Towards a New, Public Dataset for Studying Mortality Inequality

Matching the 1940 U.S. Census with Social Security death records, 1975-2005

Joshua R. Goldstein Monica Alexander

UC Berkeley, Dept. of Demography

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Two quotations

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– PAA HMD workshop

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We lost our access to the SIPP & SSA data file when the grant expired.
– a real researcher working on inequality and mortality

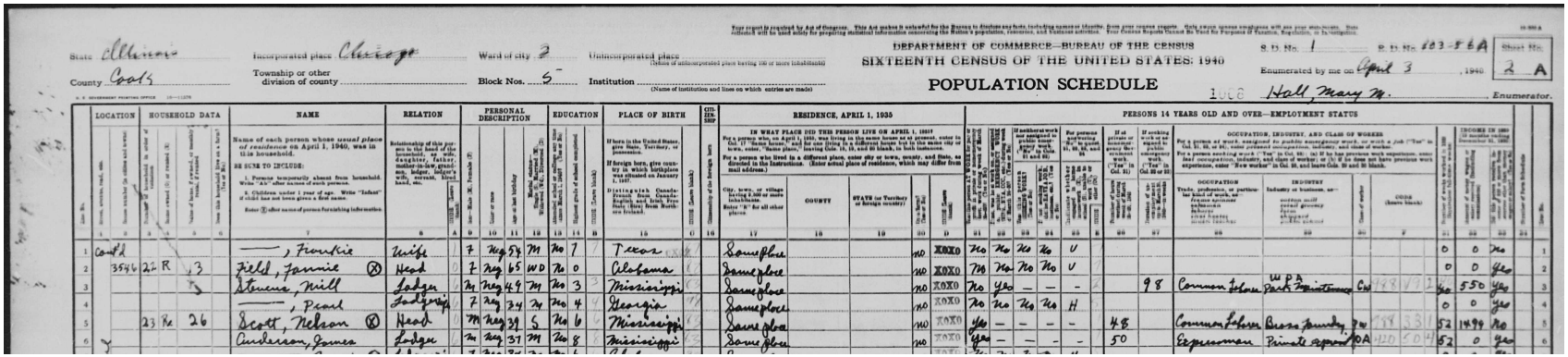
The Challenges

- Protect individual privacy
- Easy access for all researchers
- Replication and scientific progress
  (improving on others' work)
- Large sample sizes
- Lots of covariates
- Integrated estimation (matching and modeling)

The Opportunity: Unrestricted data

- The 1940 U.S. Census with names and rich covariates
- Social Security Death Records with names and mortality

1940 Census

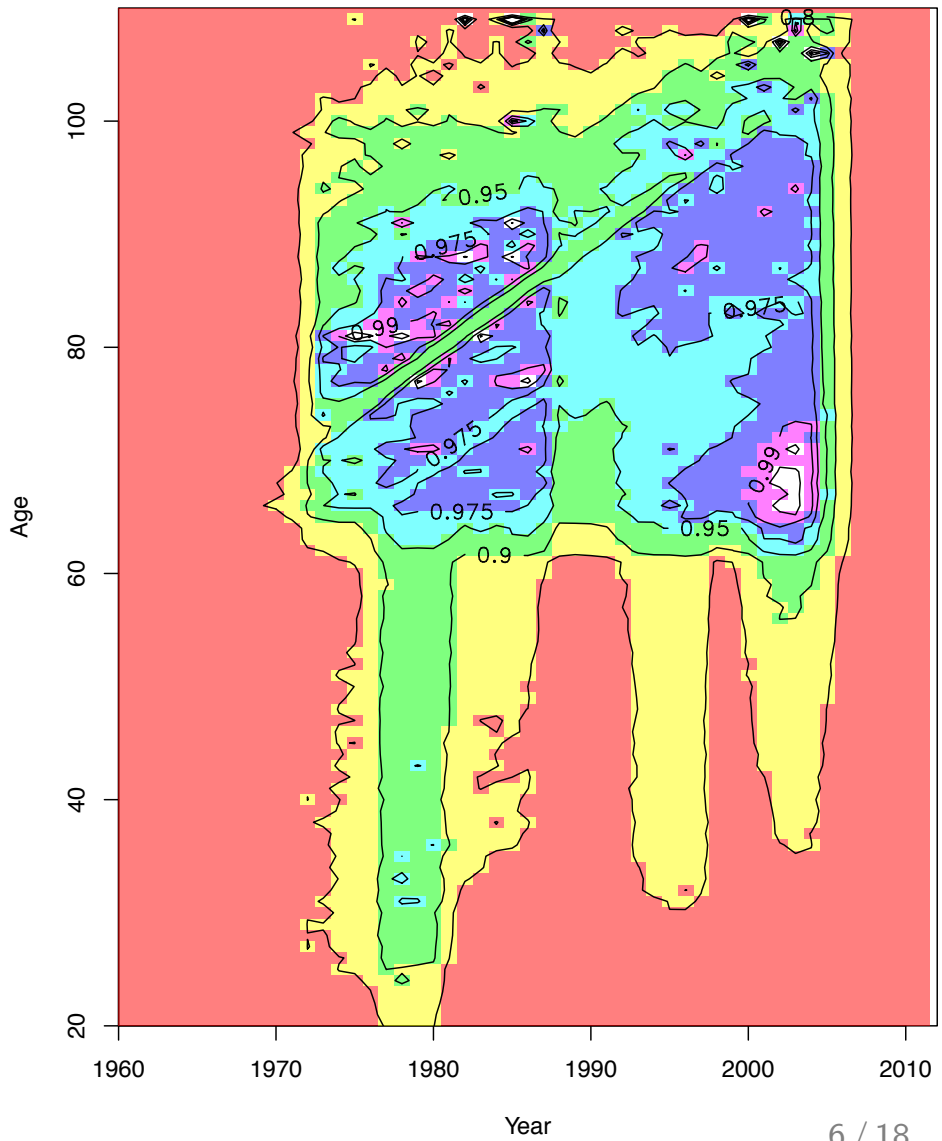


- 130 million people
- Rich individual level variables
  (Full demographics & income & education & housing)
- Street address level geography (Neighbors, blocks, ...)
- Already transcribed by Ancestry and MPC

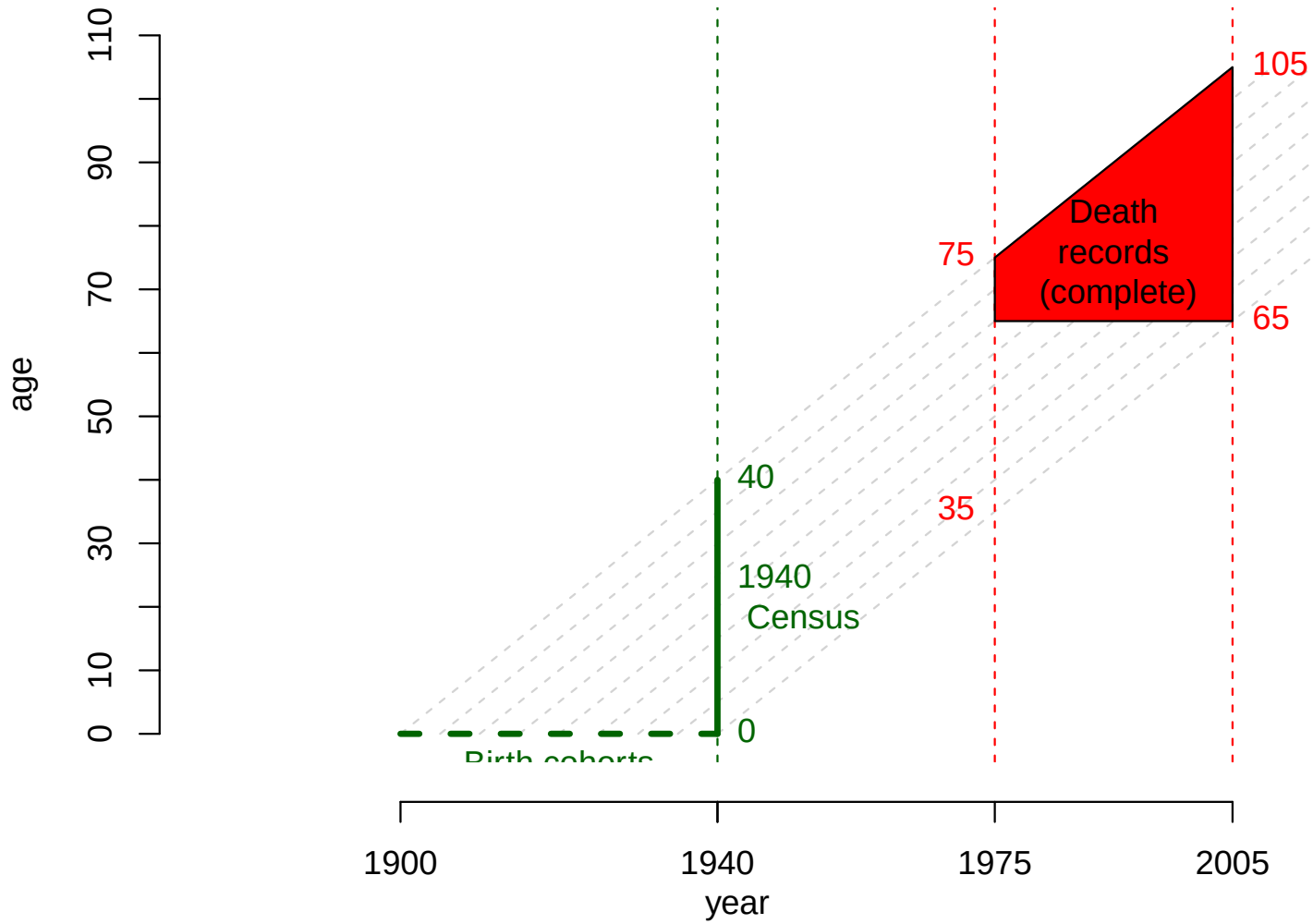
Social Security Death Index

- 80 million deaths
- Nearly complete coverage (over age 65, 1975-2005)
- Name, SSN, DOB, DOD
- Public information

SSDI deaths / HMD counts



Lexis diagram of CenSoc linkage



Matching method

Exact matching of unique keys

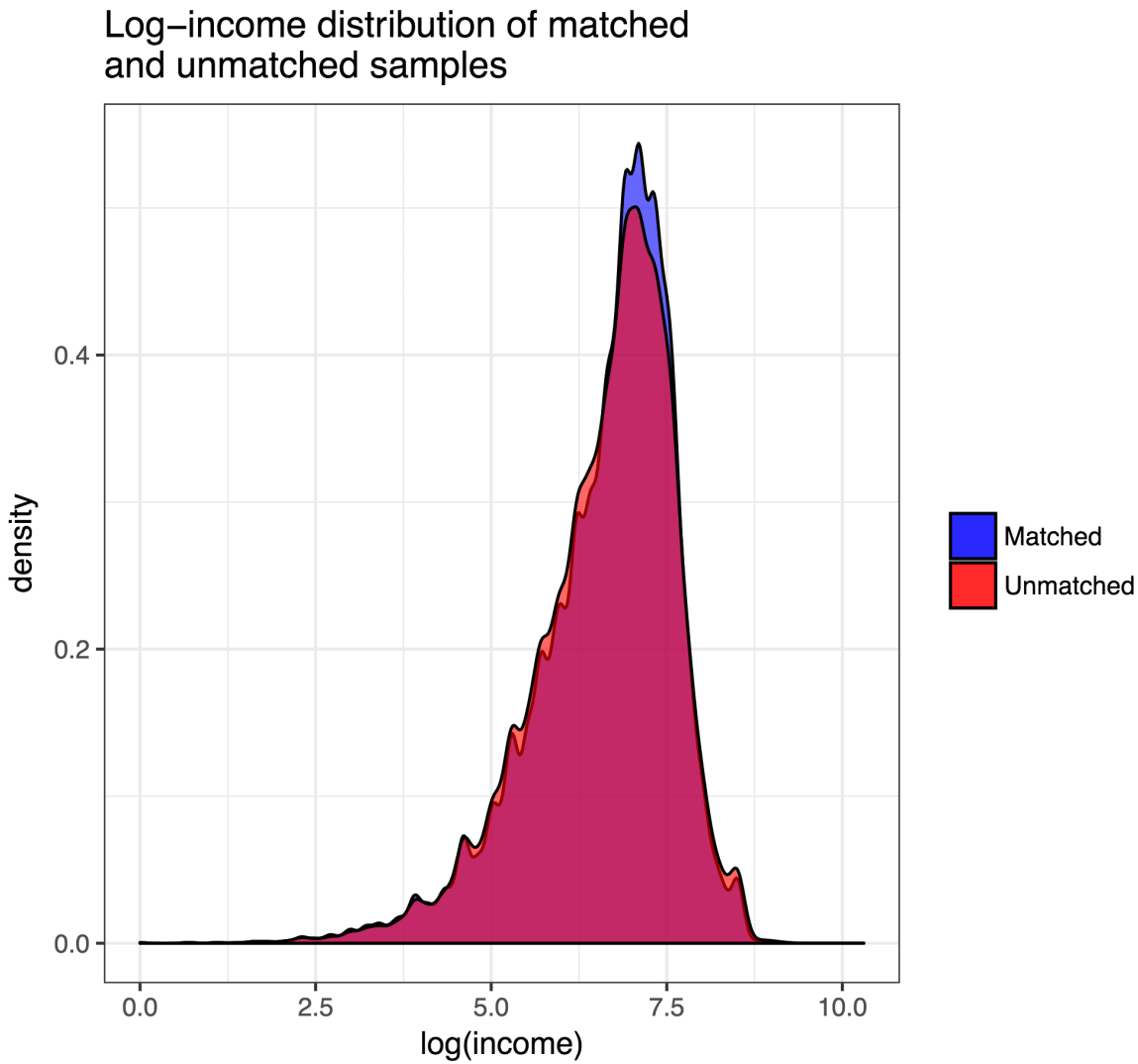
(first name, last name, birth year)

- About 75% of keys are unique

Linkage

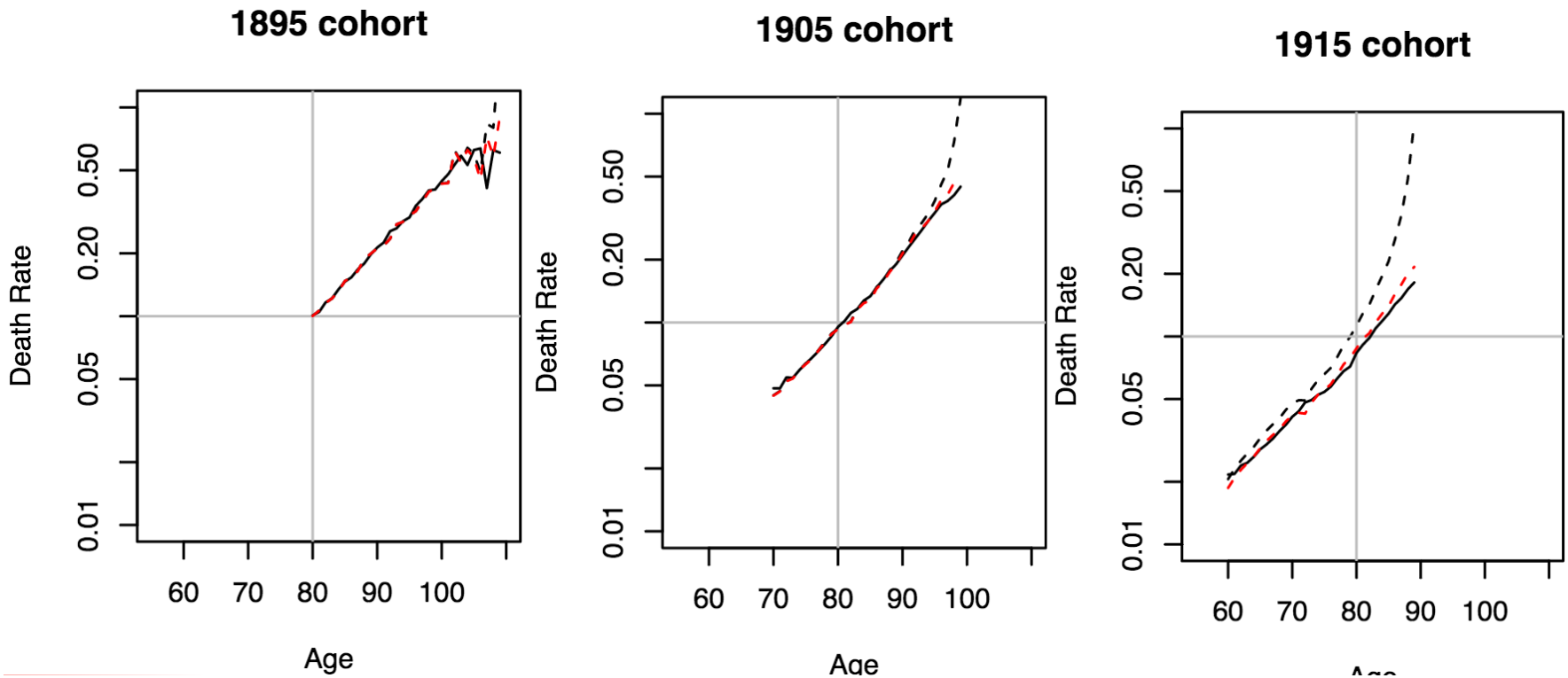
Full 1940 census	132	million
and name and age available	130	million
and male	64	million
and aged 0-70	62	million
and unique key	46	million
and expected death in interval	14	million
Matches	6	million
Match rate	43	%

Matching bias?

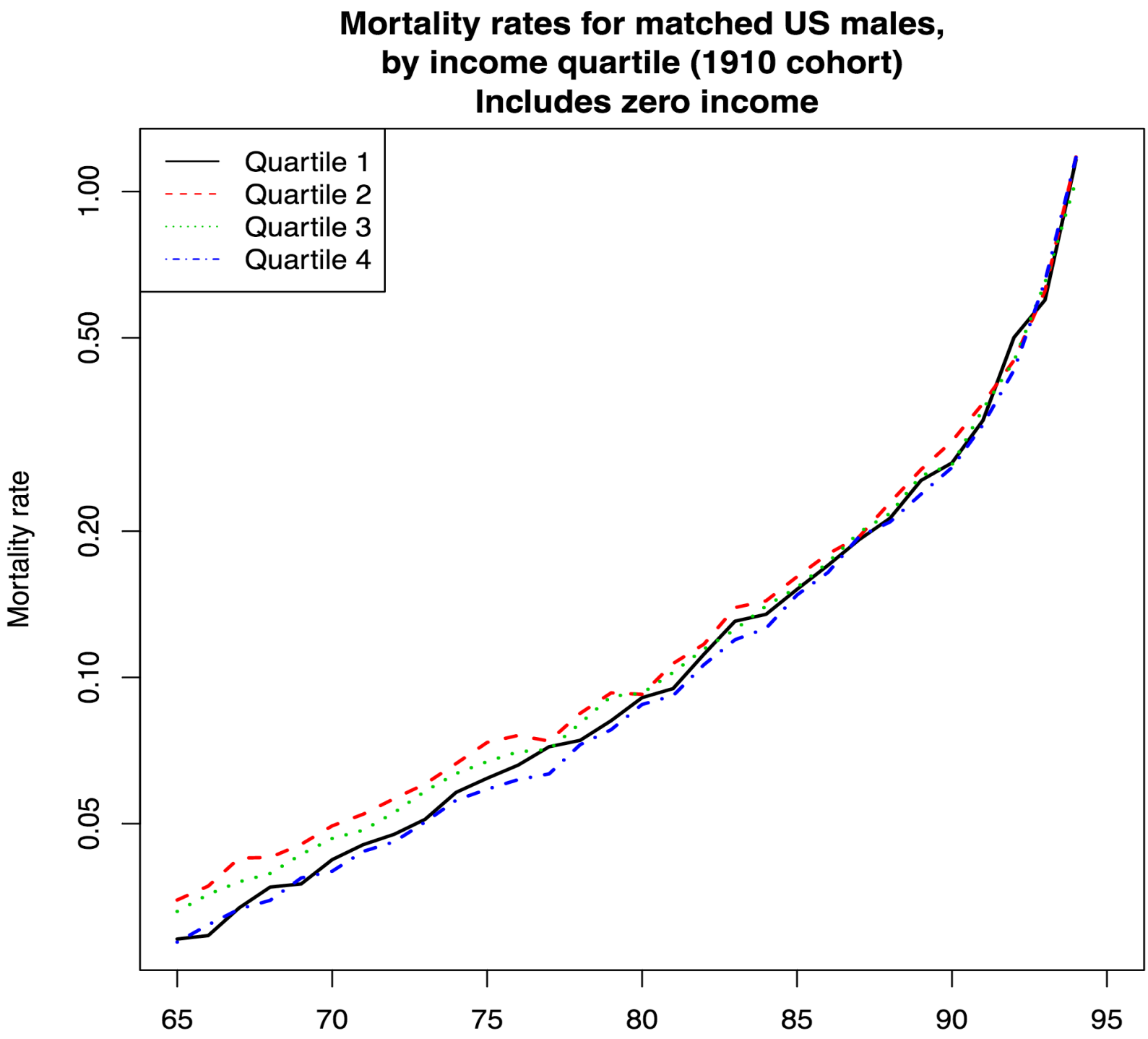


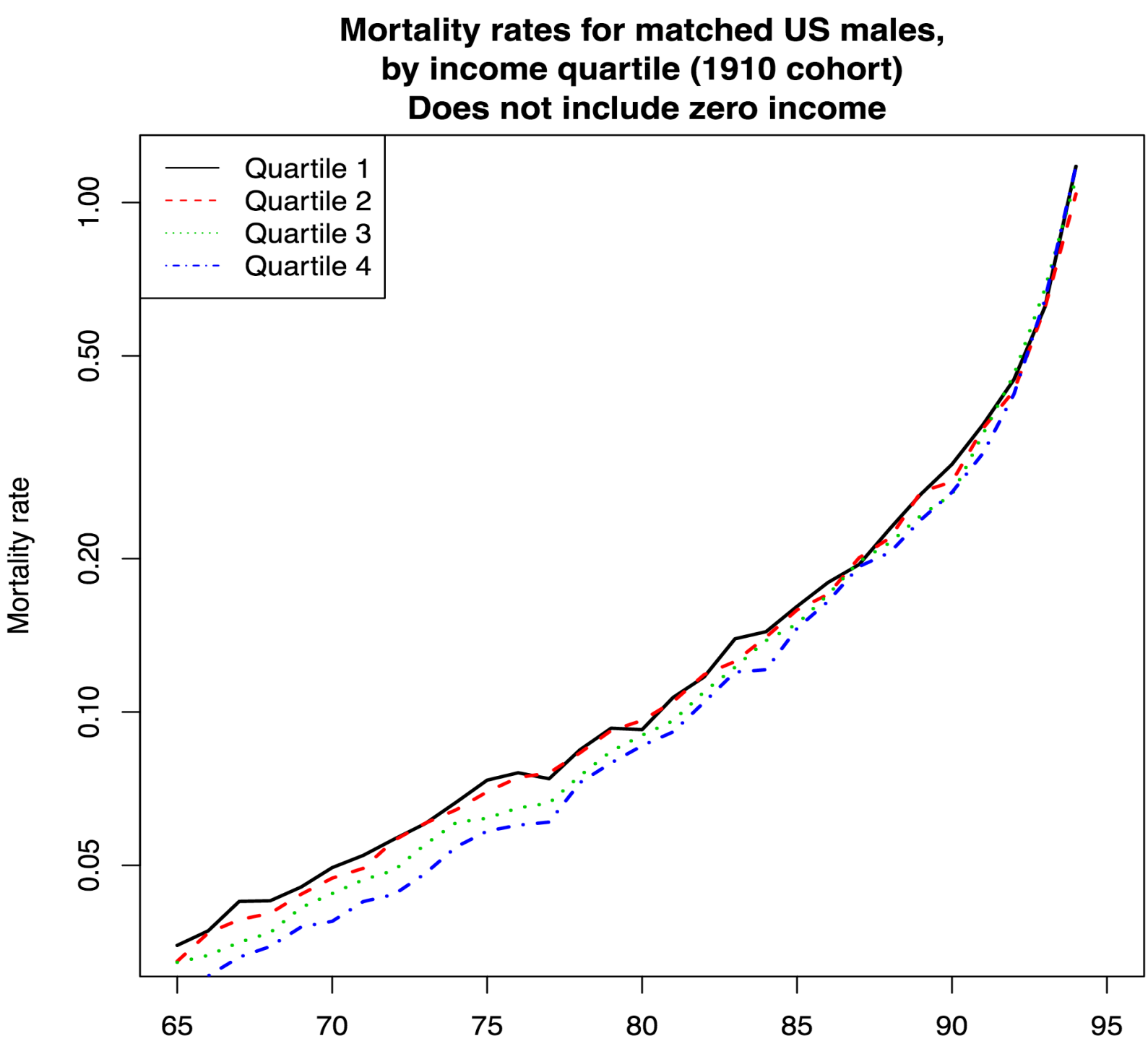
Matched also a bit whiter, more educated, and likely to be home-owners.

Mortality rate validation



Key:
solid line = HMD (Human Mortality Database)
black dash = reverse survival matched data
red dash = reverse survival matched data, adjusted with HMD survivors


Mortality rates for matched US males,
by income quartile (1910 cohort)
Includes zero income
Quartile 1
Quartile 2
Quartile 3
Quartile 4
Mortality rate
0.05
0.10
0.20
0.50
1.00
65
70
75
80
85
90
95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Smaller groups and new variables

OLS regressions of age-at-death for those aged 20-35 in 1940

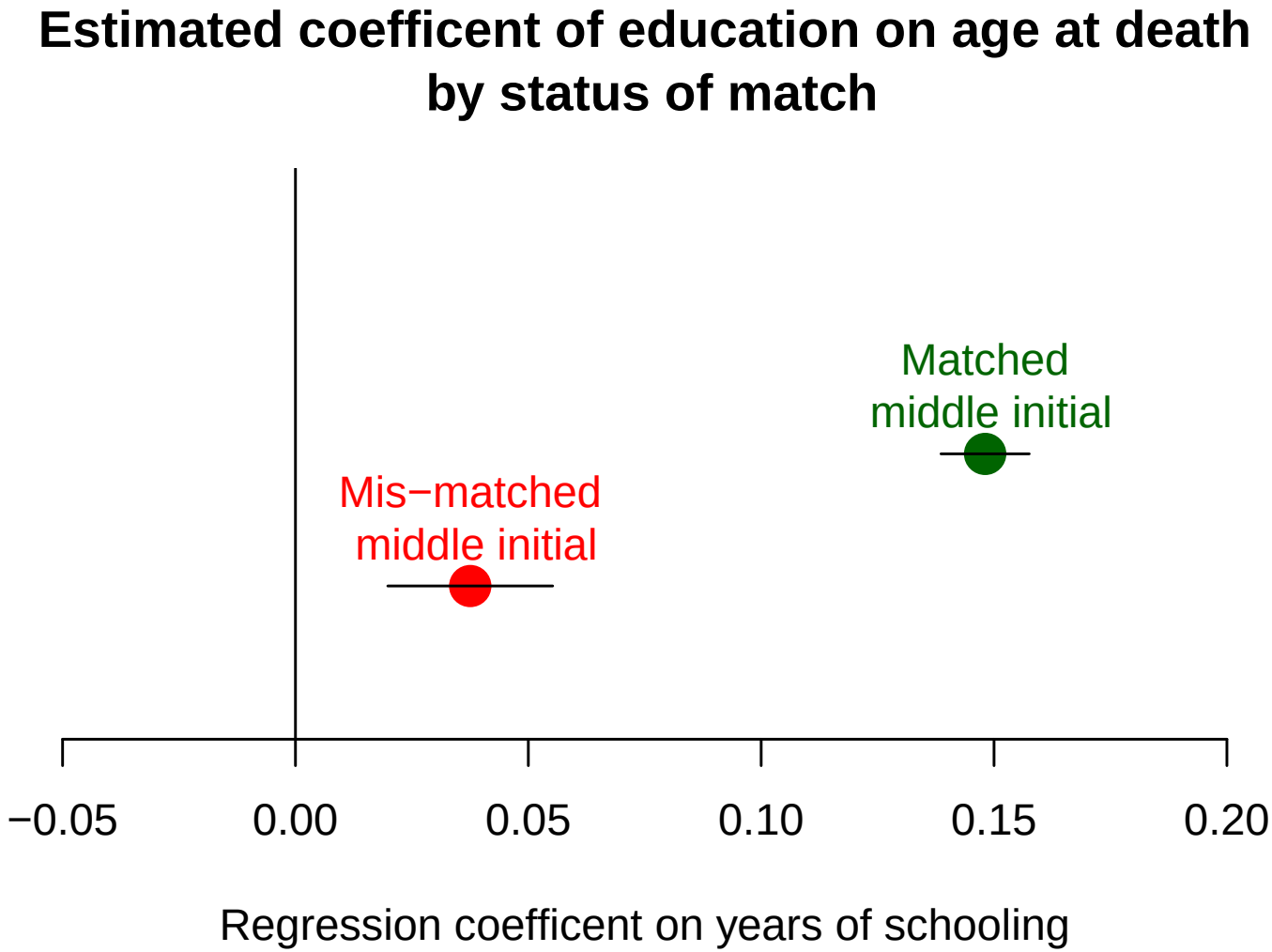
Intercept	77.83***	74.70***
Black/White	-0.90***	0.08
Chinese/White	1.01***	1.90***
Filipino/White	1.69***	2.40***
Japanese/White	1.90***	2.26***
Other/White	-1.27***	-0.70***
educ		0.19***
log(income)		0.18***
own/rent		0.50***
hh_head: Yes		-0.15
N	2 million	1.1 million

Validation: Middle Initials

	clean_key	ssn	fname.x	lname.x	mname.x	mname	mi.match
1:	AABERGEDWARD49	538074776	EDWARD	AABERG	J		
2:	AABERGEELMER32	516228997	ELMER	AABERGE			
3:	AABERGERIC34	521071090	ERIC	AABERG	C	C	TRUE
4:	AABERGLAWRENCE22	517169163	LAWRENCE	AABERG	M	A	FALSE
5:	AABERGRALPH30	522071496	RALPH	AABERG		O	
6:	AABERGROBERT39	563033374	ROBERT	AABERG	A	A	TRUE
7:	AABERGSANDER43	535096685	SANDER	AABERG	P		
8:	AABWILLIAM42	523147290	WILLIAM	AAB			
9:	AABYCARLYLE20	473091698	CARLYLE	AABY	P	P	TRUE
10:	AABYELWIN18	517167623	ELWIN	AABY			

Middle initial match rate $\approx 80\%$

Validation: Errors-in-variables framework



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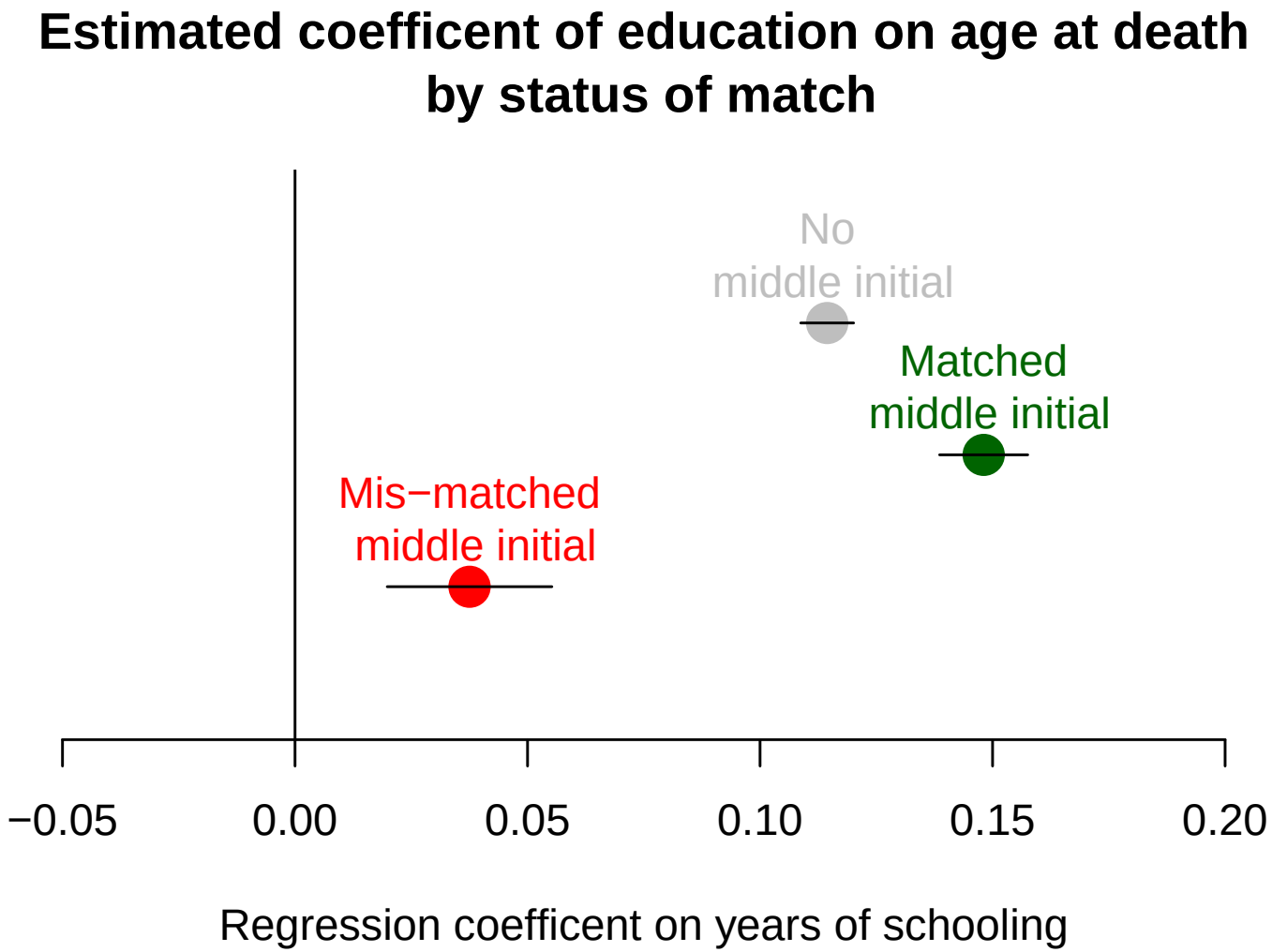

Future Directions

- Public release of our 6-7 million linked deaths (with IPUMS, HMD)
- Other match methods (birthplace, probablistic matches?)
- Mortality estimation for linked data
  - Parametric MLE for doubly-truncated cohorts
  - Bayesian methods (Schmertmann et al.)
  - Missing-at-random methods (Taylor, Sanders et al.)