LECTURE: MEDICARE

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OUTLINE OF LECTURE:

1. Overview of Medicare

2. Dimensions of variation used in the literature

3. D. Card. C. Dobkin and Nicole Maestas (2008), "The Impact of Nearly Universal Insurance Coverage on Health Care Utilization and Health: Evidence from Medicare," American Economic Review, Vol. 98, Issue. 5, pp. 2242–58,

D. Card. C. Dobkin and Nicole Maestas "Does Medicare Save Lives?" Quarterly Journal of Economics, 2009.

Medicare: Background and Program Details

Basic Facts:

- Nearly universal coverage for elderly (65+)
- Costs: $502.3 billion in 2009, or 20 percent of total national health insurance
- Benefits: Part A (Hospital), Part B (Physician's services) both with deductible and copayments, Part D (prescription drugs)

History:

- Medicare enacted in July 1965; nearly universal implementation in July 1966.
- Single largest increase in health insurance coverage in the U.S.—increase in insurance coverage by 75 percentage points among elderly

Eligibility:

- Can get at age 65 if you (or spouse) has worked for 40 quarters.
- Part A is free; Part B is optional and has low monthly premium; Part D is new drug coverage.

Who is likely to be more affected by Medicare:

- Those with low insurance coverage (disadvantaged)
- This is important to understand the reason for the program (redistribution?) as well as to keep in mind in empirical analyses

How to examine impact of program when it is universal and with no interstate variation?

→ Look for discontinuities in year (using introduction of program) and age (using eligibility at age 65)

The papers address one of the most important questions in health economics: how health insurance affects health care utilization and health status. (Alternative: RAND health insurance experiment)

Similar motivation for interest in literature on Medicaid expansions.

Work by Card, Dobkin, and Maestas

"The Impact of Nearly Universal Insurance Coverage on Health Care Utilization and Health: Evidence from Medicare" AER 2008

"Does Medicare Save Lives?" QJE 2009

Both papers use:
Regression discontinuity approach using variation around age 65

The AER paper:
Examines impacts across groups; with an interest in evaluating impacts on inequality in utilization, outcomes

The QJE paper:
Examines impacts on outcomes (mortality following hospital admission)

Identification? Standard checks for RD:
-- No confounding factors that are also changing (discontinuously) near age 65
-- Other factors are (mostly) smoothly changing near age 65 (in contrast to discontinuous change due to Medicare)

Possible confounders?

- Retirement
- Income
- Family Structure
- Changes in medical guidelines at 65

Is the "right" experiment?

- Depends what question you want to ask
- The RD captures short term changes in health care utilization (and impacts on mortality) from shift from <65 to >65
- Another question (not answerable in this framework) is how does access to Medicare change outcomes through older ages?

AER 2008 paper on utilization of health services:

Outcomes examined:
Health insurance coverage (1st stage, CPS, NHIS)
Health care utilization (BRFSS, NHIS)
Health behaviors (BRFSS, NHIS)
Hospital stays (Census of hospital discharges from CA, FL and NY, HCUP data)

Measuring age:
Limit to 55-75
Data allows for measurement of age in quarters

Things to show in an RD paper:
First stage (insurance at age 65) – sharp at discontinuity?
Confounders -- smooth through discontinuity?
Counts of running variable – smooth through discontinuity? [they do not do this here, since age assume not manipulatable]
Outcomes through RD

Basic model:

Consider: $Y_i = \alpha + \beta X_i + \gamma HI_i + \varepsilon_i$

Y_i = outcome of interest (health care utilization, health outcome)
HI_i =1 if have health insurance

Problem is that HI is endogenous. People with better jobs, higher preference for medical care, have more/better insurance.

Best evidence on this from the literature:

- Rand health insurance experiments
- Oregon Health Insurance Experiment, Finkelstein et al, Forthcoming QJE—Lottery to expand Medicaid (T and C from oversubscribed applicants); Results show higher health care utilization (including primary and preventive care as well as hospitalizations), lower out-of-pocket medical expenditures and medical debt (including fewer bills sent to collection), and better self-reported physical and mental health.
- Quasi experimental evidence from Medicare and Medicaid.

Card et al, RD Methodology

$$y_{ija} = X_{ija}\alpha_j + h_j(a) + D_a\pi_j + \upsilon_{ija}$$

where
y = first stage (insurance coverage) or outcome (health care utilization, mortality)
a = age
j = socioeconomic group (since we expect larger increases in coverage/outcomes for more disadvantaged groups)
h(a) = smooth function of age
D = dummy if 65+
π = treatment effect

In principle the shift at age 65 can reflect an increase in coverage (e.g. for someone w/o coverage) and generosity (for someone with an existing plan)

Parameterizing running variable h(a): quadratic in age, with different coefs for polynomial below and above age 65

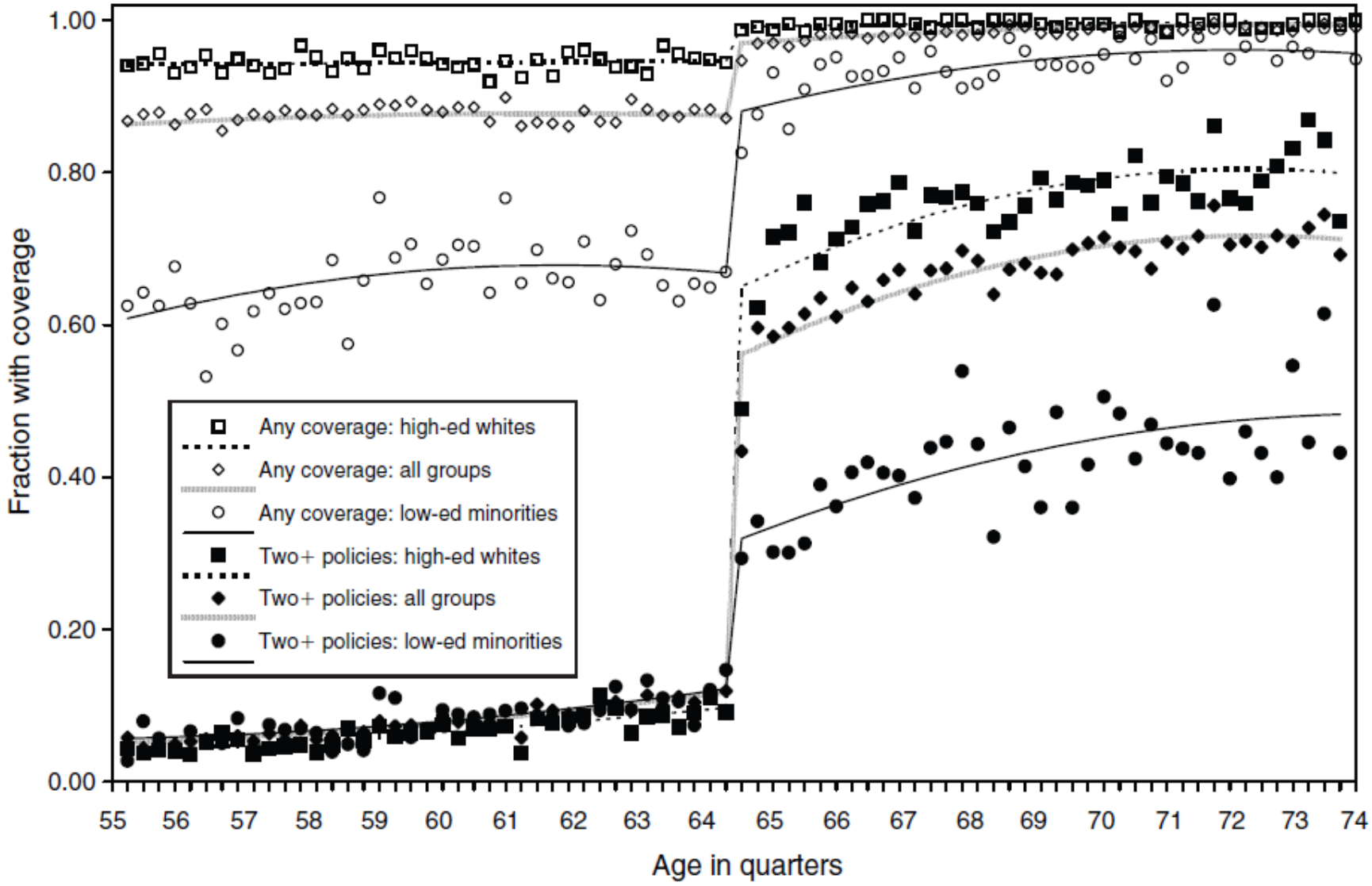


FIGURE 1. COVERAGE BY ANY INSURANCE AND BY TWO OR MORE POLICIES, BY AGE AND DEMOGRAPHIC GROUP

First stage: sharp increase in coverage; more for disadvantaged
(From NHIS; age measured in quarters) FIGURE 1

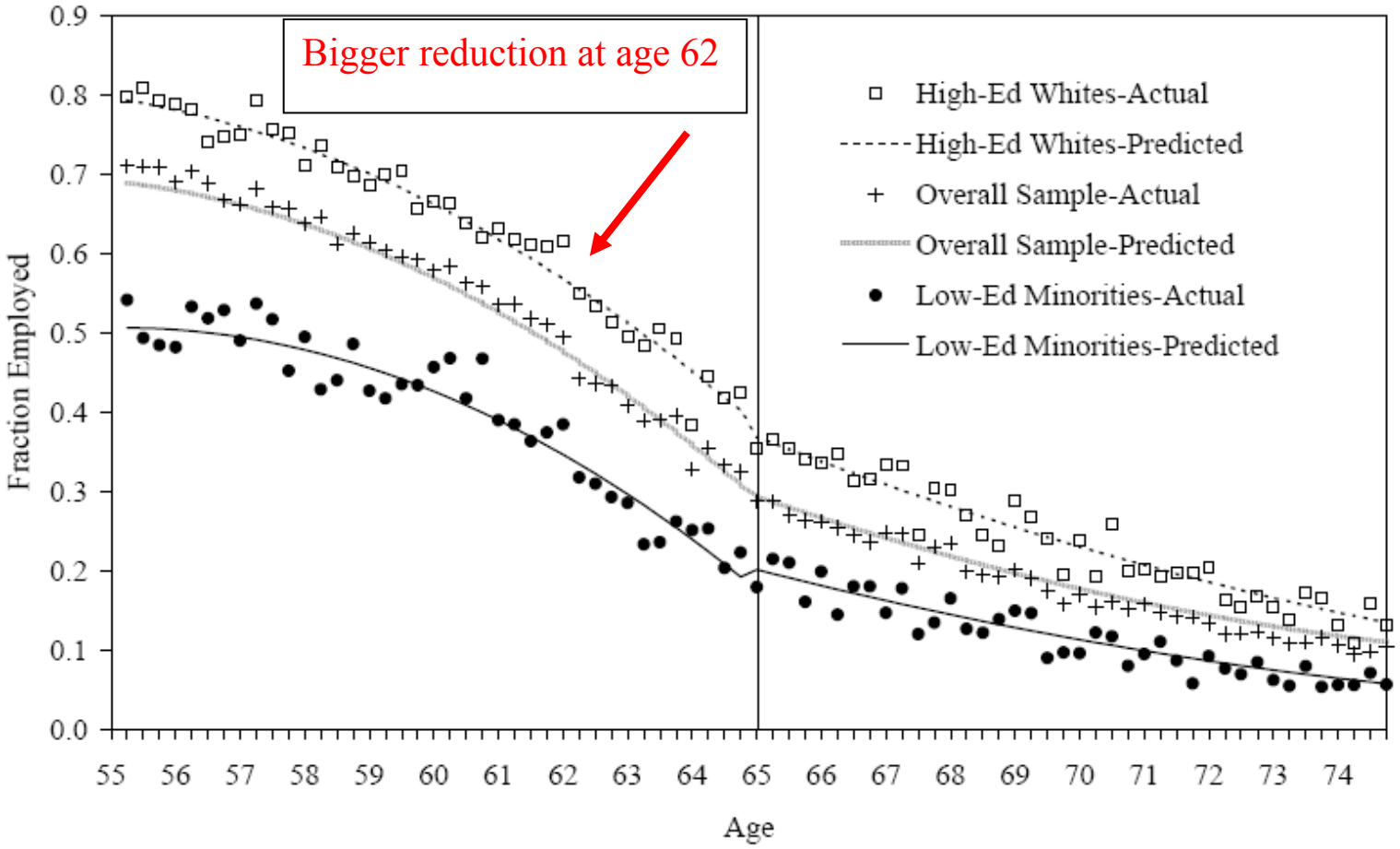
First stage: impacts on insurance coverage using 1999-2003 NHIS

TABLE 1—INSURANCE CHARACTERISTICS JUST BEFORE AGE 65 AND ESTIMATED DISCONTINUITIES AT AGE 65

	On Medicare		Any insurance		Private coverage		2+ Forms coverage		Managed care	
	Age 63–4 (1)	RD at 65 (2)	Age 63–4 (3)	RD at 65 (4)	Age 63–4 (5)	RD at 65 (6)	Age 63–4 (7)	RD at 65 (8)	Age 63–4 (9)	RD at 65 (10)
Overall sample	12.3	59.7 (4.1)	87.9	9.5 (0.6)	71.8	−2.9 (1.1)	10.8	44.1 (2.8)	59.4	−28.4 (2.1)
Classified by ethnicity and education:										
White non-Hispanic:										
High school dropout	21.1	58.5 (4.6)	84.1	13.0 (2.7)	63.5	−6.2 (3.3)	15.0	44.5 (4.0)	48.1	−25.0 (4.5)
High school graduate	11.4	64.7 (5.0)	92.0	7.6 (0.7)	80.5	−1.9 (1.6)	10.1	51.8 (3.8)	58.9	−30.3 (2.6)
At least some college	6.1	68.4 (4.7)	94.6	4.4 (0.5)	85.6	−2.3 (1.8)	8.8	55.1 (4.0)	69.1	−40.1 (2.6)
Minority:										
High school dropout	19.5	44.5 (3.1)	66.8	21.5 (2.1)	33.2	−1.2 (2.5)	11.4	19.4 (1.9)	39.1	−8.3 (3.1)
High school graduate	16.7	44.6 (4.7)	85.2	8.9 (2.8)	60.9	−5.8 (5.1)	13.6	23.4 (4.8)	54.2	−15.4 (3.5)
At least some college	10.3	52.1 (4.9)	89.1	5.8 (2.0)	73.3	−5.4 (4.3)	11.1	38.4 (3.8)	66.2	−22.3 (7.2)
Classified by ethnicity only:										
White non-Hispanic (all)	10.8	65.2 (4.6)	91.8	7.3 (0.5)	79.7	−2.8 (1.4)	10.4	51.9 (3.5)	61.9	−33.6 (2.3)
Black non-Hispanic (all)	17.9	48.5 (3.6)	84.6	11.9 (2.0)	57.1	−4.2 (2.8)	13.4	27.8 (3.7)	48.2	−13.5 (3.7)
Hispanic (all)	16.0	44.4 (3.7)	70.0	17.3 (3.0)	42.5	−2.0 (1.7)	10.8	21.7 (2.1)	52.9	−12.1 (3.7)

Huge increase in coverage and dual coverage.

Figure 2: Employment Rates by Age and Demographic Group (1992-2003 NHIS)



Testing for confounders; estimate same model on employment:

-- Estimate SAME model as above

-- Tiny employment discontinuity at age 65.

-- Stronger reduction at age 62.

-- they also look at marriage, poverty, mobility; no discontinuity

OUTCOME: HEALTH CARE UTILIZATION

TABLE 3—MEASURES OF ACCESS TO CARE JUST BEFORE 65 AND ESTIMATED DISCONTINUITIES AT 65

	1997–2003 NHIS				1992–2003 NHIS			
	Delayed care last year		Did not get care last year		Saw doctor last year		Hospital stay last year	
	Age 63–64 (1)	RD at 65 (2)	Age 63–64 (3)	RD at 65 (4)	Age 63–64 (5)	RD at 65 (6)	Age 63–64 (7)	RD at 65 (8)
Overall sample	7.2	−1.8 (0.4)	4.9	−1.3 (0.3)	84.8	1.3 (0.7)	11.8	1.2 (0.4)
Classified by ethnicity and education:								
White non-Hispanic:								
High school dropout	11.6	−1.5 (1.1)	7.9	−0.2 (1.0)	81.7	3.1 (1.3)	14.4	1.6 (1.3)
High school graduate	7.1	0.3 (2.8)	5.5	−1.3 (2.8)	85.1	−0.4 (1.5)	12.0	0.3 (0.7)
At least some college	6.0	−1.5 (0.4)	3.7	−1.4 (0.3)	87.6	0.0 (1.3)	9.8	2.1 (0.7)
Minority:								
High school dropout	13.6	−5.3 (1.0)	11.7	−4.2 (0.9)	80.2	5.0 (2.2)	14.5	0.0 (1.4)
High school graduate	4.3	−3.8 (3.2)	1.2	1.5 (3.7)	84.8	1.9 (2.7)	11.4	1.8 (1.4)
At least some college	5.4	−0.6 (1.1)	4.8	−0.2 (0.8)	85.0	3.7 (3.9)	9.5	0.7 (2.0)
Classified by ethnicity only:								
White non-Hispanic	6.9	−1.6 (0.4)	4.4	−1.2 (0.3)	85.3	0.6 (0.8)	11.6	1.3 (0.5)
Black non-Hispanic (all)	7.3	−1.9 (1.1)	6.4	−0.3 (1.1)	84.2	3.6 (1.9)	14.4	0.5 (1.1)
Hispanic (all)	11.1	−4.9 (0.8)	9.3	−3.8 (0.7)	79.4	8.2 (0.8)	11.8	1.0 (1.6)

Modest increase in access to care and utilization; larger for more disadvantaged groups.

Hospital discharge data (CA, FL, NY 1992-2002), ages 60-70

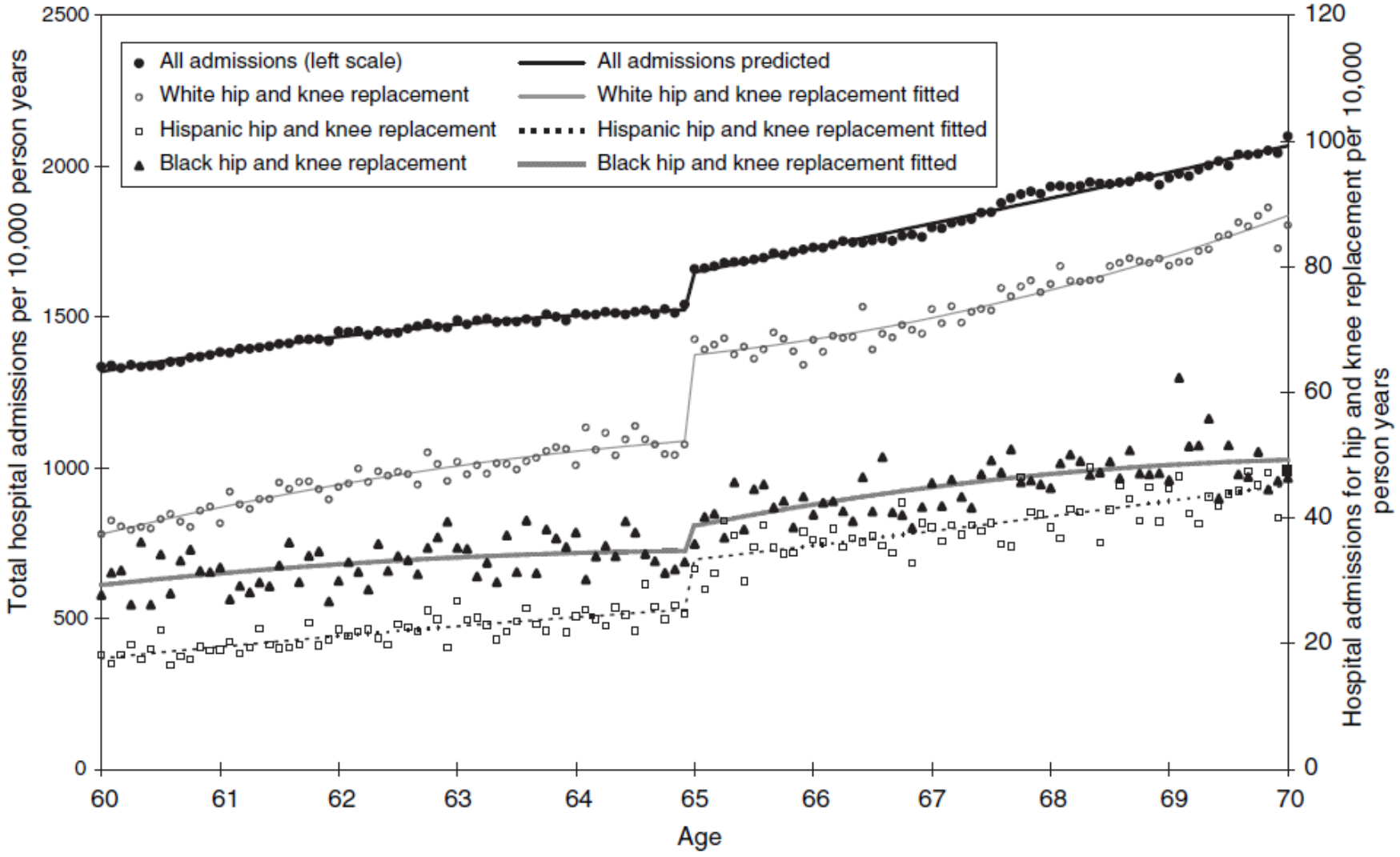


FIGURE 3. HOSPITAL ADMISSION RATES BY RACE/ETHNICITY

Increase is driven by discretionary medical care, diagnostic heart treatments.

Table 4: shows that increases in admissions are for:
-- non ER route in hospital
-- procedure-heavy diagnoses show bigger increase at 65

Osteoarthrosis
Joint replacement lower extremity
Gall bladder removal

Seems discretionary; substitution across time?

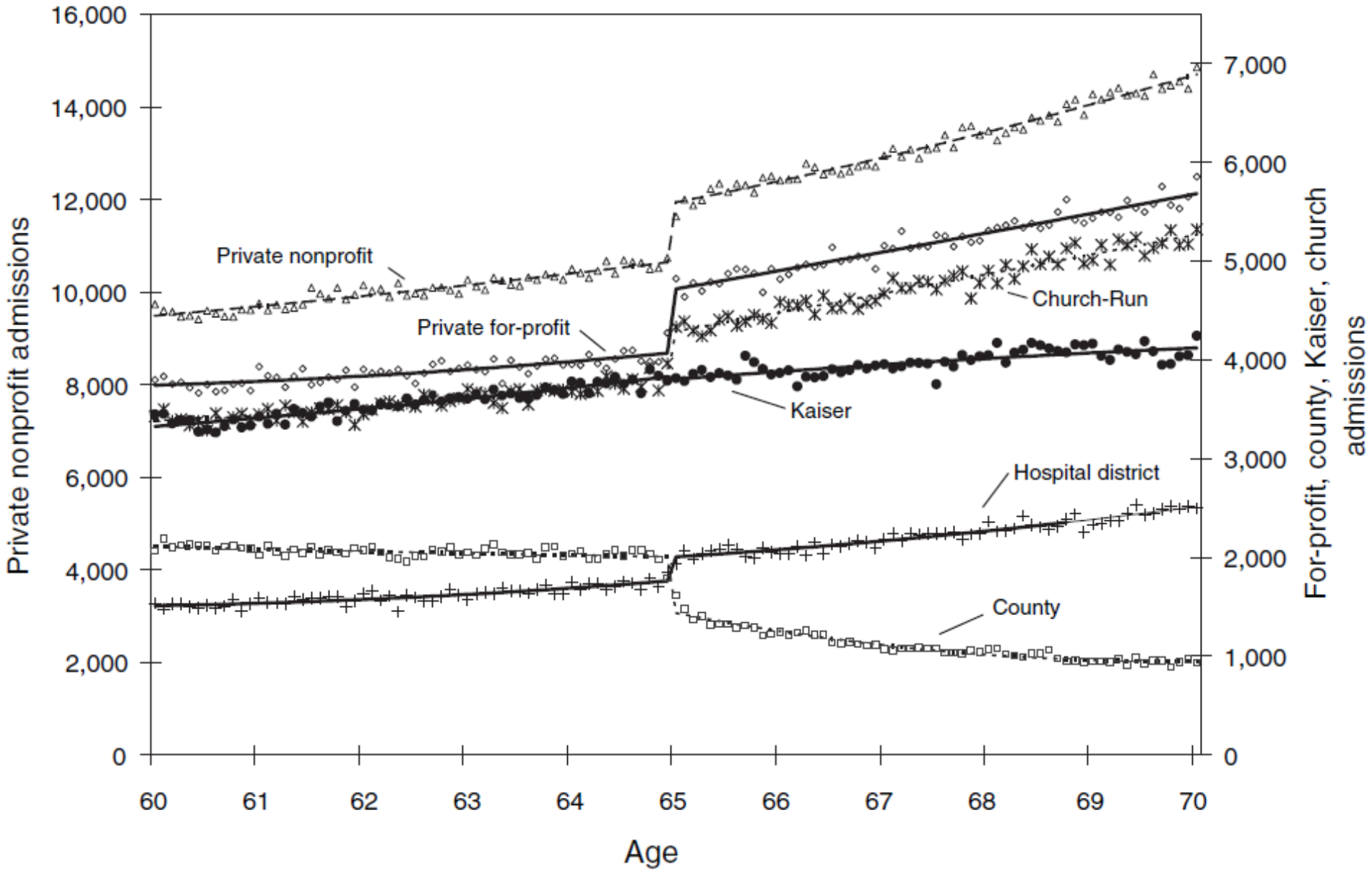


FIGURE 4. HOSPITAL ADMISSION IN CALIFORNIA BY OWNERSHIP TYPE (1992–2002)

County hospital decreases, private increases

Conclusions:

-- Medicare causes sharp increase in coverage, especially for disadvantaged

-- Medicare causes increase in health care utilization:

Low cost services increase more for previously underinsured

Higher cost services increase more for dual insured

Card, Dobkin and Maestas "Does Medicare Save Lives", *QJE*

RD on age 65 (as before)
Attempt to isolate a subpopulation whose mortality is more likely to be affected by Medicare "treatment"

They want to test whether the increase in insurance (Medicare) leads to different/better/more health services and thus improved outcomes (lower mortality)

Potential confounder is that hospital admissions change with Medicare and we do not want to bias the results from a composition effect (likely bias??)

Their solution is to focus on:
Hospital admissions that come through the emergency department (ED) for severe illnesses [= codes with same admit rate on weekdays and weekends]

[This gets out the elective surgery folks, such as knee replacement, that seem to dominate the increase in hospital admissions]

Basic Model

$$y_i = f(a_i, \alpha) + Post65_i\beta + \epsilon_i$$

β = scaled estimate of causal impact of 65 threshold (scaled by first stage impact of insurance at RD)
Age polynomial interacted fully with post65 dummy

DATA:
California Hospital Discharge File, 1/92-12/02, universe of discharges
Measuring age: exact age at entry into hospital (not birthdate or exact date of admission)

Remember: things to show in an RD paper:
First stage (insurance at age 65) – sharp at discontinuity?
Counts of running variable – smooth through discontinuity?
Confounders -- smooth through discontinuity?
Here number of hospital visits (and composition, see AER paper) change discontinuously at age 65. Have to deal with this some way.

All admissions rise at 65 (below). That is a problem (selection at RD)

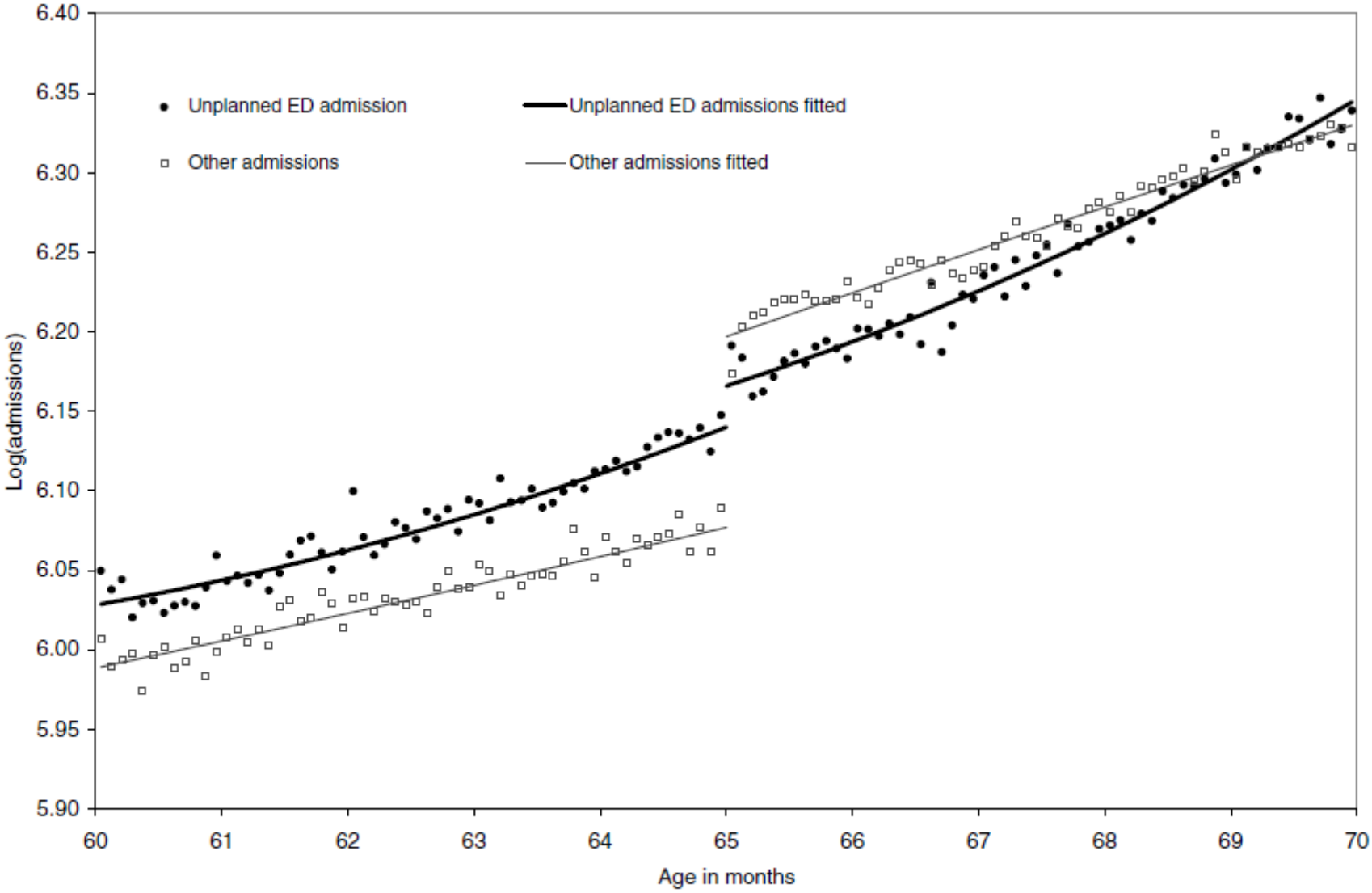


FIGURE II
Number of Admissions by Route into Hospital, California, 1992–2002

Solution: focus on certain admissions (those that enter through the ER due to conditions that require immediate hospitalization). They identify these as having similar admission rates on weekdays and weekends. They create 4 quartiles based on t-test for weekend/weekday balance. (High tstat means reject balance --> and these have a jump at 65.)

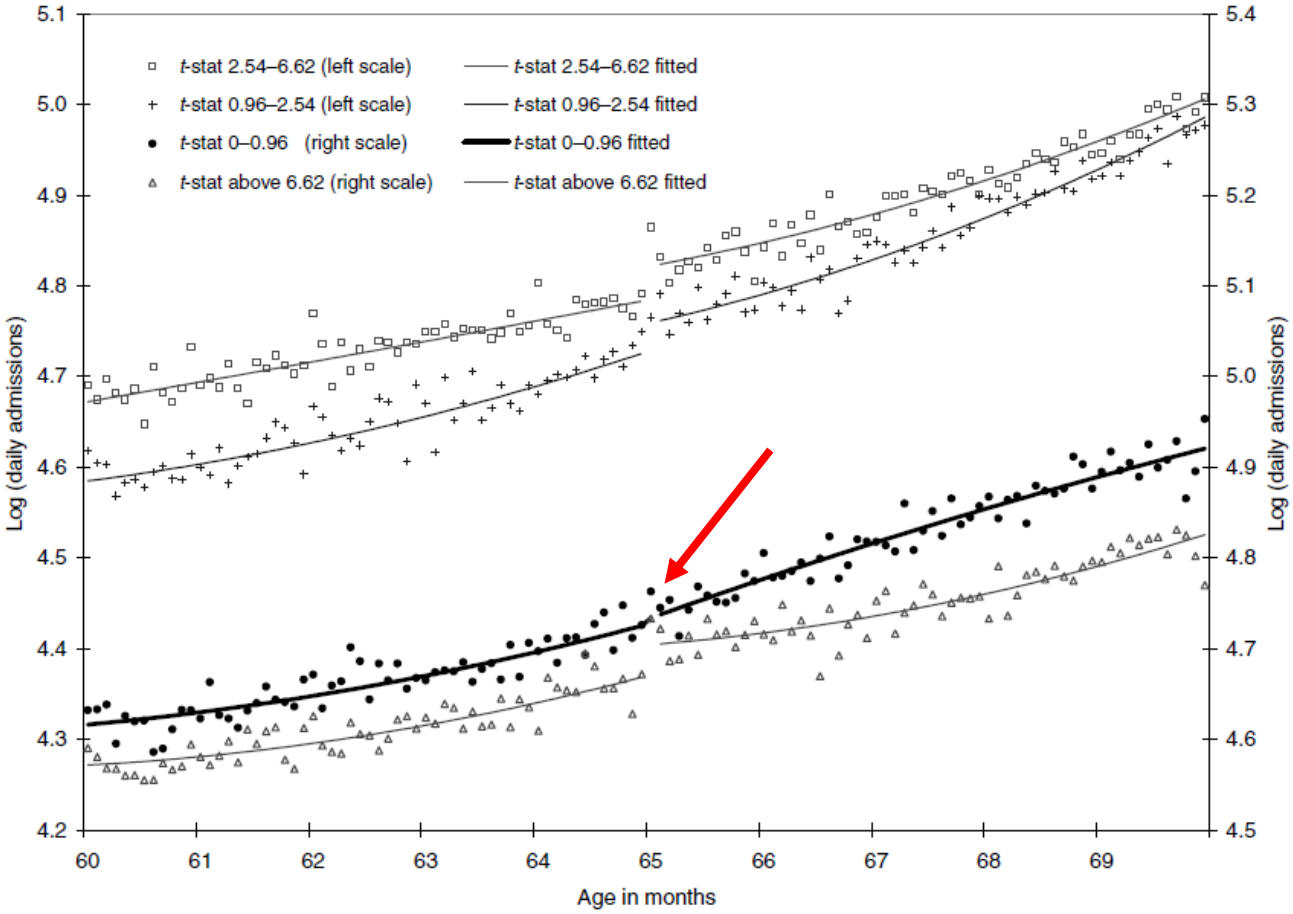


FIGURE III
Admissions through the ED by Quartile of *t*-test for Equality of Weekend and Weekday Admission Rates

They then focus on the conditions in the bottom quartiles (t<0.96) which is smooth through the discontinuity.

Called nondeferrable

They also looked for discontinuity in casemix, demographics

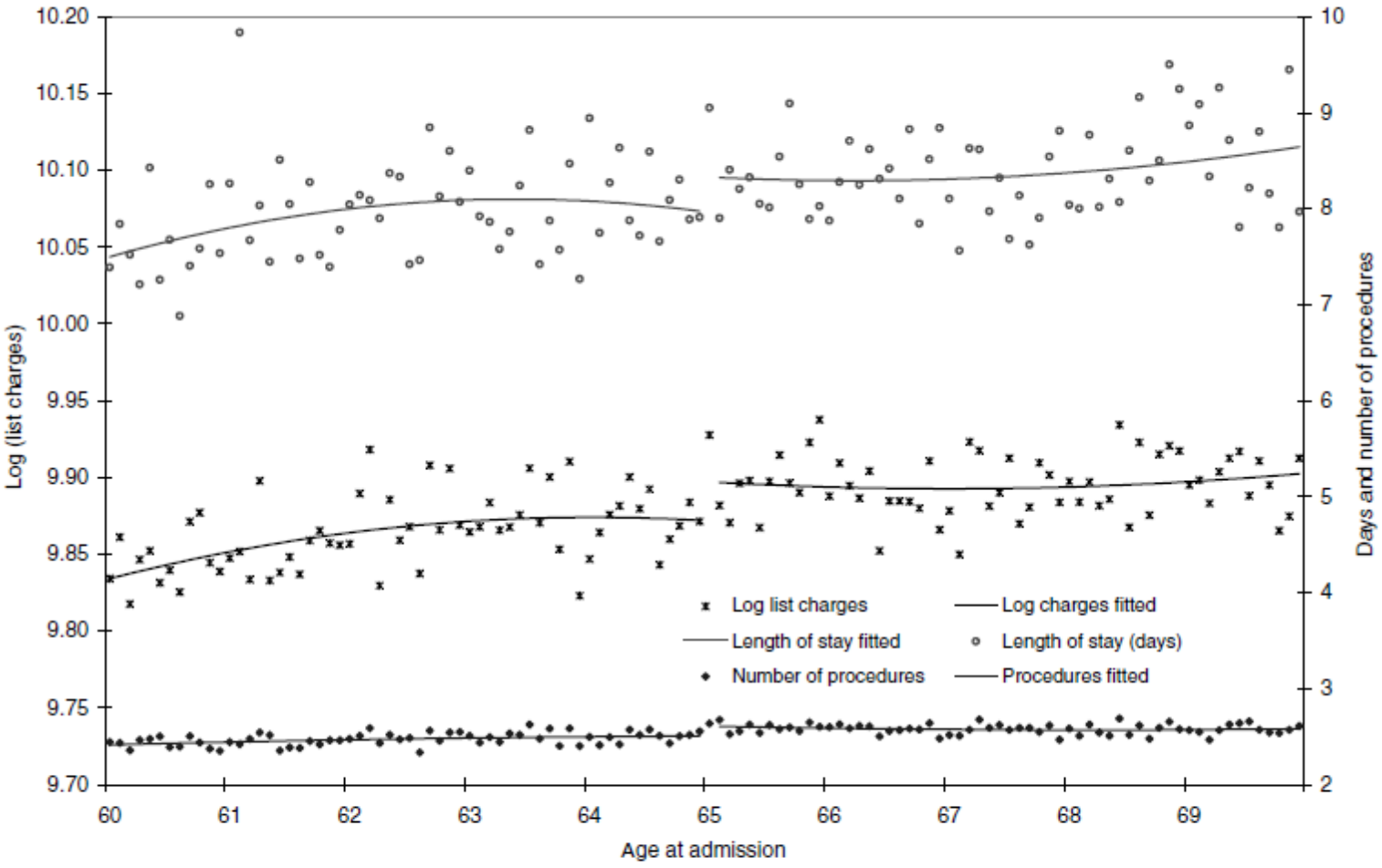


FIGURE V
Three Measures of Inpatient Treatment Intensity

Intensity of treatment

There is a small increase in procedures.

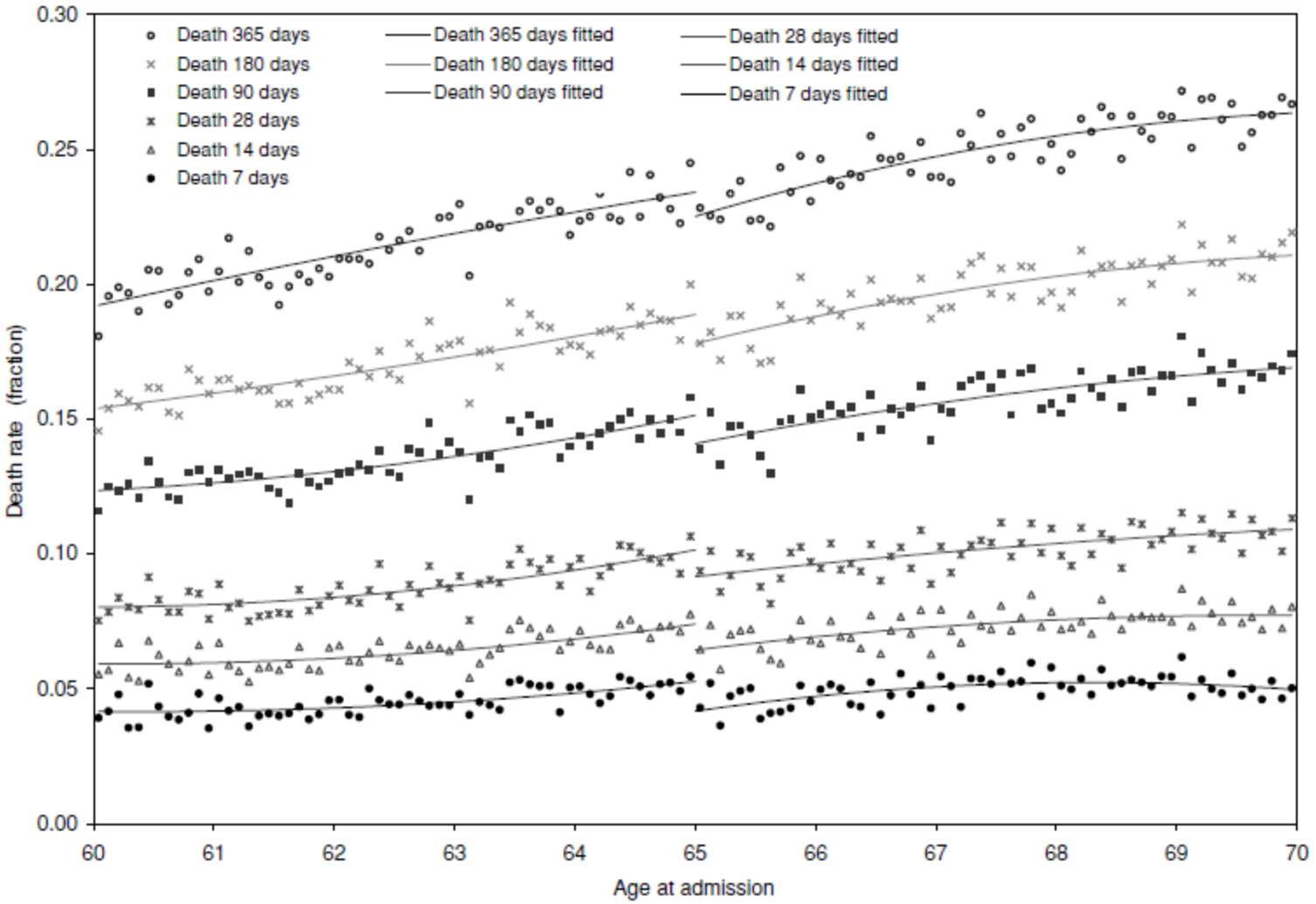


FIGURE VI
Patient Mortality Rates over Different Follow-Up Intervals

Nontrivial decrease in mortality.

The authors find that this change in coverage leads to a nearly 1 percentage point drop in 7-day mortality for patients at age 65 (20 percent reduction). The mortality gap persists for at least two years following the initial hospital admission.

The magnitude is too large to be driven solely by changes in the 8% of the population that transition from no insurance to Medicare.

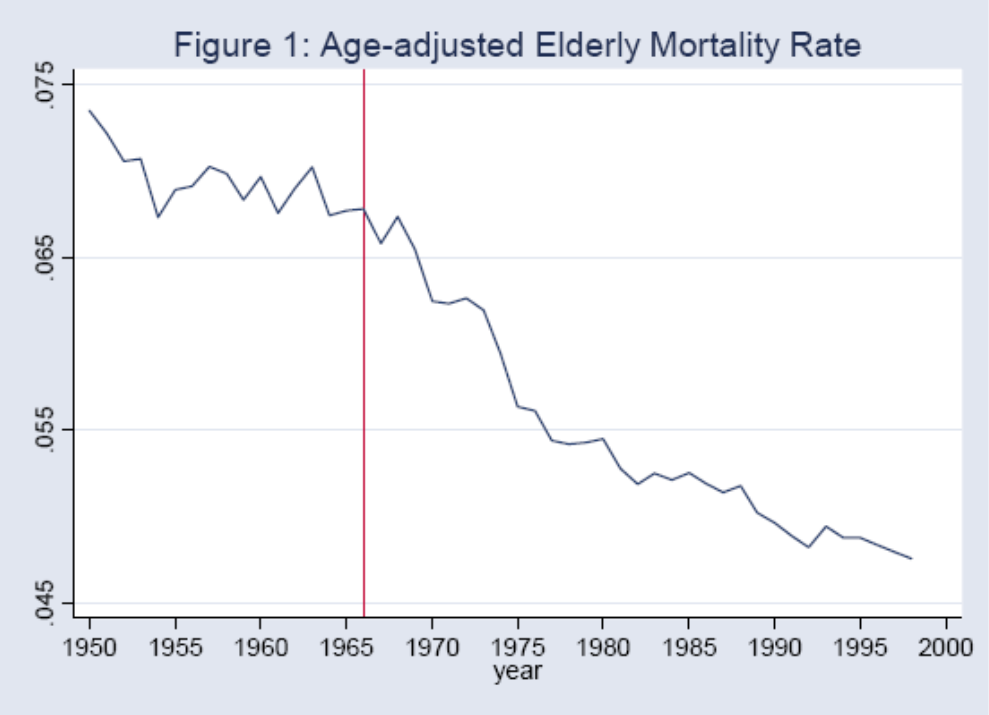
Ultimate placebo check – do same exercise using data from pre-1965.

Finkelstein & McKnight "What did Medicare do: (And was it worth it)?"

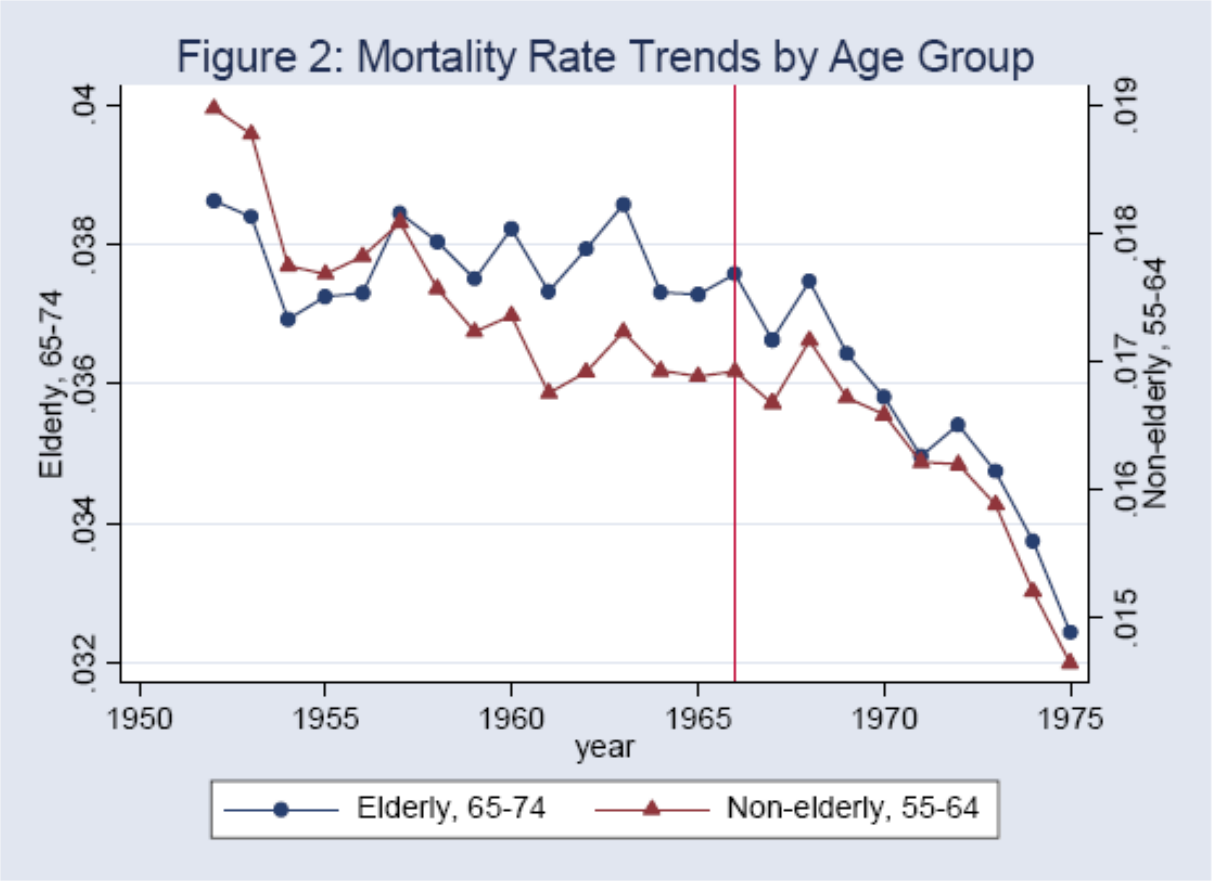
Examine introduction of Medicare on mortality and out of pocket health care expenditures.

They use a difference-in-difference framework:
-- difference 1: before/after introduction
-- difference 2: age ("young elderly" 65-74 vs "near elderly" 55-64)

As an alternative second differencing they compare changes with the introduction among groups with higher and lower prior insurance coverage.



DD1: Changes across young elderly and near elderly before and after 1965.



Trending down for both groups; elderly turns down pre-1965.

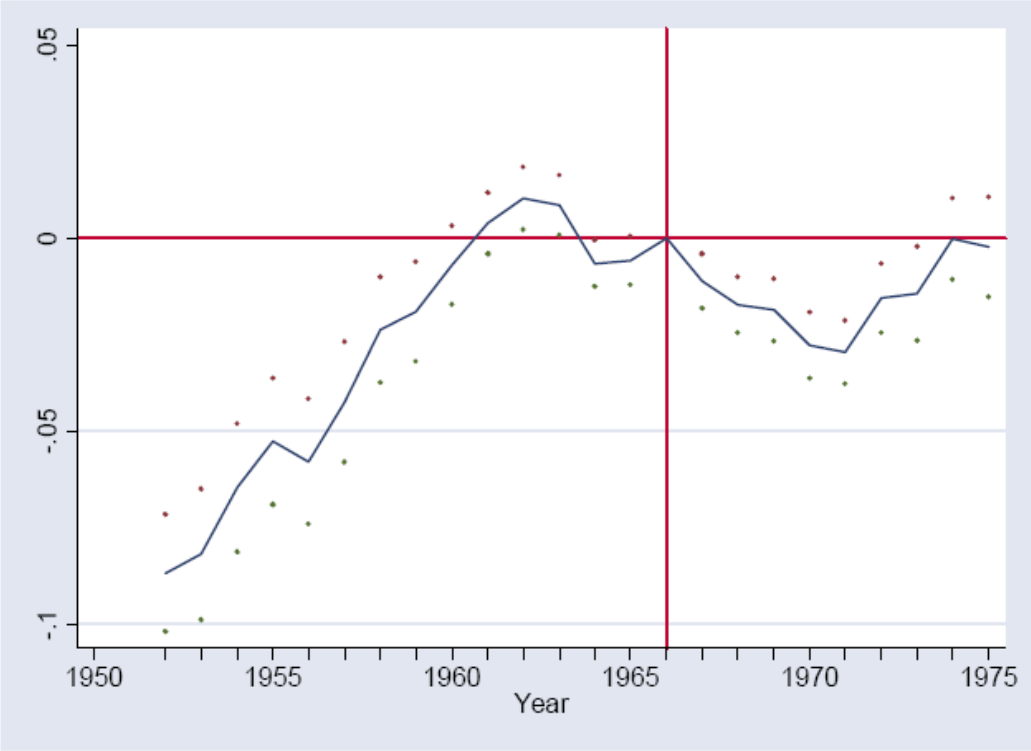
Conditional difference-in-difference model:

$$\ln(\text{death})_{ast} = \beta_1 \ln(\text{popn})_{ast} + \beta_2 \text{elderly}_a + \alpha_s * \mathbf{1}(state_s) + \delta_t * \mathbf{1}(Year_t) + \sum_{t=1952}^{t=1975} \lambda_t (\text{elderly})_a * \mathbf{1}(Year_t) + X_{st}\beta + \varepsilon_{ast}$$

[how is this a DD model?]

Estimated λ:

Figure 3. Estimates of equation (1), the age identification strategy, for ages 55-74.



Same as unconditional graph—decline in (relative) mortality prior to 1965.

DD2: Geographic variation in % of elderly w/o insurance

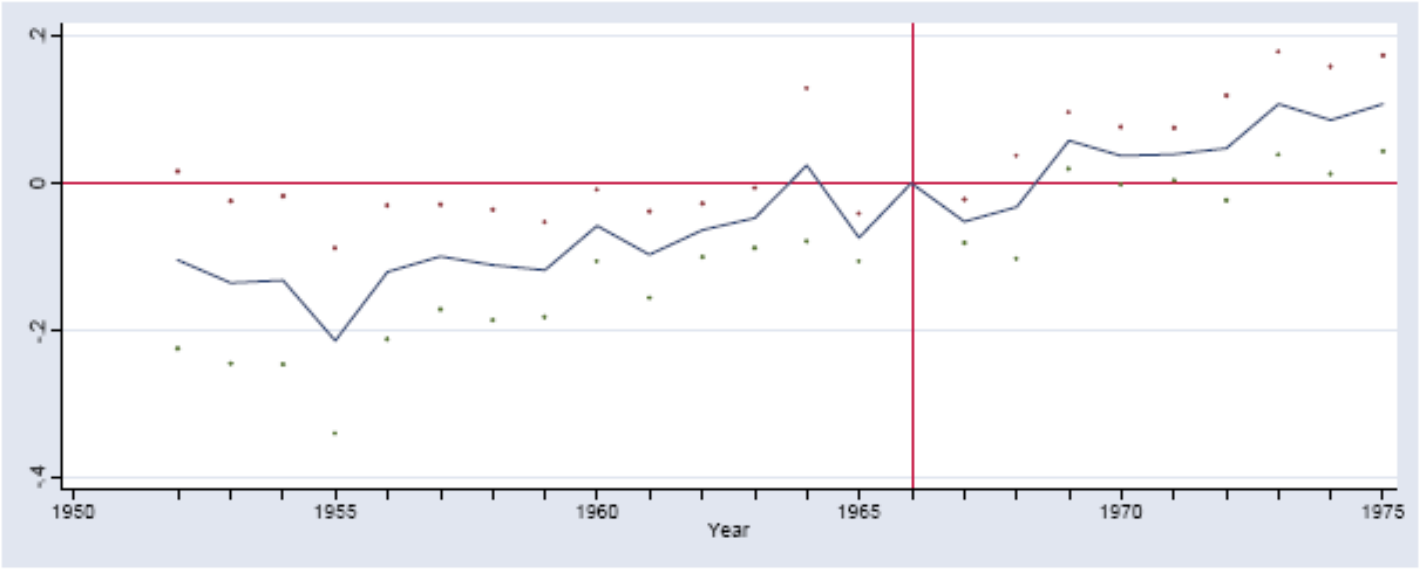
[Why do this as a DD instead of DDD? They drop the age interaction which seems strange in this case. They mention later that DDD is similar to DD but I would show DDD.]

Note problem is that vital statistics data (e.g. death certificates is short on demographic variables—no education for example). So a common alternative is to use geographic variation to proxy for these missing demographic variables.

No break in trend at 1966

Figure 4: Estimates of equation (4), the geographic variation strategy

Panel A: Ages 65+



Also no impact on specific diseases (not shown in paper)

Their interpretation of the results:
-- when people were in need (with possible exception of segregated south), people w/o insurance sought and received care in county hospitals. This is consistent with little change in mortality

<u>Out of pocket expenditures:</u>
Looking for some impact of Medicare, they use two cross-sectional data sets on health care utilization and expenditures (1963, 1970).

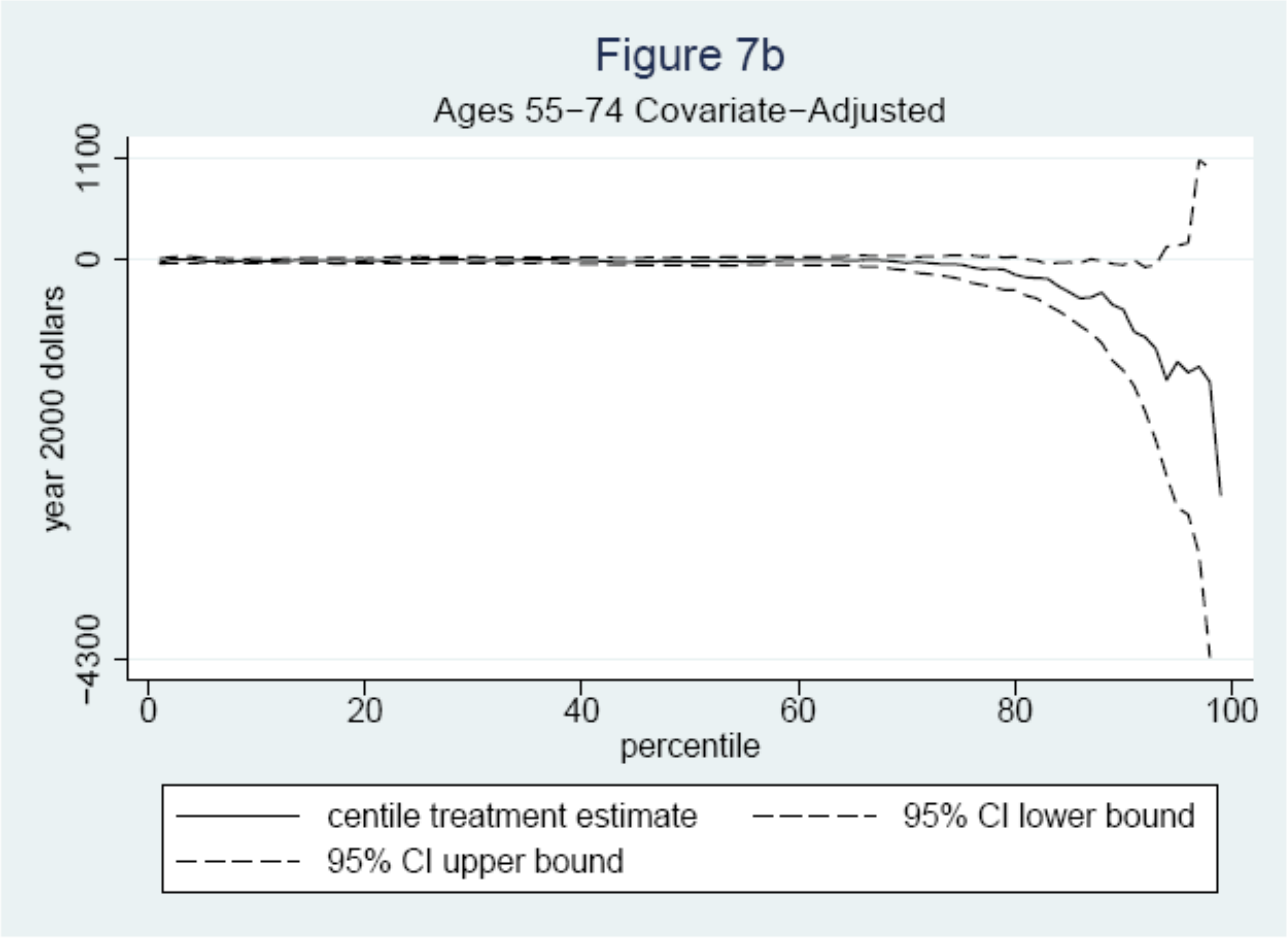
They want to capture the impacts across the distribution as out of pocket expenditures are highly skewed (see Fig 5)

QTE in DD setting:

$$\Delta_q = \{\text{spend}_q(1970, \text{elderly} = 1) - \text{spend}_q(1963, \text{elderly} = 1)\}$$
$$- \{\text{spend}_q(1970, \text{elderly} = 0) - \text{spend}_q(1963, \text{elderly} = 0)\}$$

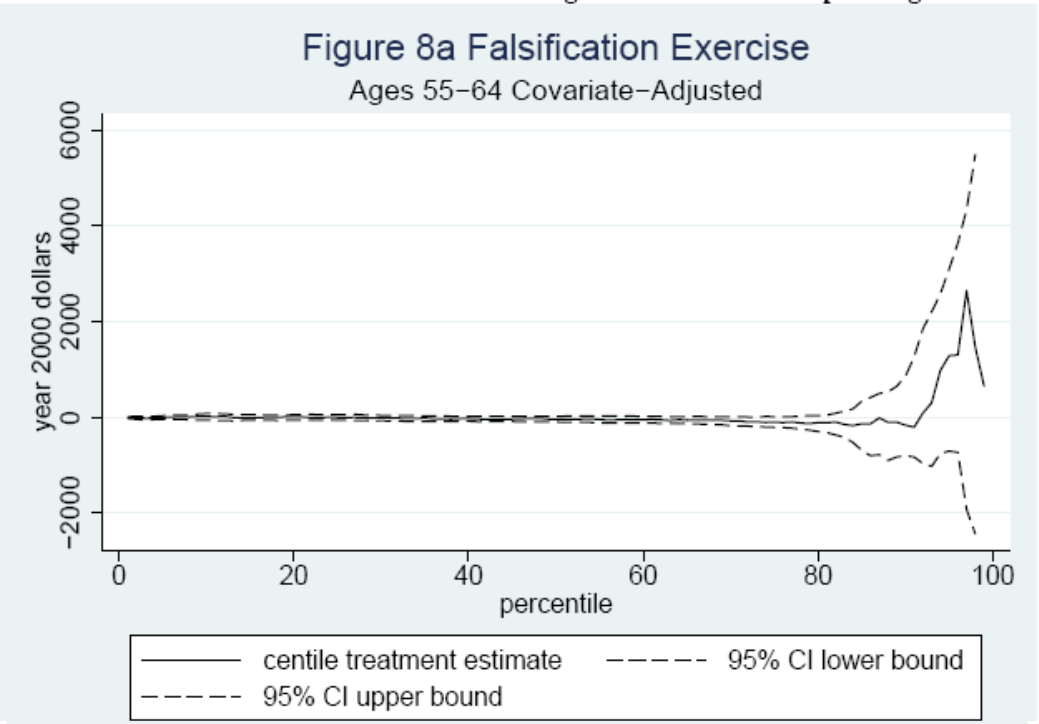
Again comparing young elderly to near elderly, before/after

Results for QTE with covariates:

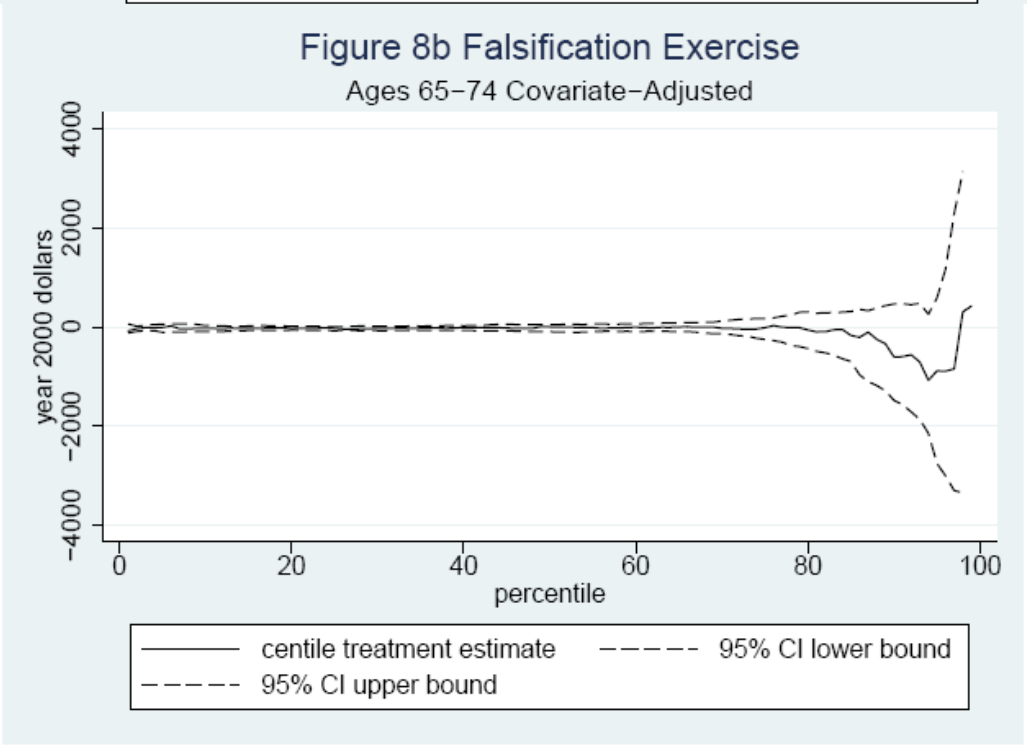


Large reduction concentrated at the top of the distribution.

Is this result just picking up an underlying trend?



Compare 55-59 to 60-64



Compare 65-69 to 70-74

Looks like no—although there is a downward trend in 8b
Comments:
-- not sure why they do not present everything by race? This is in the vital statistics data.