# Black-White Mortality Crossover: New Evidence from Social Security Mortality Records MORTAL Conference

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July 4, 2024

# Black-White Mortality Crossover

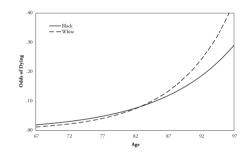
 Black-White mortality crossover is a well-studied demographic paradox

# Black-White Mortality Crossover

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- White mortality is lower than Black mortality until advanced ages, when Black mortality becomes lower than White mortality

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Dupre 2006. Demography.

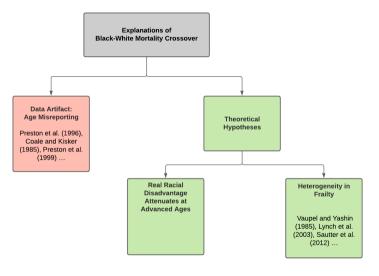
### Black-White Crossover repeatedly documented

Age of Crossover	Covariates	Age Veri- fication	Citation
74			Sibley (1930)
85 (f); 80 (m)			Wing et al. (1985 <b>)</b>
88 (f); 86 (m)			Kestenbaum (1992)
90 (f); 85 (m)		$\checkmark$	Preston (1996)
85-86			Parnell and Owens (1999)
81			Johnson (2000)
79–87		$\checkmark$	Lynch, Brown and Harmsen (2003)
80-85			Arias (2006)
83 (f); 79 (m)	Religious Attendance		Dupre, Franzese and Parrado (2006)
80	Education, Income, Neighborhoods		Yao and Robert (2011)
85			Masters (2012)
83 (f); 79 (m)			Sautter et al. (2012)
87	Education, Income		Fenelon (2013)
85			Şahin and Heiland (2017 <b>)</b>
	74 85 (f); 80 (m) 88 (f); 86 (m) 90 (f); 85 (m) 85–86 81 79–87 80–85 83 (f); 79 (m) 80 85 83 (f); 79 (m) 87	74     85 (f); 80 (m)     88 (f); 86 (m)     90 (f); 85 (m)     85-86     81     79-87     80-85     83 (f); 79 (m)     Religious Attendance     80     Education, Income, Neighborhoods     85     83 (f); 79 (m)     87   Education, Income	74 fication   74 85 (f); 80 (m)   88 (f); 86 (m) ✓   90 (f); 85 (m) ✓   85-86 %   81 ✓   79-87 ✓   80-85 %   83 (f); 79 (m) Religious Attendance   80 Education, Income, Neighborhoods   85 %   83 (f); 79 (m) Education, Income   87 Education, Income

Data + method 0000000 Results

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### No consensus on explanation...

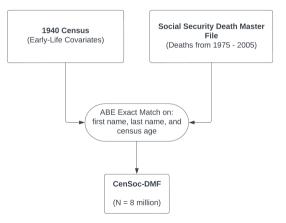


Data + methods

Results 00000000000000 Reserve slides

- Is the Black-White mortality crossover a data artifact?
- Does heterogeneity in frailty explain Black-White crossover? To what extent do we observe mortality selection?

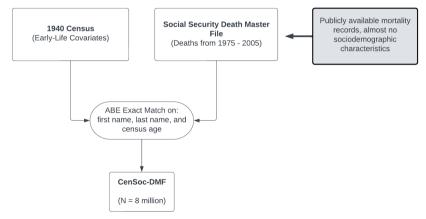
# CenSoc-DMF: Linked IPUMS 1940 Census and mortality records (CenSoc Project, PI: Joshua Goldstein)



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# CenSoc-DMF: Linked IPUMS 1940 Census and mortality records

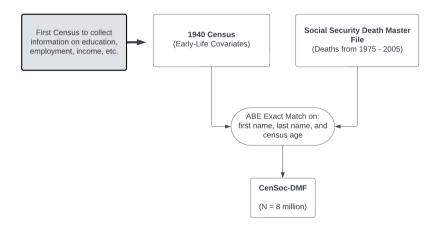


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# CenSoc-DMF: Linked IPUMS 1940 Census and mortality records



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#### 1940 Census

 1940 Census reflected heightened time of social awareness brought about by Great Depression

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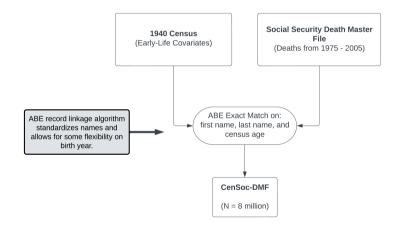
### 1940 Census

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1940 Census Form

# CenSoc-DMF: Linked census and mortality records



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# Analytic Samples

- 1. Birth cohorts of 1890-1905
  - Extinct cohort method
- 2. Birth cohorts 1906-1915 (not extinct)
  - Gompertz parametric maximum likelihood estimation

# Gompertz Model + Maximum Likelihood Estimation Method

$$h(x) = \mathbf{a} e^{\mathbf{b} x}$$

• 
$$h(x) = hazard at age x$$
. "Force of mortality"

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(1)

# Gompertz Model + Maximum Likelihood Estimation Method

$$h(x) = \mathbf{a} e^{\mathbf{b} x}$$

#### • h(x) = hazard at age x. "Force of mortality"

#### ► a is baseline mortality

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# Gompertz Model + Maximum Likelihood Estimation Method

$$h(x) = \mathbf{a} e^{\mathbf{b} x}$$

• 
$$h(x) = hazard at age x$$
. "Force of mortality"

- ► a is baseline mortality
- **b** is rate of increase of mortality



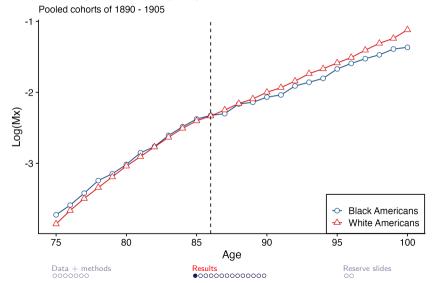
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# Black-White Crossover (extinct cohort method)

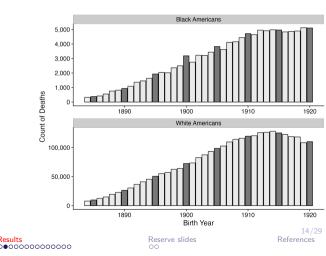
#### a Mortality Crossovers (Men)



# Is this a data artifact?

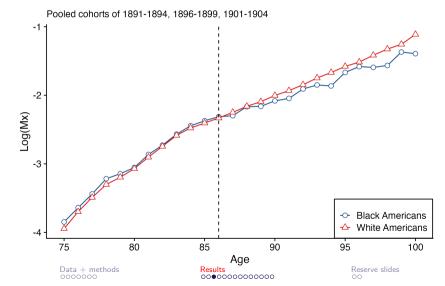
Background: Age of death calculated from date of birth and date of death

- 1. Date of death gets reported immediately (no heaping)
- 2. Minimal age heaping on birth year...
- 3. Institutional incentive: Social Security wants to accurately track birth date
- 4. Linkage requires exact match on year of birth with 1940

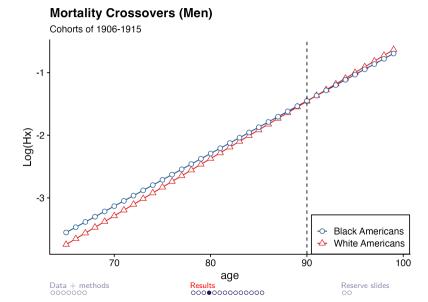


# Black-white crossover (extinct cohort method)

b



# Black-white crossover (Gompertz Parametric Approach)



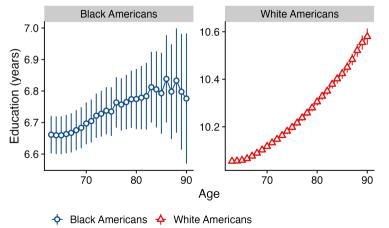
## Is this driven by heterogeneity in frailty?

First, how much mortality selection do we actually observe ...?

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# Changing composition of survivors

#### a Educational Attainment



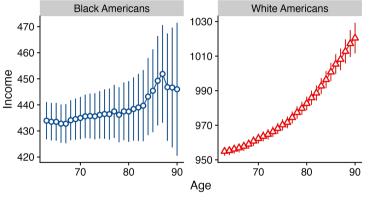
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# Changing composition of survivors

#### c Wage and Salary Income

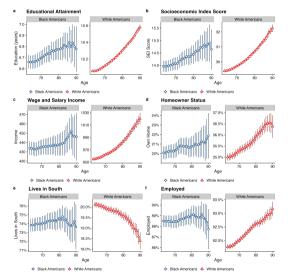


 $\diamond$  Black Americans  $\diamond$  White Americans

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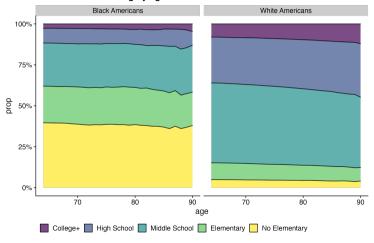
# Changing composition of survivors



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# Education of the living...



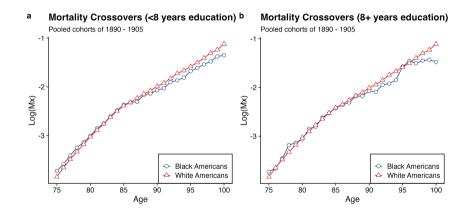
#### Education of the living by age

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# Stratifying by dimensions of frailty



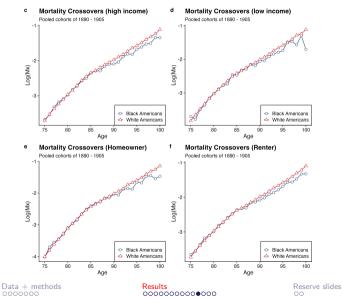
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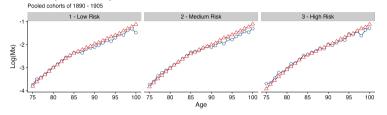


# Stratifying by dimensions of frailty



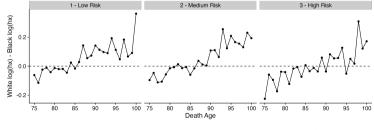
# Stratifying on risk score

a Mortality Crossovers by Risk Score



🗢 Black Americans 🔺 White Americans





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#### Conclusions

Black-White crossover is (probably) not a data artifact

### Conclusions

- Black-White crossover is (probably) not a data artifact
- Observed heterogeneity socioedemographic characteristics cannot explain the Black-White crossover
  - Modest but clear evidence of mortality selection

### Conclusions

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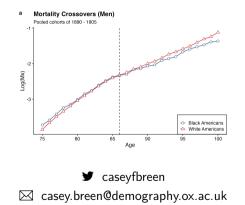
- Observed heterogeneity socioedemographic characteristics cannot explain the Black-White crossover
  - Modest but clear evidence of mortality selection

#### Open Questions

- Some real attenuation of racial disadvantage at most advances ages?
- Not capturing most important pieces of heterogeneity that constitute frailty?

# Thank You

Questions?



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# Representativeness of samples

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	General	Рор	CenSoc-	DMF	CenSoc-DMF Siblings			
	No.	%	No.	%	No.	%		
Educational Attainment								
<high school<="" td=""><td>4951782</td><td>67.3</td><td>608639</td><td>64.7</td><td>26137</td><td>66.7</td></high>	4951782	67.3	608639	64.7	26137	66.7		
High School or some college	1783203	24.3	247103	26.3	10133	25.9		
Bachelors Degree	339072	4.6	48024	5.1	1664	4.2		
Advanced Degree	162122	2.2	24559	2.6	820	2.1		
NA	117086	1.6	12091	1.3	441	1.1		
Race								
Black	656027	8.9	34159	3.6	278	0.7		
Other	27778	0.4	3296	0.4	43	0.1		
White	6669460	90.7	902961	96.0	38874	99.2		
Marital Status								
Married	7013184	95.4	905924	96.3	38102	97.2		
Not married	340081	4.6	34492	3.7	1093	2.8		
Homeownership								
Homeowner	1780906	24.2	249379	26.5	11553	29.5		
Not Homeowner	5572359	75.8	691037	73.5	27642	70.5		
Socioeconomic Status Indicator								
Sei 1-9	1293523	17.6	138209	14.7	5513	14.1		
Sei 10-14	1170543	15.9	149673	15.9	7962	20.3		
Sei 15-25	1862967	25.3	246484	26.2	10028	25.6		
Sei 26+	2776321	37.8	380226	40.4	14745	37.6		
NA	249911	3.4	25824	2.7	947	2.4		
Rural								
Rural	3183160	43.3	397739	42.3	19754	50.4		
Urban	4170105	56.7	542677	57.7	19441	49.6		
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