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What is the elast. of demand for health care?

- Key question in health economics

- Fundamental question in health care reform
  - Millions have been added to health insurance rolls
  - Most have been funded in part by Federal $
  - Estimating cost to the government is fundamentally determined by the elasticyt of demand

Typical study

- $y_i = \alpha + x_i\beta + c_i\delta + \varepsilon_i$

- y_i some measure of health care use
- x_i control variables (age, sex, race, income)
- c_i coinsurance rate (what person has to pay out-of-pocket for $1 in medical care)
  - Higher c, higher cost of care so $\delta<0$
  - With most insurance policies, c is 0.10 to 0.4
  - Really generous plans, $c_i=0$
  - No insurance, $c_i=1$

Problem

- Insurance is not randomly assigned.
- Positive selection
  - People with the greatest demand for medical care have greater demand for insurance
  - Those who are the sickest (also eligible through Medicaid)
  - Most risk adverse
- Negative selection
  - Most insurance provided by employers
  - People with high incomes and education have more income and better insurance
  - They also tend to be healthier and need less care
- Hard to get unbiased estimate of δ

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Health insurance in the US

- 3 major sources
  - Employer
  - Government
    - Medicare (elderly and disabled)
    - Medicaid (poor and those with high medical expenses)
    - Military
    - Veterans
  - Self-purchase
- Significant gaps in coverage – primarily
  - Low income
  - Self employed
  - People working for small companies

Insurance coverage by type, 2015

- Any insurance   90.9%
- Any Private   67.2%
  - Employment based   55.7%
  - Direct purchase   16.3%
- Any government   37.1%
  - Medicare   16.3%
  - Medicaid   19.6%
  - Military   4.7%
- Uninsured   9.1%

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Figure 1

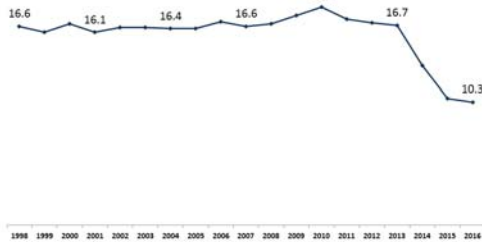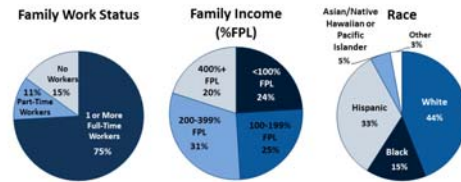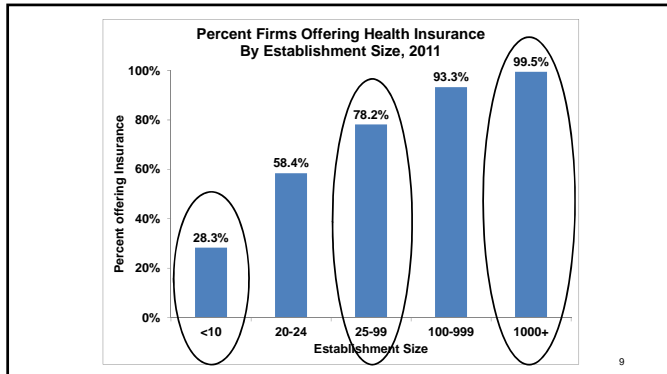**Uninsured Rate Among the Nonelderly Population, 1998-2016**

Figure 4

Characteristics of the Nonelderly Uninsured, 2016

Total = 27.5 Million Nonelderly Uninsured

NOTES: Includes nonelderly individuals ages 0-64. The U.S. Census Bureau's poverty threshold for a family with two adults and one

Percent Firms Offering Health Insurance By Establishment Size, 2011

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- CalPERS is a large retire health plan in CA
- Because of rising costs, instituted a copayment system in part of their plan
- This increased the cost of a standard Dr. visit
- Use this as a change in price to estimate the elast. of demand
- Copayment was only instituted in one part of the system – the other part can serve as a control in a difference-in-difference model

Medicare

- Part A
  - Hospital care
  - Mandatory
- Part B
  - Ambulatory visits
  - Voluntary (although nearly all sign up)
- Part D
  - Prescription drugs
  - voluntary

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Retiree health plans

- Workers were covered by employer when working
- Many cases, when you retire, firm continues to provide health insurance
- Once turn age 65, Medicare picks up almost all costs
- Retiree plans then pay the "gaps" in Medicare coverage (deductibles, coinsurance, copays)

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4/6/2018

CalPERS

- CA Public Employees Retirement System
  - 1.2 million employees and families
  - 3rd largest insurance plan in nation
- Retirees, provides gap coverage in Medicare
- Two plans
  - HMO
  - PPO
- Early 2000s, mounting fiscal concerns
- Instituted copays in plans

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- Physician visits
  - HMO increased from $0-$10 in 2002
  - No change in PPO
- Prescription drugs changes
  - Generic copays held at $5
  - Name brand $10 to $15 for formulary, to $30 for non-formulary
  - Instituted in 2001 for HMO, 2002 in PPO

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Specifics

- Sample
  - Medicare recipients
  - Continuous enrollment in PPO or HMO (Why?) (Is this a problem?)
- Data
  - Monthly aggregates of health care use
  - 1/2000-9/2003 (45 months)
  - 4 plans (2 PPO, 2 HMO)
  - 4*45 = 180 obs.

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Model

$$UTIL_{pt} = \alpha + \beta HIPAY_{pt} + \delta_p + \lambda_t + \varepsilon_{pt},$$

- p measures plan, t is month
- UTIL is measure of utilization
- δ and λ are plan and time effects
- HIPAY =1 for high copay, =0 otherwise
- Standard difference-in-difference model

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TABLE 1—MEANS OF KEY DEPENDENT VARIABLES
(By type of plan and year)

	PPOs				HMOs			
	Prepolicy	Postpolicy			Prepolicy		Postpolicy	
	2000	2001	2002	2003	2000	2001	2002	2003
Office visits								
Average copayment per visit (in dollars)	—	$0.68	$0.61	$0.59	—	$0.14	$10.11	$9.89
Visits per member per month	—	1.07	1.14	1.19	—	0.75	0.72	0.75
Prescription drugs								
Average copayment per drug (in dollars)	$6.93	$13.50	$13.82	$13.29	$1.36	$1.27	$7.63	$7.43
Drugs per member per month	1.98	2.07	2.21	2.44	1.27	1.43	1.34	1.50
Hospitalizations								
Share of members with any hospital days during the month (×10,000)	156.7	169.8	182.2	206.7	119.5	131.0	149.0	174.3

Treatment: $\Delta q = (q2-q1) = -0.03$
Control: $\Delta q = (q2-q1) = 0.07$
Diff-in-diff= $\Delta\Delta q = -0.03 - 0.07 = -0.10$

Arc-elasticity= $[(\Delta Q)/((q2+q1)]/[(\Delta P)/(p2+p1)]$
$= [-.1/(0.75+0.72)]/[(10.11-0.14)/(10.11+0.14)] = -0.7$

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Translating results

$$\xi_d = \frac{\%\Delta Q}{\%\Delta P} = \frac{\dfrac{Q_2 - Q_1}{Q_1}}{\dfrac{P_2 - P_1}{P_1}}$$

$$Arc\ \xi_d = \frac{\dfrac{Q_2 - Q_1}{\left(\dfrac{Q_2 + Q_1}{2}\right)}}{\dfrac{P_2 - P_1}{\left(\dfrac{P_2 + P_1}{2}\right)}} = \frac{\dfrac{Q_2 - Q_1}{Q_2 + Q_1}}{\dfrac{P_2 - P_1}{P_2 + P_1}}$$

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TABLE 2—EFFECTS OF 2002 HMO OFFICE VISIT COPAYMENT INCREASE ON OFFICE VISIT UTILIZATION

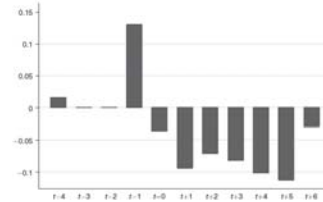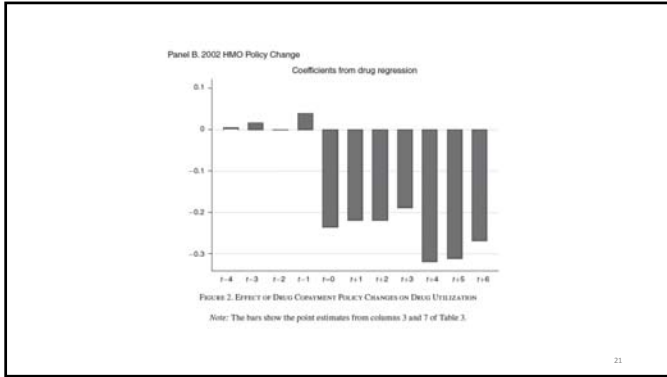| Independent variable	Copayment (Dollars per drug) (1)	Utilization (Number of office visits per member per month)		
		(2)	(3)	(4)
HIPAY	$10.06** (0.05)	−0.132** (0.018)		−0.095** (0.012)
$HIPAY_{t-4}$			0.016 (0.018)	
$HIPAY_{t-3}$			0.0002 (0.016)	
$HIPAY_{t-2}$			0.130** (0.016)	
$HIPAY_t$			−0.036** (0.016)	
$HIPAY_{t+1}$			−0.094** (0.016)	
$HIPAY_{t+2}$			−0.073** (0.016)	
$HIPAY_{t+3}$			−0.082** (0.023)	
$HIPAY_{t+4}$			−0.101** (0.016)	
$HIPAY_{t+5}$			−0.113** (0.016)	
$HIPAY_{t+6}$			−0.029** (0.016)	
N	128	128	128	104

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FIGURE 1. EFFECT OF 2002 HMO POLICY CHANGE ON OFFICE VISITS

Note: The bars show the point estimates from column 3 of Table 2.

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Panel B. 2002 HMO Policy Change

Coefficients from drug regression

FIGURE 2. EFFECT OF DRUG COPAYMENT POLICY CHANGES ON DRUG UTILIZATION

Note: The bars show the point estimates from columns 3 and 7 of Table 3.

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Arc Elasticity for Rx

- Δq is from regression – roughly -0.30
- q1=1.43, q=1.34
- p1=1.27, p2=7.63
- Arc-elasticity

    =[(q2-q1)/((q2+q1)]/[(p2-p1)/(p2+p1)]

    =[-.30/(1.43+1.34)]/

    [(7.63-1.27)/(7.63+1.27)]=-0.15

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Offset effect
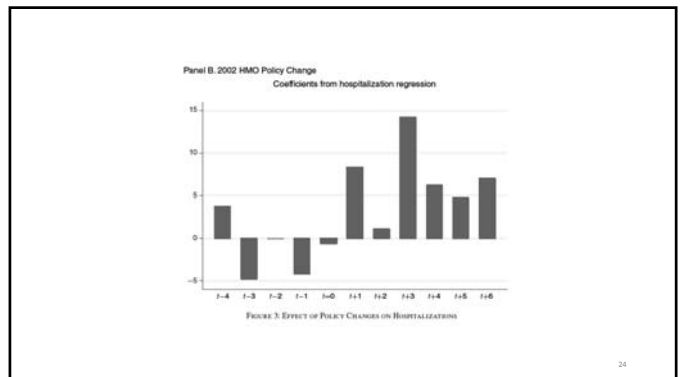
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Panel B. 2002 HMO Policy Change

Coefficients from hospitalization regression

FIGURE 3: EFFECT OF POLICY CHANGES ON HOSPITALIZATIONS

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TABLE 5—EFFECTS OF 2002 COPAYMENT INCREASES ON MEDICAL PAYMENTS PER MEMBER PER MONTH
(By source of payment)

	2002 Policy change			
	(1) Office visit payments (Dollars)	(2) Drug payments (Dollars)	(3) Hospital payments (Dollars)	(4) Offset (Percent)
All sources	−13.16** (1.18)	−23.06** (1.85)	7.23** (2.60)	20.0
Payment source				
Medicare	−10.53** (0.95)	—	5.58** (2.25)	53.0
Supplemental insurance	−11.24 (0.26)	−29.20** (1.67)	1.49** (0.38)	3.7
N	104	100	104	

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