The Impact of Medicare Part D on Pharmaceutical Prices and Utilization

Mark Duggan

University of Maryland, MPRC, and NBER

Fiona Scott Morton

Yale University and NBER

February 2008

Introduction

- **Medicare created in 1965 and now insures 43+ million**
- **Insurance for most health care services**
  - Part A: hospital inpatient care and some long term care
  - Part B: hospital outpatient care and physician services
- **Most (85%) Medicare recipients in fee-for-service**
  - Thousands of FFS prices set and updated periodically
- **For first 40 yrs – most prescription drug expenses uncovered**
  - Certain physician-administered drugs the exception
- **Changed in Jan 2006 with enactment of Medicare Part D**
  - Largest expansion of Medicare since its inception
  - Projected to cost $780 billion in first ten years (2006-15)
- **This paper: estimate impact on RX prices and utilization**

Medicare Before Part D

- **Created for those 65+ by Soc Sec Amendments of 1965**
  - Provides insurance for most health care expenditures
  - By 1967 19 million elderly individuals enrolled
  - Expanded to include Social Security Disability recipients in 1973
  - Currently insures 43 million U.S. residents
- **Two main components – Part A and Part B**
  - Hospital Insurance - deductible of $900
  - Supplementary Medical Insurance - monthly premium, 20% copay
- **Fee-for-service reimbursement**
  - Thousands of prices set and updated periodically
- **Essentially no coverage for prescription drugs**
  - Physician-administered drugs the one exception

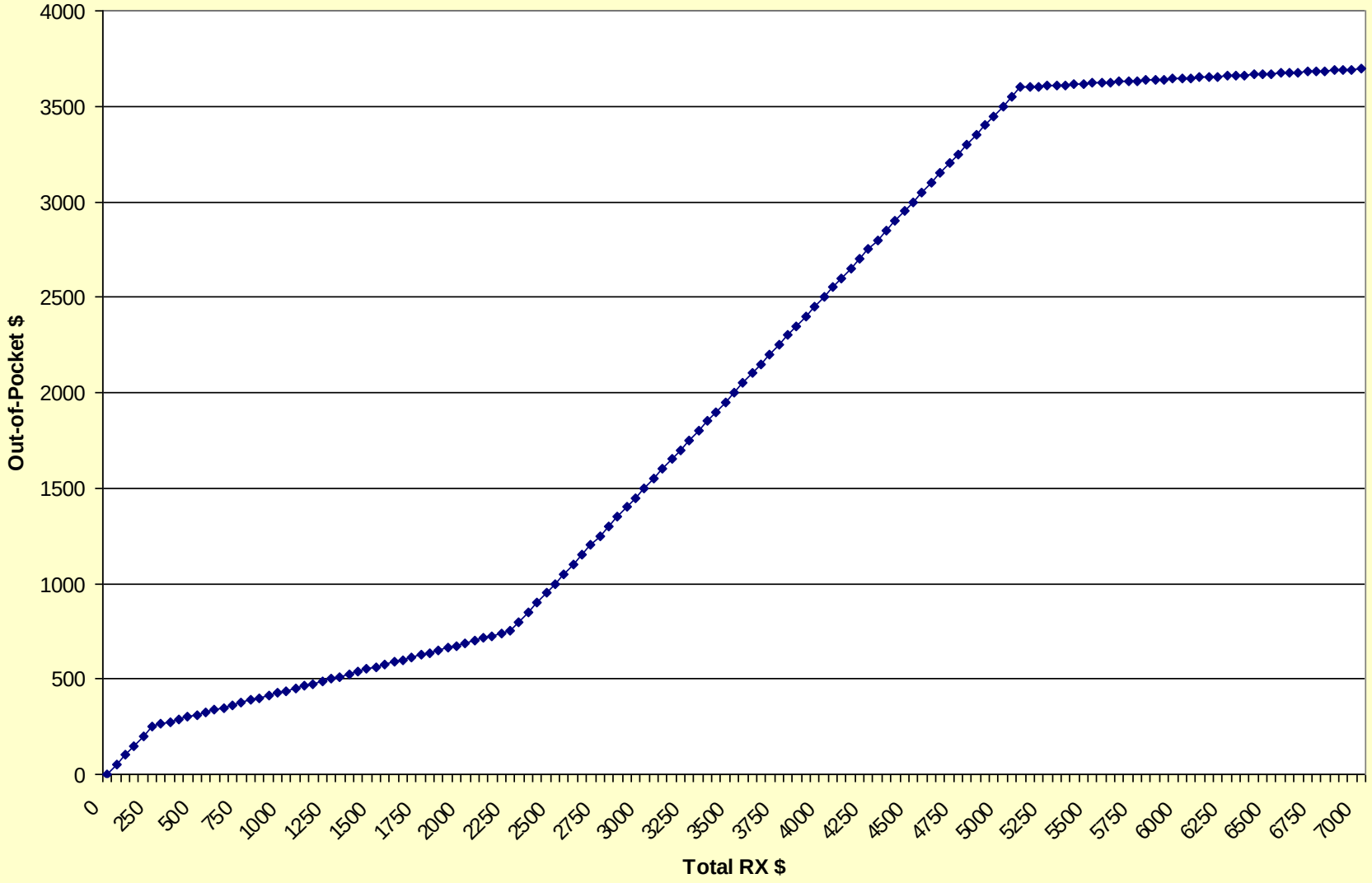
Medicare Part D

- **Medicare Modernization Act passed in December 2003**
  - Part D took effect January 1, 2006
- **Several key features**
  - Private insurance plans compete for enrollees
  - Medicare recipients have option to enroll and pay monthly premium
  - Premiums subsidized by the federal government (~70 percent)
  - Out-of-pocket costs a non-linear function of RX spending
  - Premiums increase for those who delay enrollment
- **Plan instruments**
  - Formulary (list of covered drugs) - need 2+ in each of 146 categories
  - Prices in the "donut hole" and co-pays in the coverage areas
  - Degree to which enrollees are steered to certain drugs

Medicare Part D (continued)

- **Two Part D plan types**
  - Prescription Drug Plans (PDPs) – stand-alone plans
  - Medicare Advantage Drug Plans (MA-PD) – all services incl. drugs
- **Low-income Medicare recipients**
  - Dual eligibles (also on Medicaid) required to enroll in a plan
  - Subsidies if not on Medicaid but income below 135% of poverty line
- **Firms subsidized to continue providing own coverage**
  - Included to reduce crowd-out of existing insurance
  - Equal to 28 percent of cost to employer
- **Six protected therapeutic classes – includes HIV ARVs**
- **Plans submit bids – cost over average borne by recipient**
  - Can serve one or more of the 34 coverage regions in U.S.

Figure 1: Out-of-Pocket Spending in 2006 for Medicare Part D Recipients



Medicare Part D Enrollment as of January, 2007

Appendix Table 1: Total Medicare Beneficiaries with Drug Coverage

Description	June 11, 2006 (millions)	January 16, 2007 (millions)	Percent change
Drug Coverage from Medicare or Former Employer			
Stand-Alone Prescription Drug Plan (PDP)	10.37	10.98	5.9%
Medicare Advantage with Prescription Drugs (MA-PD)	6.04	6.65	10.1%
Medicare-Medicaid (Automatically Enrolled)	6.07	6.27	3.3%
Medicare Retiree Drug Subsidy (RDS)	6.90	6.94	0.6%
FEHB Retiree Coverage	1.60	1.47	-8.1%
TRICARE Retiree Coverage	1.86	1.86	0.0%
TOTAL	**32.84**	**34.17**	**4.0%**
Additional Sources of Creditable Drug Coverage			
Veterans Affairs (VA) Coverage	2.01	1.85	-8.0%
Indian Health Service Coverage	0.11	0.03	-73.6%
Active Workers with Medicare Secondary Payer	2.57	2.57	0.0%
Other Retiree Coverage, Not Enrolled in RDS	0.10	0.10	0.0%
State Pharmaceutical Assistance Programs	0.59	0.31	-47.5%
TOTAL	**5.38**	**4.86**	**-9.7%**

Part D Plan Market Characteristics in 2006

- **226 organizations offered plans by end of 2006**
  - Top two (UHC-Pacificare and Humana, Inc.) had 44 percent
  - Next eight had 28 percent
- **Total of 3873 region-plan combinations in 2006**
  - 1678 PDPs and 2195 MA-PDs
  - Firm can offer several in each region
- **Just 14 percent of enrollees in plans with standard benefit**
  - 51 percent in actuarially equivalent and rest in enhanced plans
- **80 percent of enrollees have no coverage in "donut hole"**
  - 94 percent if restrict to PDPs
  - 9-10 million dual eligible / low-income subsidy have full coverage by the federal government

Related Literature

- **Medicare Part D**
  - Lichtenberg (2007) and Simon and Lucarelli (2007)
- **Drug procurement (Medicaid)**
  - Duggan and Scott Morton (2006) and Scott Morton (1997)
- **Impact of Medicare**
  - Acemoglu et al (2006), Card et al (2006), and Finkelstein (2007)
- **Prescription Drug Cost Sharing and Out-of-Pocket Costs**
  - Gibson et al (2005) and Pavcnik (2002)
- **Crowdout of Private Insurance**
  - Cutler and Gruber (1996) on Medicaid eligibility expansions
- **Contracting out to private insurers**
  - Duggan (2004) on Medicaid HMOs

Theoretical Framework

- **Part D may affect firm's profit-maximizing price**
  - Our measure will be average product-specific price
- **Two key forces– theoretically ambiguous which dominates**
  - More insurance => lower demand elasticity => higher price
  - Plans compare price/efficacy => negotiate discounts => lower price
- **Consider linear differentiated products demand curve**
  - Similar to Deneckere and Davidson (1985) or Shubik (1980)

$$q_i = V_i - \alpha_g p_i - \gamma_g (p_i - \frac{1}{N} \sum_{j=1}^{N} p_j)$$

- **i indexes drugs and N is number of therapeutic substitutes**
- **α_g and γ_g likely to change with switch from cash to Part D**

Theoretical Framework (continued)

- **Part D likely to reduce α_g and increase γ_g (substitutability)**
  - This will influence prices as follows:

$$p_i = \frac{V + c(\gamma \frac{(N-1)}{N} + \alpha)}{2\alpha + \gamma(\frac{N-1}{N})}$$

- **Change in avg price will be linear function of MMS**
  - Change allows us to difference out time invariant omitted factors
  - Should see bigger effects for uninsured Medicare recipients
  - Protected versus all other therapeutic categories
  - Determining substitutes – still in progress
- **Do prices change differentially for Medicare-intensive drugs?**

IMS Data on U.S. Sales and Quantity

- **Total sales in the U.S. for all pharmaceutical products**
  - Annual data from 2001 to 2006
  - Sales increased from $162.6 billion to $223.9 billion (2006 $)
- **Also includes utilization data**
  - Total standardized units and units per daily dose
- **Divided into therapeutic categories and subcategories**
  - 14 therapeutic categories (e.g. cardiovascular)
  - 260 subcategories (e.g. cholesterol reducers)
- **Aggregate different versions of the same product**
  - Example: Prozac and Prozac Weekly
  - Do not include generic versions when doing this – different firm

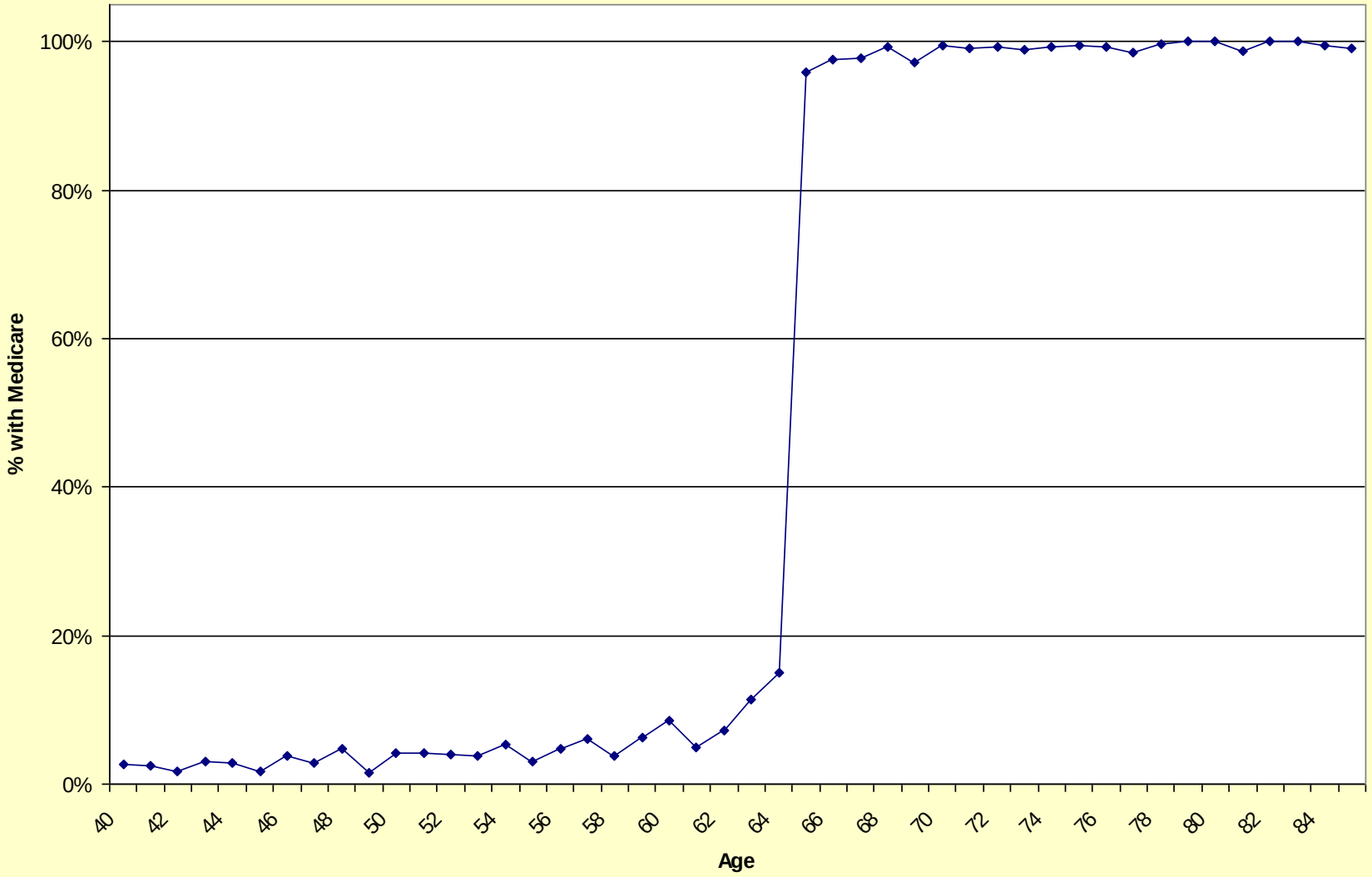
Medical Expenditure Panel Survey

- **Publicly available constructed by AHRQ**
- **Detailed information on health care utilization**
  - For nationally representative sample of U.S. pop (using weights)
- **Prescribed Medicines file in 2003**
  - 304,324 prescriptions for 20,475 individuals
  - Lines up reasonably well with IMS rankings (Table 1)
- **Consolidated Data File (CDF)**
  - Data on age, gender, health insurance coverage, etc.
  - There are 34,215 people in 2003 MEPS
  - Can be linked to Prescribed Medicines file
- **Fraction on Medicare increases sharply at 65 (Figure 2)**
  - 15 percent at 64 to 96 percent at 65

Medicare Recipients in the MEPS

- **Medicare recipients have much greater RX utilization**
  - Average of 28.0 prescriptions filled and $1789 in spending
  - Compare to 6.5 and $412 for those not on Medicare
  - 14.4 percent of pop but 40.3 percent of prescriptions
- **Source of payment in 2003 also differs (Table 1)**
  - Larger share out-of-pocket for Medicare recipients
  - Medicare recipients less private but more public insurance
  - Just 8 percent paid for by Medicare prior to MMA
- **Substantial variation in Medicare market share**
  - Anti-depressant Zoloft (ranked #5 in sales) at 27.1 percent
  - Heart treatment Plavix (#16) at 72.9 percent

Figure 2: Medicare Enrollment by Age: 2003 Medical Expenditure Panel Survey



Medicare vs. All Other RX Spending: 2003 MEPS

Table 1: Source of Payment for Prescriptions in the 2003 MEPS

	All	Medicare	All Other
Average Total Paid per Prescription	$69.48	$69.90	$69.17
% Paid Out-of-Pocket	44.9%	50.9%	40.5%
% Paid by Private Insurance	34.5%	19.8%	45.2%
% Paid by Medicaid	12.4%	13.9%	11.3%
% Paid by VA	3.3%	5.8%	1.5%
% Paid by Medicare	3.3%	7.8%	0.0%
% Paid by TRICARE	1.1%	1.2%	1.0%
% Paid by Other Insurance	0.5%	0.5%	0.5%
Total Number of Prescriptions	298,293	129,990	168,303

Constructing the Analysis Sample

- **Consider price and utilization changes from 2003 to 2006**
  - Medicare Modernization Act passed in Dec 2003
  - Part D does not take effect until 2006
- **Focus on top 1000 drugs in IMS data by 2003 sales**
  - 97.2 percent of the $196.0 billion in sales
- **Use 2002 and 2003 MEPS to increase accuracy of MMS**
- **Sample restrictions**
  - Drop 113 over-the-counter drugs – not covered by Part D
  - Drop 194 generic drugs – difficult to measure accurately in MEPS
  - Drop 125 products not in MEPS
  - Drop 20 products with no sales in 2002 or 2003 or missing FDA year
- **Final sample of 548 drugs – accounts for 78 percent of 2003 $**

Table 2: Rankings of Top 20 Drugs in IMS and/or the MEPS by 2003 Sales

	IMS Rank	MEPS Rank	MEPS Scripts	Medicare Share
Lipitor	1	1	7534	0.455
Zocor	2	2	4208	0.574
Prevacid	3	3	2651	0.417
Nexium	4	4	2093	0.316
Zoloft	5	10	2596	0.271
Celebrex	7	5	2590	0.499
Epogen	6	435	19	0.537
Norvasc	14	6	3926	0.592
Advair	12	7	1788	0.293
Zyprexa	8	35	623	0.463
Paxil	13	8	2435	0.292
Neurontin	9	14	1624	0.515
Allegra	17	9	2654	0.19
Procrit	10	48	74	0.652
Effexor	11	16	1610	0.275
Pravachol	15	11	1772	0.538
Plavix	16	12	1664	0.729

Empirical Framework

- **Exploit variation across drugs in the Medicare market share**
- **Consider change from 2003 to 2006**
  - Differences out time-invariant omitted factors
- **$MMS_{j,2003}$ represents *potential* Part D enrollment**
- **Impact of Part D modeled here as common effect β**

$$\Delta P_{j,2003\text{-}06} = \alpha + \beta MMS_{j,2003} + \gamma \Delta P_{j,2001\text{-}02} + \mu X_{j,2003} + \varepsilon_{j,2006}$$

- **Key assumption: $MMS_{j,2003}$ is orthogonal to other unobserved determinants of average price changes**
  - Also assumes no "spillover effect" to non-Medicare recipients
- **Use log instead of level in prices**
  - Reduces skewness and proportional impacts more plausible

Level of and Change in Price is Highly Skewed

Table 3: Distribution of Price and Price Change: Log and Level

	Price per Day 2006		*Δ Price per Day 2003-06*	
	PPD_{06}	$Log(PPD_{06})$	ΔPPD_{06}	$\Delta Log(PPD_{06})$
5th Percentile	0.375	-0.982	-0.018	-0.069
10th Percentile	0.716	-0.334	0.002	0.001
25th Percentile	1.327	0.283	0.172	0.104
50th Percentile	2.611	0.96	0.356	0.172
75th Percentile	3.665	1.299	0.674	0.248
90th Percentile	7.72	2.044	1.277	0.348
95th Percentile	12.671	2.539	2.388	0.442
Mean	4.251	0.809	0.747	0.174
Std Dev	9.573	1.049	3.478	0.199
Skewness	10.548	-0.013	12.098	-0.543

Average Price of Medicare-Intensive Drugs Declines

Table 4: The Impact of Medicare Part D on the Change in Average Pharmaceutical Prices from 2003-06

Dependent Variable: Δ Log(Price Per Day$_{j,2003\text{-}6}$)

	μ (σ)	(1)	(2)	(3)
Medicare Market Share $_{2002\text{-}03}$	0.355	-0.128**	-0.132**	-0.138**
	(.265)	(.057)	(.059)	(.056)
Δ Log(Price Per Day $_{2001\text{-}2}$)	0.073		-.333**	-0.016
	(.198)		(.161)	(.138)
Years on the Market $_{2003}$	11.5		0.001	0.001
	(7.2)		(.002)	(.002)
Any Generic Competition	0.400		0.001	0.011
	(.490)		(.024)	(.024)
Constant	-	0.225	0.244	0.217
	-	(.026)	(.032)	(.032)
# of Observations	518	548	518	508
R-squared	-	0.016	0.044	0.025
Outliers Excluded?	No	No	No	Yes

Robust to Excluding Cancer Drugs and Restricting to Top 200

Table 4: The Impact of Medicare Part D on the Change in Average Pharmaceutical Prices from 2003-06

Dependent Variable: Δ Log(Price Per Day$_{j,2003\text{-}6}$)

	μ (σ)	(4)	(5)	(6)
Medicare Market Share $_{2002\text{-}03}$	0.355	-0.137**	-0.134**	-0.128**
	(.265)	(.057)	(.057)	(.055)
Δ Log(Price Per Day $_{2001\text{-}2}$)	0.073	-0.015	-0.012	0.022
	(.198)	(.140)	(.139)	(.177)
Years on the Market $_{2003}$	11.5	0.001	0.001	0.002
	(7.2)	(.002)	(.002)	(.002)
Any Generic Competition	0.400	0.011	0.011	-0.005
	(.490)	(.023)	(.023)	(.023)
Constant	-	0.216	0.215	0.207
	-	(.032)	(.032)	(.037)
# of Observations	518	488	488	200
R-squared	-	0.025	0.024	0.044
Outliers Excluded?	No	Yes	Yes	Yes
Cancer Drugs Excluded?	No	Yes	Yes	Yes
RX or Spending MMS?	RX	RX	Spending	RX
Top 200 Only:	No	No	No	Yes

Interpretation of Baseline Price Results

- **Estimates imply 12% decline in prices for Medicare recipients**
- **If driven by Part D – actual effects nearly twice as large**
  - Slightly more than half enroll in a Part D plan
- **Assumes no "spillover effect" to non-Medicare prices**
- **Out-of-pocket costs would have declined even more**
  - 25 percent co-pay from $250 to $2250
  - 100 percent co-pay from $2250 to $5100
  - 5 percent co-pay past $5100
- **Next test for corresponding effect on utilization**
  - Recent work examines impact of Part D on utilization at one large pharmacy chain (Lichtenberg, 2007)
  - Complicated due to variation in co-pay with RX spending

Utilization Estimates Less Precise & Suggest Large Impact

Table 5: The Impact of Medicare Part D on the Change in RX Utilization from 2003-06

Dependent Variable: Δ Log(Daily Doses$_{j,2003\text{-}06}$)

	μ (σ)	(1)	(2)	(3)
Medicare Market Share $_{2002\text{-}03}$	0.355	0.516	0.488	0.434
	(.265)	(.320)	(.325)	(.318)
Δ Log(Daily Doses $_{2001\text{-}02}$)	0.129		0.047	0.031
	(.841)		(.081)	(.069)
Years on the Market	11.5		0.001	0.003
	(7.2)		(.011)	(.011)
Any Generic Competition?	0.4		-1.084***	-1.098***
	(.490)		(.193)	(.194)
Constant	-	-0.826	-0.333	-0.301
		(.161)	(.180)	(.173)
# of Observations	518	548	518	508
R-squared	-	0.009	0.268	0.300
Outliers Excluded?	No	No	No	Yes

Main Utilization Results (continued)

Table 5: The Impact of Medicare Part D on the Change in RX Utilization from 2003-06

Dependent Variable: Δ Log(Daily Doses$_{j,2003\text{-}06}$)

	(4)	(5)	(6)	(7)
Medicare Market Share $_{2002\text{-}03}$	0.445	0.374	0.554	0.252*
	(.321)	(.319)	(.471)	(.140)
Δ Log(Daily Doses $_{2001\text{-}02}$)	0.031	0.030	0.029	-0.011
	(.069)	(.069)	(.070)	(.046)
Years on the Market	0.003	0.003	0.014	-0.023***
	(.011)	(.011)	(.018)	(.008)
Any Generic Competition?	-1.101***	-1.102***	-1.226***	-
	(.194)	(.195)	(.247)	
Constant	-0.310	-0.280	-0.376	-0.005
	(.174)	(.175)	(.256)	(.125)
# of Observations	489	489	200	489
R-squared	0.301	0.299	0.326	0.301
Outliers Excluded?	Yes	Yes	Yes	Yes
Cancer Drugs Excluded?	Yes	Yes	Yes	Yes
RX or Spending MMS?	RX	Spending	RX	RX
Top 200 Only:	No	No	Yes	No
Exclude if face gen comp?	No	No	No	Yes

Summary of Main Results

- **Decline of 12% in average prices for Medicare recipients**
- **Impact of Part D likely greater**
  - Many do not enroll or stick with existing coverage
- **Out-of-pocket prices not observable in our data**
  - Large declines in coverage areas from 250-2250 and 5100+
- **Back-of-the-envelope estimate suggests elasticity ~0.5**
  - Out-of-pocket price change depends on where in coverage gap
- **Limitations**
  - Aggregate rather than individual-level data
  - Do not observe drug-specific Part D enrollment
- **Have assumed common impact**
  - Next explore how effect varies

Insured and Uninsured Medicare Recipients

- **Do not observe drug-specific Part D enrollment**
- **Likely to be larger for those uninsured in 2003**
  - Many retained existing coverage with past or current employer, etc.
- **Use MEPS to differentiate Medicare uninsured & insured %**
  - Averages of .249 and .152 for 548 sample drugs

$$\Delta Y_{j,2006} = \alpha + \beta_1 MMS\_Self_{j,2003} + \beta_2 MMS\_Ins_{j,2003} + \gamma \Delta Y_{j,2003} + \mu Yrs_{j,2003} + \varepsilon_{j,2003}$$

- **Expect larger estimate, in terms of magnitude, for β_1**
- **Also explore effects for dual (Medicaid-Medicare) share**
  - Dual eligibles shifted from Medicaid RX coverage to Medicare plans
  - Reduces Medicaid market share - Duggan and Scott Morton (2006)

Price effects driven by impact on the uninsured

Table 6: The Impact of MMS: Differentiating between Those with and without RX Insurance

		Δ Log(Price Per Day$_{j,2003\text{-}06}$)		
	μ (σ)	(1)	(2)	(3)
Medicare Market Share $_{2002\text{-}03}$	0.352	-.137**		
	(.263)	(.057)		
Medicare Self-Pay Share $_{2002\text{-}03}$	0.217		-0.227***	-0.247***
	(.191)		(.070)	(.077)
Medicare Insured Share $_{2002\text{-}03}$	0.135		0.063	
	(.134)		(.157)	
Dual Eligible Share $_{2002\text{-}03}$				-0.190
				(.276)
Other Medicare Insured Share $_{2002\text{-}03}$				0.202
				(.310)
Years on the Market	11.4	0.001	0.001	0.001
	(7.2)	(.002)	(.002)	(.002)
Any Generic Competition	0.402	0.011	0.012	0.011
	(.491)	(.023)	(.024)	(.023)
Δ Log(Price Per Day $_{2001\text{-}02}$)	0.077	-0.015	0.005	0.017
	(.158)	(.140)	(.138)	(.137)
Constant	-	0.216	0.202	0.205
	-	(.032)	(.033)	(.033)
# of Observations	488	488	488	488
R-squared	-	0.025	0.032	0.035

Utilization Estimates also Larger for Uninsured

Table 6: The Impact of MMS: Differentiating between Those with and without RX Insurance

		Δ Log(Daily Doses$_{j,2003\text{-}06}$)		
	μ (σ)	(4)	(5)	(6)
Medicare Market Share $_{2002\text{-}03}$	0.352	0.439		
	(.263)	(.322)		
Medicare Self-Pay Share $_{2002\text{-}03}$	0.217		0.483	0.398
	(.191)		(.426)	(.452)
Medicare Insured Share $_{2002\text{-}03}$	0.135		0.341	
	(.134)		(.879)	
Dual Eligible Share $_{2002\text{-}03}$				-0.838
				(1.690)
Other Medicare Insured Share $_{2002\text{-}03}$				0.972
				(1.222)
Years on the Market	11.4	0.003	0.003	0.003
	(7.2)	(.011)	(.001)	(.011)
Any Generic Competition	0.402	-1.100***	-1.101***	-1.109***
	(.491)	(.194)	(.195)	(.196)
Δ Log(Daily Doses $_{2001\text{-}02}$)	0.132	0.030	0.030	0.029
	(.843)	(.068)	(.068)	(.068)
Constant	-	-0.308	-0.302	-0.286
	-	(.174)	(.187)	(.186)
# of Observations	488	488	488	488
R-squared	-	0.301	0.301	0.303

Protected and "Small" Therapeutic Categories

- **CMS requires plans to cover all drugs in these 6 categories:**
  - Anti-depressant, anti-psychotic, HIV anti-retroviral, anti-convulsant, immunosuppressant, anti-cancer
- **Main motivation: to reduce ability to cream skim**
- **Less ability to "move market share" in these categories**
  - Do we see smaller price declines (σ positive)?
- **Similar if just 1 or 2 treatments in a category**
  - Plans required to cover one or both
- **Estimate specifications of following type**

$$\Delta Y_{j,2006} = \alpha + \beta MMS_{j,2003} + \lambda Prot_j + \sigma MMS_{j,2003} * Prot_j + \gamma DY_{j,2003} + \varepsilon_{j,2003}$$

Less Price Reduction in Protected and Small Categories

Table 7: The Impact of MMS: Variation Across Therapeutic Categories

	Δ Log(Price Per Day$_{j,2003\text{-}06}$)			
	(1)	(2)	(3)	(4)
Medicare Market Share $_{j,2002\text{-}03}$	-0.142**	-0.143**	-0.149**	-0.174**
	(.060)	(.057)	(.062)	(.078)
Protected	-0.046		-0.046	-0.038
	(.056)		(.056)	(.071)
Protected * MMS $_{j,2002\text{-}03}$	0.183		0.182	0.195
	(.201)		(.203)	(.146)
Small Category		-0.086	-0.086	-0.117*
		(.059)	(.059)	(.063)
Small Category * MMS $_{j,2002\text{-}03}$		0.316*	0.314*	0.408**
		(.161)	(.160)	(.185)
Constant	0.217	0.218	0.219	0.218
	(.032)	(.032)	(.034)	(.043)
# of Observations	488	488	488	292
R-squared	0.027	0.028	0.030	0.068
Exclude if face gen comp?	No	No	No	Yes

Utilization Shifting Away from "Small" Categories

Table 7: The Impact of MMS: Variation Across Therapeutic Categories

	Δ Log(Daily Doses$_{j,2003\text{-}06}$)			
	(5)	(6)	(7)	(8)
Medicare Market Share $_{j,2002\text{-}03}$	0.549*	0.482	0.598*	0.339**
	(.302)	(.318)	(.313)	(.142)
Protected	0.897*		0.920**	0.125
	(.456)		(.457)	(.155)
Protected * MMS $_{j,2002\text{-}03}$	-3.352**		-3.401**	-0.107
	(1.630)		(1.637)	(.335)
Small Category		0.755***	0.771***	0.639***
		(.220)	(.218)	(.174)
Small Category * MMS $_{j,2002\text{-}03}$		-1.327**	-1.320**	-1.166**
		(.548)	(.578)	(.452)
Any Generic Competition	-1.096***	-1.086***	-1.082***	
	(.248)	(.233)	(.249)	
Constant	-0.339	-0.348	-0.382	-0.066
	(.146)	(.147)	(.150)	(.126)
# of Observations	488	488	488	291
R-squared	0.320	0.304	0.324	0.128
Exclude if face gen comp?	No	No	No	Yes

Summary / Conclusions

- **Medicare Part D reduced pharmaceutical prices and increased utilization of prescription drugs**
  - Partially explains why spending much lower than anticipated
  - Elasticity estimates of approximately 0.5 after accounting for mechanical effect of insurance
- **Effects driven by uninsured Medicare recipients**
  - Imprecise estimates for those shifted from Medicaid
- **Suggestive evidence of no price decline for protected drugs**
- **Price increase for treatments in "small" categories**
  - Consistent with plan's financial incentives
- **Utilization shifts away from treatments in small categories**

Limitations

- Aggregate sales and utilization data
- Drug-specific Part D enrollment unobserved
- Just one year of post-program data
- Omitted factors correlated with Medicare market share?
- Spillover effects may be present – especially for Medicaid
- Behavior of pharmacies and wholesalers not considered
- Effect on new drugs, generic use, shifting across categories

Future Research Possibilities

- Do effects persist in subsequent years?
- Individual-level data on RX utilization
- Effects on private (and other public?) insurance coverage
- Effects on use of other health care
- Effects on health outcomes
- Variation in effects with plan market power
- Do Medicare recipients optimize plan choices?