $\Longrightarrow$ bias against . Bargaining power lower costs suggesting the markup is even higher than the observed Δp.

Discussion

- Are firm's strategic responses to inertia relevant for market design in domains other than health?

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- Are firm's strategic responses to inertia relevant for market design in domains other than health?
- How much of the switching is driven by consumer preferences opposed to price changes?
- Which change in the current contract structure will allow for higher efficiency gains?
- How to set these defaults to achieve a more efficient equilibrium?
- More informed enrollees who can switch to cheaper plans will effectively be cross-subsidized by enrollees stuck in place more expensive plans. Are there any equity implications to be considered?