

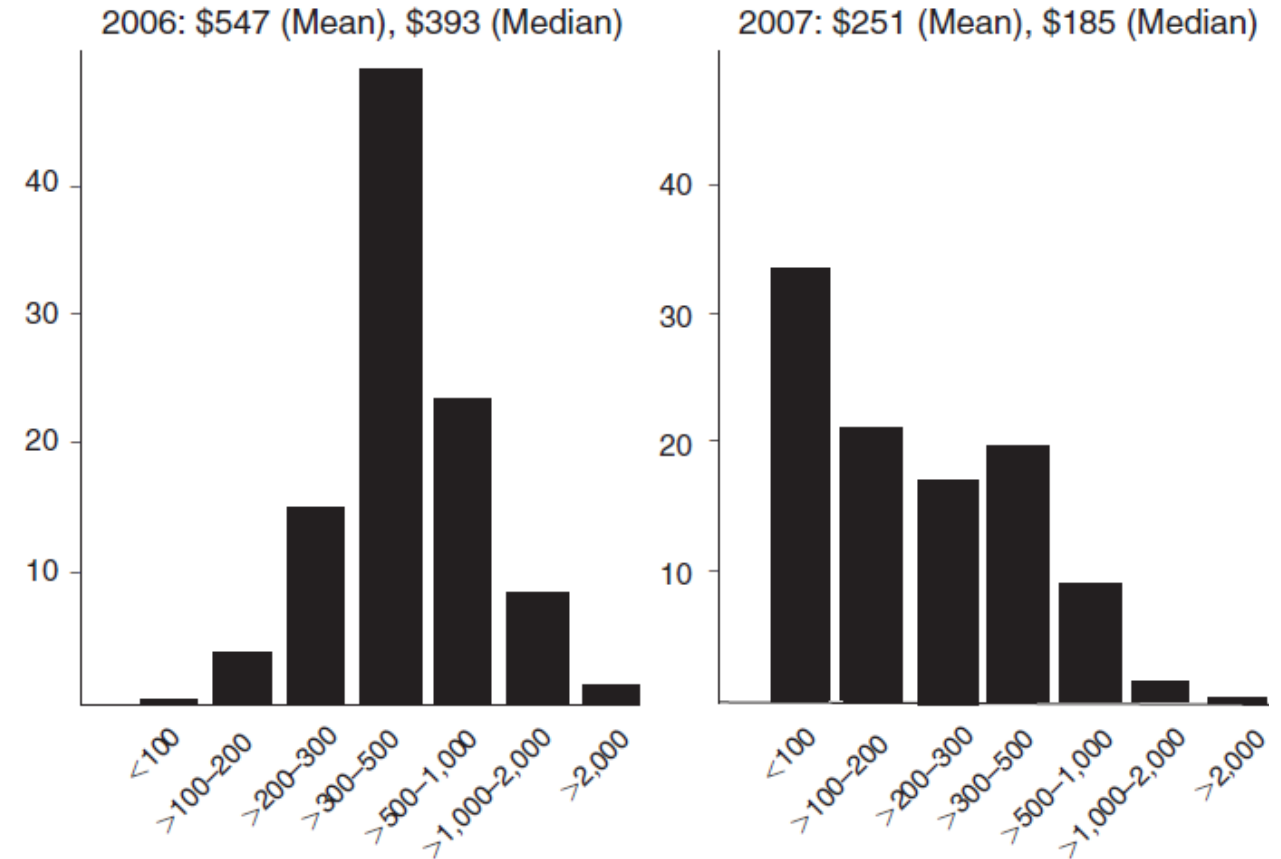
# Sinking, Swimming, or Learning to Swim in Medicare Part D

Jingxuan Zhao

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# Motivation

- Since 2006, Part D expanded Medicare beneficiaries' access to prescription drug coverage by allowing them to choose among competing private insurers.
- Provides a good opportunity to study consumer choice.



# Study Questions

- Whether Medicare Part D enrollees improved over time in terms of reducing overspending?
- How these changes varied across subpopulations?
- How switching plans affected reducing overspending?
- Who switched plans?

# Preview of findings

- Study sample reduced overspending by \$298 on average, with gains by 81 percent of them.
- The greatest improvements were by those who overspent most in 2006 and by those who switched plans.
- Decisions to switch depended on individuals' overspending in 2006 and on individual specific effects of changes in their current plans.

# Contributions

- Consumer dynamic choice: Provides insights on if Part D is too complex for beneficiaries to navigate.
- Part D: large number of lives and dollars, allows researchers to separate the effects of aging from the effects of experience.

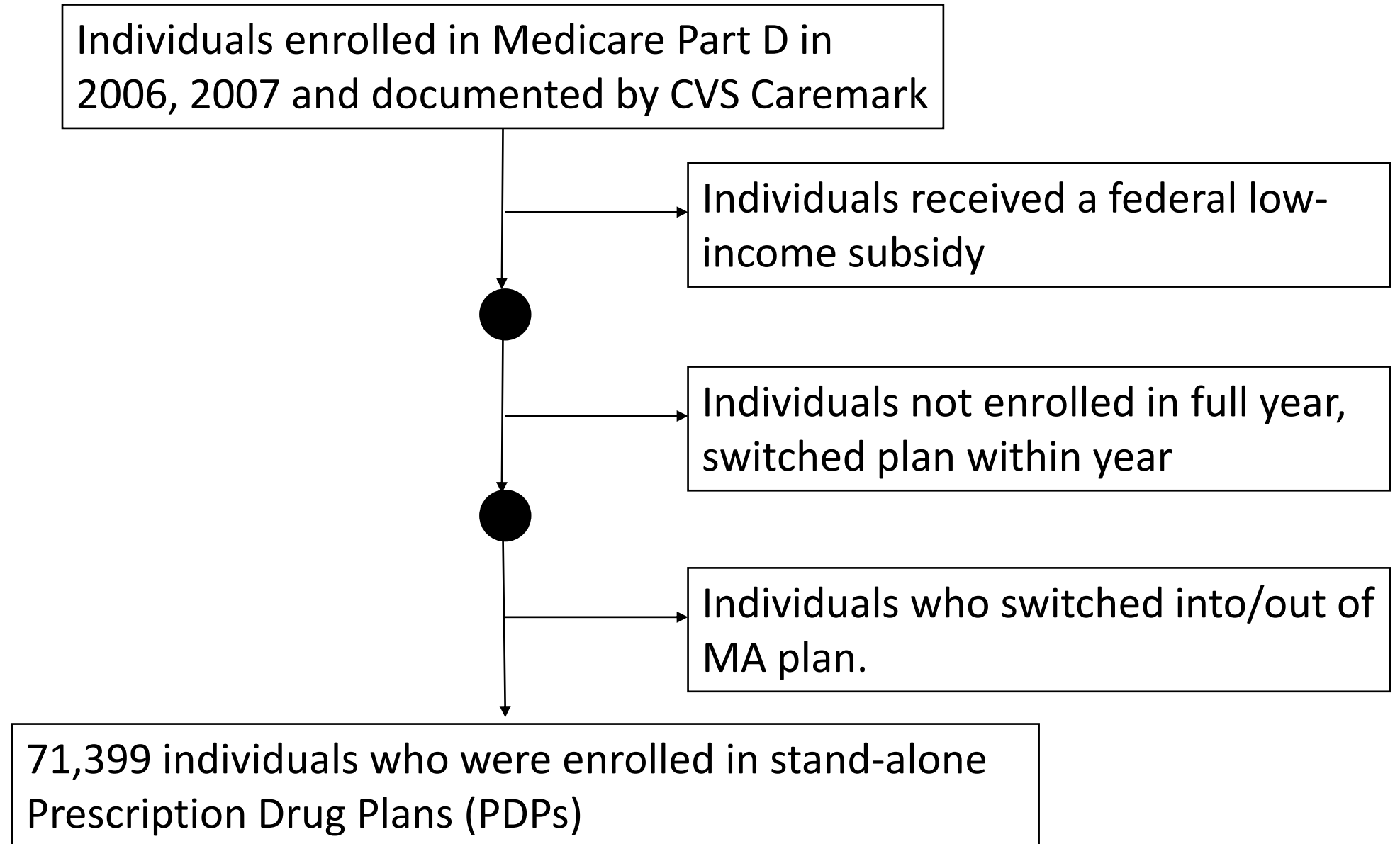
# Study Questions

- Whether Medicare Part D enrollees improved over time in terms of reducing overspending?
- How these changes varied across subpopulations?
- How switching plans affected reducing overspending?
- Who switched plans?

# Data

- Centers for Medicare and Medicaid Services (CMS) (plans)
  - Plans change, enter, exit, by region
- CVS Caremark, pharmacy benefits manager, PBM (enrollees)
  - Plan enrollment, change
  - Claims

# Sample (PBM)





# Sample characteristics (PBM)

TABLE 1—CHARACTERISTICS OF INDIVIDUALS IN THE SAMPLE

	Individuals in study sample ( <i>N</i> = 71,399)			20 percent sample of all PDP enrollees meeting criteria ( <i>N</i> = 1,168,712)			Difference in the changes	Difference in the 2006 levels
	2006	2007	Change	2006	2007	Change		
Female (percent)	70.1	70.1	0.0	67.0	67.0	0.0	0.0	3.1
Age (percent)								
65–69	20.4	16.2	–4.2	22.7	17.4	–5.3	1.1	–2.3
70–74	19.8	20.1	0.3	23.7	24.5	0.8	–0.5	–3.9
75–79	20.8	20.6	–0.2	21.3	21.7	0.4	–0.6	–0.5
80–84	20.2	20.6	0.4	16.4	17.6	1.2	–0.8	3.8
85 and up	18.7	22.5	3.8	16.0	18.8	2.8	1.0	2.7
Gross drug spending	\$2,568	\$3,002	\$434	\$2,731	\$2,978	\$247	\$186.7	–\$162.7
Ingenix pharmacy risk score	4.4	4.6	0.2	—	—	—	—	—
Took medication for (percent)								
Hypertension	77.4	78.9	1.5	—	—	—	—	—
Cholesterol and other cardiovascular	51.8	53.6	1.8	—	—	—	—	—
Pain	27.2	29.8	2.6	—	—	—	—	—
Mental health	28.0	26.2	–1.7	—	—	—	—	—
Antibiotics	40.6	42.9	2.3	—	—	—	—	—
Anticoagulants	21.7	23.0	1.3	—	—	—	—	—
Thyroid	17.5	18.4	0.9	—	—	—	—	—
Diabetes	19.1	20.0	1.0	—	—	—	—	—
Osteoporosis	17.8	17.0	–0.8	—	—	—	—	—
Alzheimer’s	4.1	5.5	1.4	—	—	—	—	—

# Plan characteristics (CMS)

TABLE 2—PART D PLAN CHARACTERISTICS

	Plans in study sample		All Part D plans		Difference
	Mean	SD	Mean	SD	
<i>2006</i>					
Deductible	\$161.58	\$74.18	\$92.23	\$116.06	\$69.35
Annual premium	\$542.33	\$164.84	\$446.10	\$151.82	\$96.23
Number of the top 100 drugs					
On the formulary	95.74	2.91	93.44	6.63	2.30
Requiring prior authorization	5.45	4.01	9.61	9.09	-4.16
With OOP prices <\$20	70.30	17.69	61.38	13.19	8.92
“Doughnut hole” coverage for generics	0.00	0.00	0.13	0.34	-0.13
“Doughnut hole” coverage for brands	0.00	0.00	0.02	0.15	-0.02
Enhanced plan	0.00	0.00	0.43	0.50	-0.43
Observations	95		1,431		
<i>2007</i>					
Deductible	\$99.77	\$108.35	\$88.83	\$120.20	\$10.94
Annual premium	\$452.38	\$138.09	\$436.91	\$183.33	\$15.47
Number of the top 100 drugs					
On the formulary	89.53	2.69	91.46	5.68	-1.93
Requiring prior authorization	4.96	1.35	2.35	2.98	2.61
With OOP Prices <\$20	61.59	1.73	64.24	5.13	-2.65
“Doughnut hole” coverage for generics	0.31	0.46	0.25	0.43	0.06
“Doughnut hole” coverage for brands	0.00	0.00	0.05	0.21	-0.05
Enhanced plan	0.52	0.50	0.49	0.50	0.03
Observations	154		1,804		

# Measuring Overspending

Overspending = real spending - cheapest alternatives

Spending = premiums + OOP

Being uninsured is an option

ex post (primary) vs. ex ante

PBM: claims, enrollment decisions, region, subsidy level

CMS: premiums, deductibles, doughnut hole coverage, formularies (a price elasticity of - 0.54)

# Empirical framework

- Overall

$$\Delta \mathbf{O}_i = \alpha + \Gamma \Delta \mathbf{H}_i + \Delta \mathbf{u}_i.$$

- Heterogeneity in changes, by sample characteristics

$$\Delta \mathbf{O}_i = \alpha + \Gamma \Delta \mathbf{H}_i + \beta \mathbf{X}_i + \Delta \mathbf{u}_i,$$

- Effects of switching plans

$$\Delta \mathbf{O}_i = \alpha + \Gamma \Delta \mathbf{H}_i + \theta \mathbf{S}_i + \Delta \mathbf{u}_i.$$

- Effects of switching plans , by sample characteristics

$$\Delta \mathbf{O}_i = \alpha + \Gamma \Delta \mathbf{H}_i + \beta \mathbf{X}_i + \theta \mathbf{S}_i + \Delta \mathbf{u}_i.$$

# Changes in overspending, overall

TABLE 3—FIRST DIFFERENCE MODELS OF WITHIN-PERSON CHANGE IN OVERSPENDING 2006–2007

	Health controls		Stable health only	
	No	Yes	Inclusive definition	Narrower definition
Intercept	–295.97 [3.890]***	–298.29 [4.131]***	–266.01 [6.924]***	–255.39 [9.268]***
Observations	71,399	71,399	30,149	15,247
Mean overspending in 2006	546.9	546.9	515.2	504.5
<i>Within-person change in overspending</i>				
Mean	–296.0	–296.0	–266.0	–255.4
5th percentile	–1,136.0	–1,136.0	–1,044.0	–991.3
10th percentile	–766.4	–766.4	–682.0	–642.5
25th percentile	–409.4	–409.4	–381.4	–364.8
50th percentile	–236.7	–236.7	–210.6	–189.1
75th percentile	–44.1	–44.1	–38.9	–38.7
90th percentile	98.9	98.9	77.0	72.7
95th percentile	235.8	235.8	188.3	147.6

# Changes in overspending, by sample characteristics

TABLE 4—FIRST-DIFFERENCE MODELS OF WITHIN-PERSON CHANGE IN OVERSPENDING 2006–2007, BY OBSERVED INDIVIDUAL CHARACTERISTICS

2006  
Overspending  
(higher)

Age (older)

Sex (female)

2006–2007 change allowed to vary with:	Age, sex, levels and changes in health	And 2006 overspending	And levels and changes in gross drug spending
Overspending level in 2006 (\$)			
Fewer than 100	Reference category	Reference category	Reference category
Between 100 and 200		–163.51 [17.406]***	206.70 [46.436]***
Between 200 and 300		–254.67 [21.333]***	–301.89 [50.344]***
Between 300 and 500		–408.61 [17.003]***	–457.76 [53.532]***
Between 500 and 1,000		–632.37 [16.969]***	–644.07 [38.039]***
Between 1,000 and 2,000		–1298.78 [17.988]***	–1229.90 [42.816]***
More than 2,000		–3172.82 [205.489]***	–2953.45 [111.632]***
Age in 2006			
Age 65–69	Reference category	Reference category	Reference category
Age 70–74		–42.49 [10.561]***	–26.39 [9.083]***
Age 75–79		–63.07 [16.328]***	–39.02 [15.701]**
Age 80–84		–113.53 [9.332]***	–87.49 [7.733]***
Age 85 and up		–108.47 [8.668]***	–94.01 [7.284]***
Male		13.36 [11.429]	26.90 [10.172]***
Risk score in 2006		–40.85 [4.325]***	–1.21 [3.159]
Took medication in 2006 for			
Hypertension		23.33 [10.227]**	11.21 [9.743]
Cholesterol and other cardiovascular		–72.76 [11.853]***	–22.05 [10.881]**
Pain		36.64 [11.117]***	7.53 [9.930]
Mental health		20.54 [13.165]	19.08 [11.413]*
Antibiotics		9.72 [9.417]	–3.72 [8.143]
Anticoagulants		–43.55 [10.891]***	–16.16 [9.100]*
Thyroid		0.60 [9.013]	11.65 [7.591]
Diabetes		–2.45 [13.535]	–0.99 [10.349]
Osteoporosis		–14.36 [9.775]	–23.73 [7.617]***
Alzheimer’s		17.88 [17.760]	–6.39 [25.713]

2006–2007 change allowed to vary with:	Age, sex, levels and changes in health	And 2006 overspending	And levels and changes in gross drug spending
Change in risk score		5.25 [5.685]	14.91 [5.241]***
Change in takes medication for			
Hypertension		–16.62 [13.402]	–22.12 [11.747]*
Cholesterol and other cardiovascular		–14.91 [18.389]	1.62 [17.136]
Pain		2.68 [8.382]	–7.33 [7.411]
Mental health		2.42 [12.040]	3.56 [10.667]
Antibiotics		–5.60 [8.516]	–11.12 [7.726]
Anticoagulants		–51.36 [15.017]***	–36.72 [12.975]***
Thyroid		22.46 [13.256]*	14.59 [10.377]
Diabetes		–27.32 [39.774]	–43.22 [37.173]
Osteoporosis		–27.07 [12.925]**	–26.57 [10.585]**
Alzheimer’s		–11.59 [19.951]	–54.63 [16.813]***
2006 gross drug spending			–0.04 [0.052]
Change in gross drug spending			0.10 [0.070]
Intercept		–39.78 [9.761]***	294.66 [19.681]***
Observations		71,395	71,395

Initiating medications  
(hypertension,  
anticoagulants,  
osteoporosis, and  
Alzheimer’s)

# Switching and overspending, overall

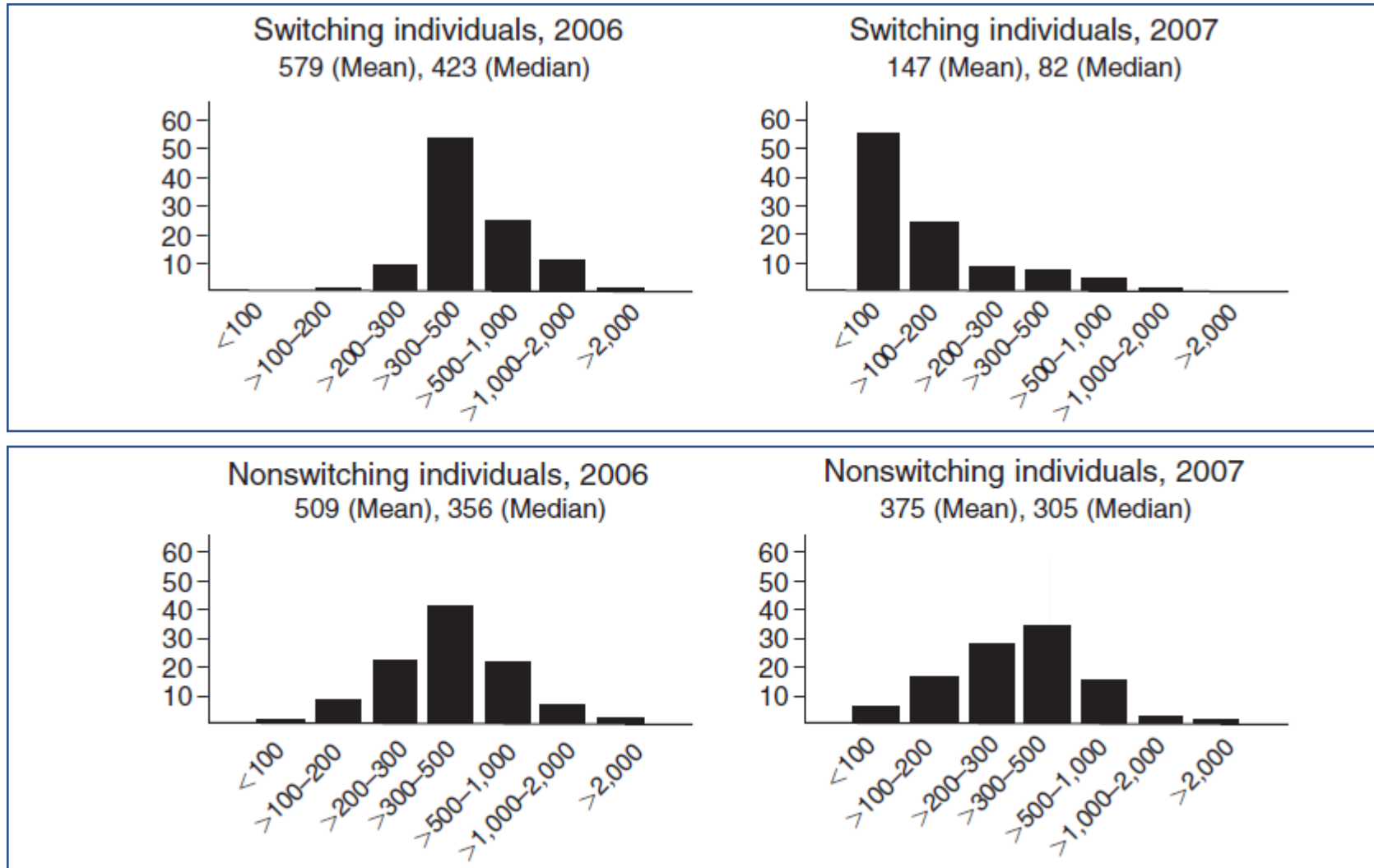


FIGURE 2. OVERSPENDING BY YEAR AND SWITCHING

# Switching and overspending, by sample characteristics

TABLE 5—FIRST-DIFFERENCE MODELS OF WITHIN-PERSON CHANGE IN OVERSPENDING 2006–2007,  
BY SWITCHING AND OTHER OBSERVED INDIVIDUAL CHARACTERISTICS

2006–2007 change allowed to vary with:	Full sample		Subset with stable health only
	Switching plans and changes in health	And other characteristics	And other characteristics
Switched plans	–298.46 [8.256]***	–232.98 [7.279]***	–231.97 [12.884]***
Overspending level in 2006 (\$)			
Less than 100			
Between 100 and 200		–174.57 [17.424]***	–170.37 [21.042]***
Between 200 and 300		–222.99 [21.514]***	–196.72 [36.930]***
Between 300 and 500		–313.81 [17.135]***	–291.67 [21.145]***
Between 500 and 1,000		–547.74 [17.285]***	–517.15 [21.687]***
Between 1,000 and 2,000		–1,195.86 [18.646]***	–1,175.86 [25.325]***
More than 2,000		–3,103.24 [206.809]***	–2,394.51 [434.065]***
Age in 2006			
Age 65–69			
Age 70–74		–2.89 [9.216]	–8.58 [6.898]
Age 75–79		16.19 [16.810]	27.64 [34.832]
Age 80–84		–12.16 [8.519]	–11.10 [10.106]
Age 85 and up		–3.66 [8.227]	0.48 [9.520]
Male		–3.91 [9.684]	14.23 [17.709]
Intercept	–136.90 [7.654]***	295.04 [19.648]***	280.84 [28.118]***
Observations	71,399	71,395	30,145

Switching plans reduced their overspending

Other reasons that can explain the differences by 2006 overspending

Switching decisions fully explain the differences observed by age and sex



# Study Questions

- Whether Medicare Part D enrollees improved over time in terms of reducing overspending?
- How these changes varied across subpopulations?
- How switching plans affected reducing overspending?
- Who switched plans?

# Empirical framework

- Overall

$$P(S_i = 1 | \Delta H_i, X_i) = \Phi(\alpha + \Gamma \Delta H_i + \beta X_i),$$

- Adding 2006 plan fixed effects

$$P(S_i = 1 | \Delta H_i, X_i, P06_i) = \Phi(\alpha + \Gamma \Delta H_i + \beta X_i + \Psi P06_i).$$

# Switching decision

TABLE 6—AVERAGE MARGINAL AND PARTIAL EFFECTS FROM PROBIT MODELS OF SWITCHING

	Full sample	Subset with stable health only	Full sample with 2006 plan fixed effects
<b>Overspending level in 2006 (\$)</b>			
Fewer than 100	Reference category	Reference category	Reference category
Between 100 and 200	-0.08 [0.039]**	-0.12 [0.067]*	-0.03 [0.062]
Between 200 and 300	0.21 [0.032]***	0.21 [0.057]***	-0.09 [0.057]
Between 300 and 500	0.49 [0.029]***	0.51 [0.051]***	-0.06 [0.059]
Between 500 and 1,000	0.50 [0.020]***	0.49 [0.036]***	0.01 [0.059]
Between 1,000 and 2,000	0.48 [0.010]***	0.49 [0.017]***	0.14 [0.059]**
More than 2,000	0.43 [0.007]***	0.45 [0.011]***	0.19 [0.060]***
Change in 2006 plan's percentile ranking	0.77 [0.000]***	0.84 [0.015]***	0.13 [0.012]***
<b>Age in 2006</b>			
Age 65-69	Reference category	Reference category	Reference category
Age 70-74	0.12 [0.007]***	0.14 [0.010]***	0.13 [0.008]***
Age 75-79	0.25 [0.006]***	0.28 [0.009]***	0.30 [0.008]***
Age 80-84	0.33 [0.006]***	0.36 [0.008]***	0.38 [0.007]***
Age 85 and up	0.39 [0.005]***	0.41 [0.008]***	0.43 [0.007]***
Male	-0.14 [0.005]***	-0.15 [0.007]***	-0.13 [0.006]***
Risk score in 2006	0.01 [0.001]***	0.00 [0.002]*	0.01 [0.001]***

Higher 2006 overspending (more likely)

Plan would be more expensive in 2007

Older (more likely)

Female (more likely)

	Full sample	Subset with stable health only	Full sample with 2006 plan fixed effects
<b>Took medication in 2006 for</b>			
Hypertension	-0.02 [0.006]***	-0.01 [0.009]	0.00 [0.007]
Cholesterol and other cardiovascular	-0.03 [0.005]***	-0.04 [0.008]***	-0.02 [0.006]***
Pain	-0.00 [0.006]	-0.00 [0.011]	0.04 [0.007]***
Mental health	-0.03 [0.006]***	-0.03 [0.010]***	0.01 [0.007]**
Antibiotics	-0.04 [0.006]***	-0.04 [0.009]***	-0.06 [0.007]***
Anticoagulants	-0.04 [0.006]***	-0.04 [0.010]***	-0.02 [0.007]**
Thyroid	-0.06 [0.006]***	-0.06 [0.009]***	-0.01 [0.007]*
Diabetes	0.01 [0.006]	0.02 [0.011]	0.02 [0.008]**
Osteoporosis	-0.02 [0.006]***	-0.03 [0.010]***	-0.03 [0.007]***
Alzheimer's	-0.06 [0.012]***	-0.02 [0.021]	-0.07 [0.014]***
Change in risk score	0.01 [0.001]***	0.03 [0.016]	0.01 [0.002]***
<b>Change in takes medication for</b>			
Hypertension	-0.00 [0.009]	0.03 [0.021]	0.02 [0.011]*
Cholesterol and other cardiovascular	-0.02 [0.008]***	-0.03 [0.024]	-0.02 [0.009]**
Pain	-0.01 [0.005]**	-0.01 [0.009]	0.02 [0.006]***
Mental health	-0.10 [0.007]***	-0.14 [0.018]***	-0.05 [0.008]***
Antibiotics	-0.02 [0.005]***	-0.02 [0.008]*	-0.02 [0.005]***
Anticoagulants	-0.01 [0.009]	-0.02 [0.024]	0.01 [0.010]
Thyroid	-0.04 [0.015]***	-0.02 [0.030]	-0.00 [0.018]
Diabetes	-0.01 [0.014]	0.04 [0.054]	-0.01 [0.017]
Osteoporosis	0.00 [0.009]	-0.00 [0.024]	-0.00 [0.011]
Alzheimer's	-0.02 [0.014]	0.02 [0.060]	-0.04 [0.017]**
Observations	71,391	30,145	70,914

Any conditions (less likely)

Initiating medications (less likely)

# Robustness of Results

- Demand for prescription drugs is perfectly inelastic
- Use the actual spending for the actual plan
- No insurance is not an option
- Ex ante

# Robustness of Results

TABLE 7—FIRST DIFFERENCE MODELS OF WITHIN-PERSON CHANGES IN OVERSPENDING  
USING ALTERNATIVE APPROACHES

	Controlling for changes in health (identical to Table 3, column 2)	And switching (identical to Table 5, column 1)
<i>Panel A. Main results reported in Tables 1 and 3</i>		
Intercept	−295.97 [3.890]***	−136.90 [7.654]***
Switched plans		−298.46 [8.256]***
Mean overspending in 2006	546.9	546.9
<i>Panel B. Assuming perfectly inelastic demand</i>		
Intercept	−368.60 [4.991]***	−158.25 [8.864]***
Switched plans		−389.00 [9.876]***
Mean overspending in 2006	794.0	794.0
<i>Panel C. Using actual rather than simulated cost for actual plan</i>		
Intercept	−273.46 [4.677]***	−107.1 [8.582]***
Switched plans		−307.66 [9.329]***
Mean overspending in 2006	586.0	586.0
<i>Panel D. Excluding no insurance as an option</i>		
Intercept	−303.02 [4.123]***	−139.25 [7.637]***
Switched plans		−302.87 [8.236]***
Mean overspending in 2006	538.5	538.5

# Robustness of Results

TABLE 8—COMPARING 2007 OVERSPENDING USING EX ANTE AND EX POST PRESCRIPTION DRUG CLAIMS

	Ex post using 2007 claims (\$)	Ex ante using 2006 claims (\$)
Mean	251.0	298.4
Median	184.8	197.8
5th percentile	0.0	0.0
10th percentile	1.7	14.0
25th percentile	65.0	79.1
75th percentile	184.8	345.9
90th percentile	515.7	526.8
95th percentile	682.9	700.5

# Generalizability

- Demographic characteristics
- Plan characteristics

# Reflections

- How the trend changed after 2007?
- People with LIS? People excluded?