The Cohort Signature of Stalled American Mortality Progress

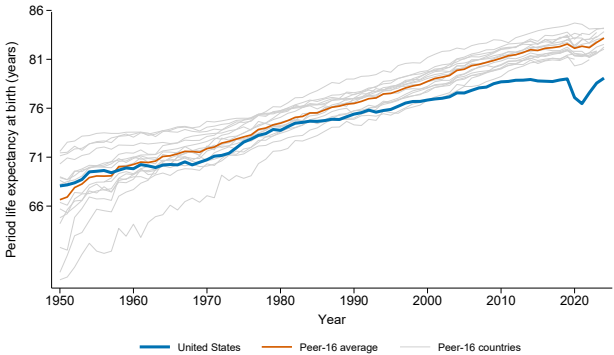
Sam Arenberg, University of Houston

Nicholas Reynolds, University of Essex

Sam Stripling

Any views expressed are those of the authors and not those of the U.S. Census Bureau. The Census Bureau has reviewed these results for disclosure avoidance protection (Project 7527874: CBDRB-FY2026).

The U.S. mortality disadvantage



Period e_0, HMD; peer-16 from NASEM/NRC reports.

- U.S. has fallen behind rich-country peers — gap still widening
- Lost value relative to trend: trillions of dollars

"One of the most consequential epidemiological and economic facts of the century."

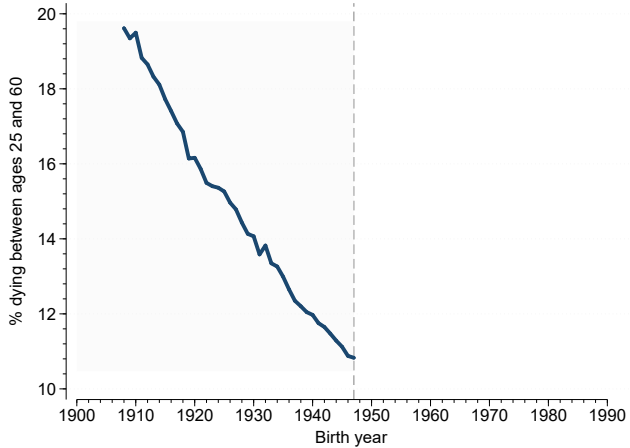
Cutler (2017); NAS (2021)

Likely many complex and complementary causes

- Regional manufacturing decline (Pierce & Schott 2020)
- Educational divide, deaths of despair (Case & Deaton 2015, 2020)
- State policy: tobacco, environment, labor (Montez et al. 2020)
- Opioid epidemic (Maclean et al. 2020)
- Obesity, alcohol, behavior (Preston et al. 2018, 2024)

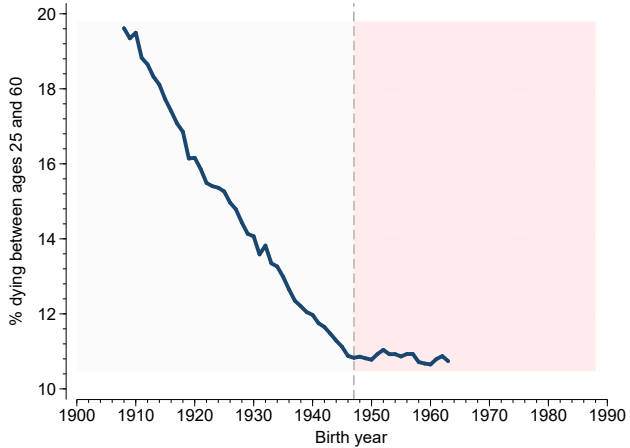
"... a consensus remains out of reach." (NAS 2021)

U.S. mortality between ages 25 and 60, by birth cohort



U.S. mortality between ages 25 and 60, by birth cohort. Cohorts born up to 1947.

U.S. mortality between ages 25 and 60, by birth cohort (full series)



Progress halts — and reverses — for cohorts born after 1947.

My earlier paper (AER Insights, 2025)

- Health and human capital improved enormously across American cohorts born 1890–1940s
  - key driver: gains in early-life health (Fogel 1986; Floud et al. 2011)
- Showed a sudden stop and reversal for cohorts born after 1947
  - Americans born 1947–mid-1960s worse health and human capital than those born a year earlier
  - decline likely originated in adolescence or earlier

Overview

Cohorts born after 1947:

1. poor educational outcomes in teens and early-20s → educational declines in 1960s and 1970s (Bishop, 1989; Card & Lemieux 2001a; Heckman & Lafontaine 2010; Acemoglu & Autor 2012)

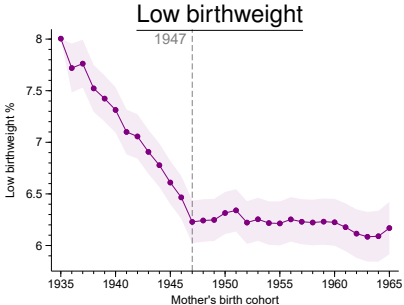
2. lower earnings for men → earnings stagnation since the 1970s (Bivens et al. 2014; Katz & Murphy 1992; Card & Lemieux 2001b; Acemoglu & Autor 2011; Guvenen et al. 2021)

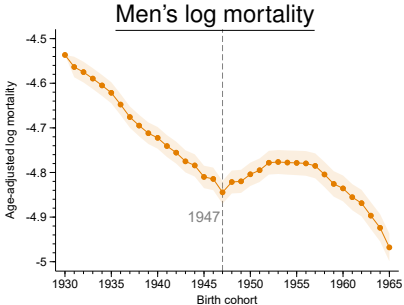
3. give birth to less healthy infants in 20s and 30s → increases in LBW in 1980s (CDC 1994; Currie & Gruber 1996)

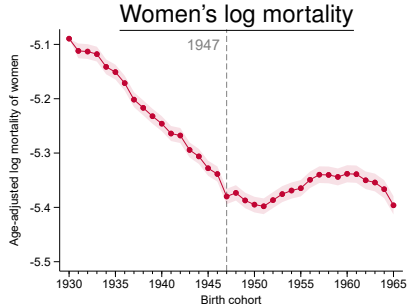
4. greater likelihood of dying prematurely → post-1999 mid-life mortality increases (Case & Deaton 2015, 2017)

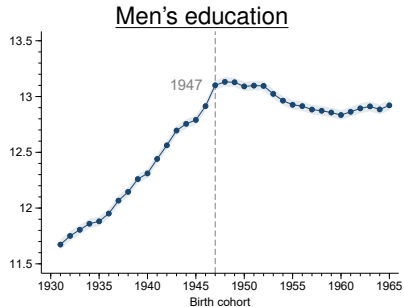
→ What went wrong early in life for cohorts born after 1947?

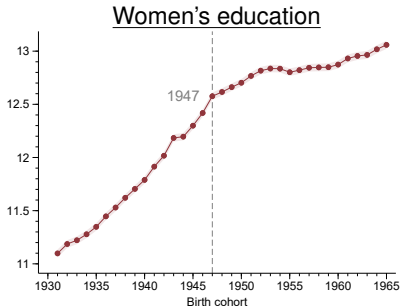
Age-adjusted outcomes by cohort








Men's education
1947
13.5
13
12.5
12
11.5
1930
1935
1940
1945
1950
1955
1960
1965
Birth cohort


Women's education
1947
13
12.5
12
11.5
11
1930
1935
1940
1945
1950
1955
1960
1965
Birth cohort

This paper

- Focus on mortality
- Rich admin data: 2000 Census $\times$ SSA Numident — month and county of birth
- Goal: characterize the empirical *signature* of the break, to *discipline the search for a cause*

The empirical signature

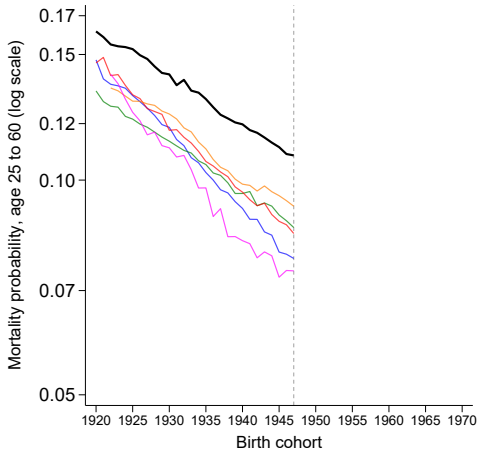
Three features of the cohort mortality break:

1. Uniqueness — U.S. stands apart from other rich countries
2. Timing — sharply dated to cohorts born around summer 1947
3. Pervasiveness — near-ubiquitous across race, sex, and geography

Any successful explanation must reproduce these three facts.

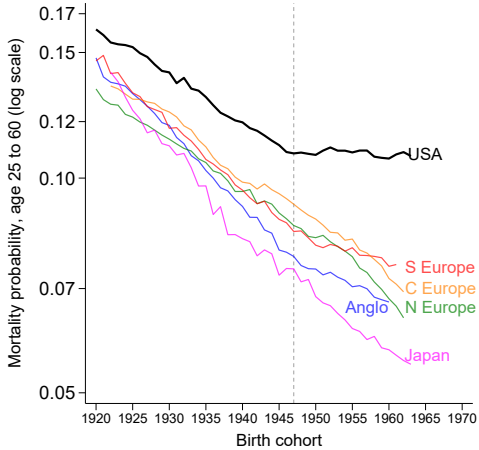
Uniqueness

International cohort mortality, pre-1947



Through cohorts born in 1947, U.S. improvement tracks peers.

International cohort mortality, full series



After 1947, the U.S. path *diverges* from peer countries.

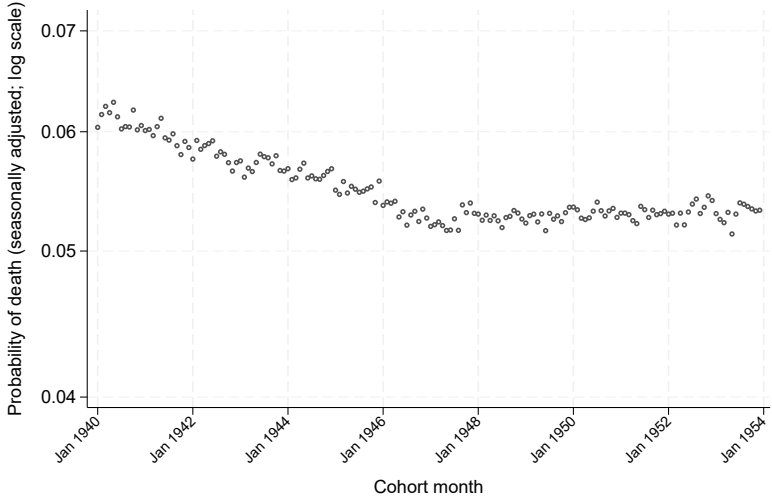
ages 61–65

Timing

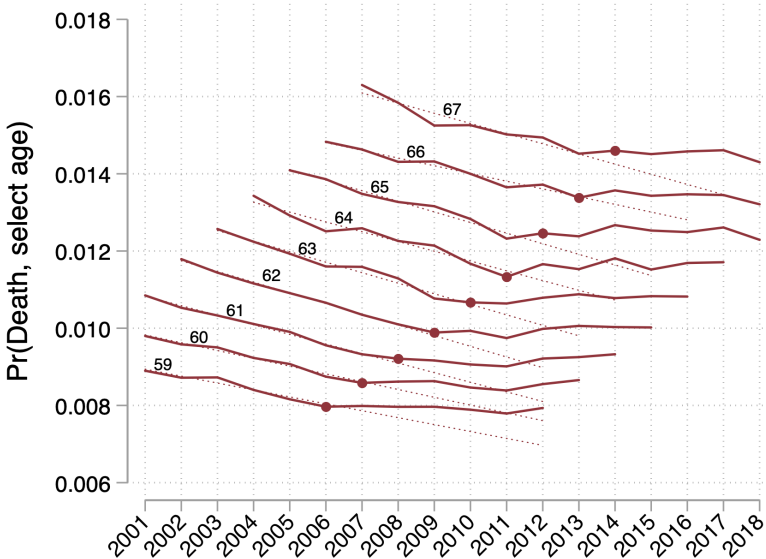
Data

- 2000 Decennial Census (short form) linked to SSA Numident
- Year and *month* of birth; death outcomes
- Sample: ages **61–65**, deaths **2000–2019** (pre-COVID)
- Over 200 million linked records; linkage rate $\approx 88\%$

Monthly cohort death probability (seasonally adjusted)



Age-specific death probability by year



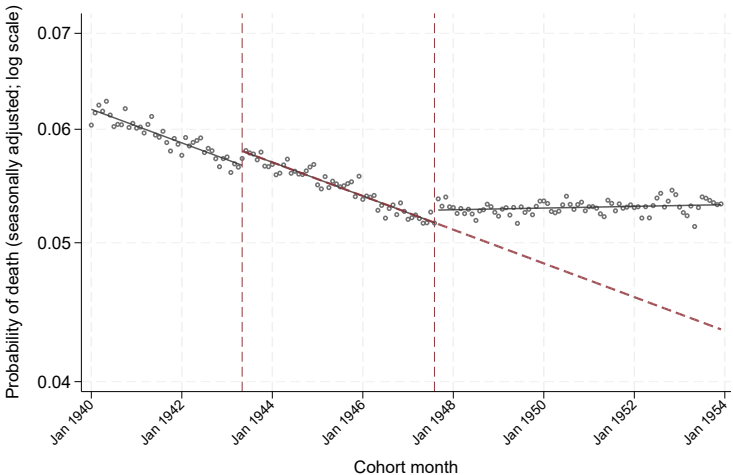
Structural-break model

For cohort c, monthly (log) death probability y_c:

$$y_c = \sum_{j=1}^{m+1} \mathbb{1}\{c \in [T_{j-1},\ T_j)\}\,(\alpha_j + \beta_j\, c) + \varepsilon_c$$

- Bai–Perron: m and $\{T_j, \alpha_j, \beta_j\}$ chosen jointly to minimize SSR
- Identifies level shifts and trend changes; m data-driven

Multibreak fit on the monthly cohort series



Estimated breaks: **May 1943**, **Aug 1947**.

Break dates, regime trends, and discrete shifts

	Break 1	**Break 2**
Date (cohort)	May 1943	Aug 1947
95% CI	Apr–May 1943	Apr 1946 – Aug 1947
Level shift (log)	0.0229 (0.0045)	0.0201 (0.0039)
Trend shift (log/mo.)	−0.000008 (0.00017)	0.00237 (0.00012)

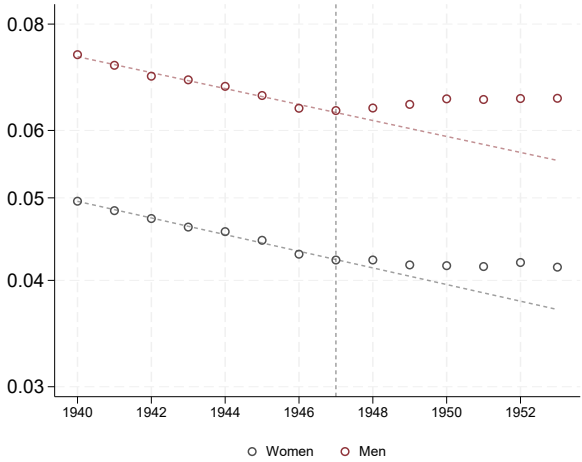
Standard errors in parentheses.

counterfactual

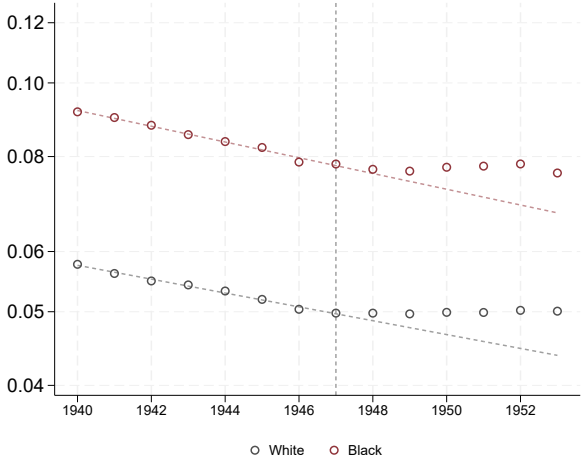
shift summary

Pervasiveness

Death probability by sex



Death probability by race (Black, White)



Hispanic / API / AIAN: appendix

Heterogeneity by adult SES and place of birth

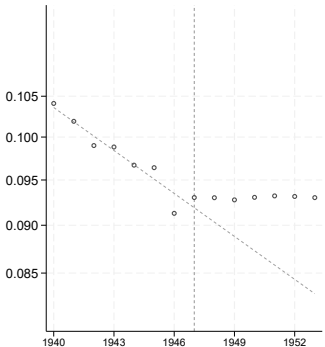
- 2000 Census long form (20% sample): income and education
- Numident: county (or country) of birth
- County-of-birth covariates merged from external sources

Adult income rank

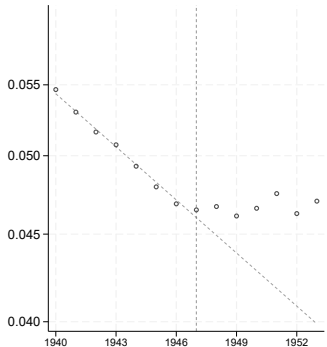
- Rank each individual's income *within* their birth-year cohort
- Split the cohort into quantile groups
- Plot mortality by cohort *within* each group

Death probability by adult-income quantile

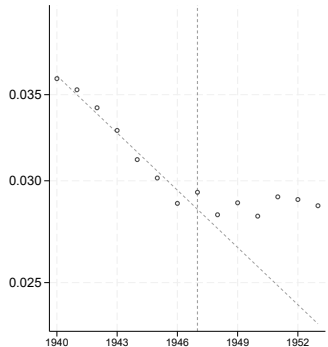
Q1: below 20th pct



Q3: 40th–60th pct



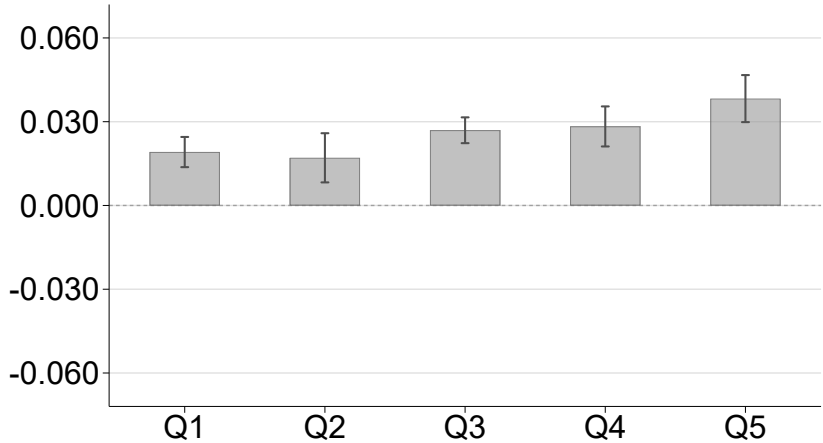
Q5: above 80th pct



By within-cohort adult-income quantile.

all on one panel

Trend-break coefficients by adult-income quantile

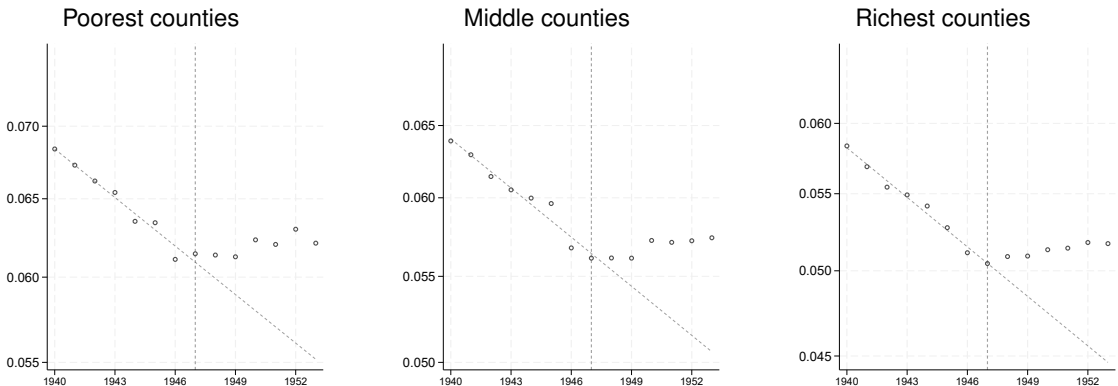


Trend-break coefficient (slope change at 1947) by adult-income quantile, 95% CI.

From adult SES to place of birth

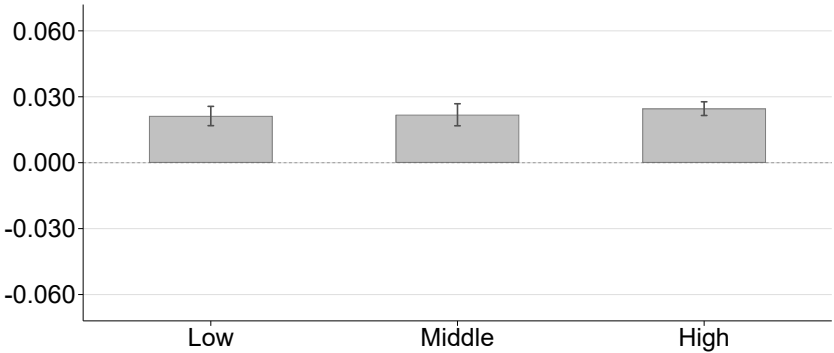
- Rank individuals by their county of birth's average income (c. 1950), split into terciles
- *Does the cohort break differ by early-life economic environment?*

Death probability by county-of-birth income tercile



Break magnitude similar across county-income levels.

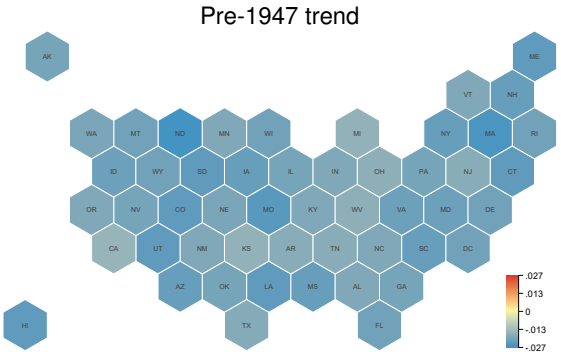
Trend-break coefficients by county-of-birth income tercile

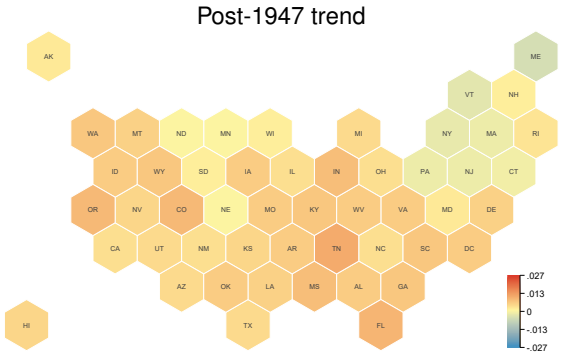


State of birth — method

- Estimate *pre-* and *post-1947* linear trends separately for each state of birth
- Empirical-Bayes shrinkage toward the national mean (stabilize small states)
- Map the shrunken state trends pre vs post

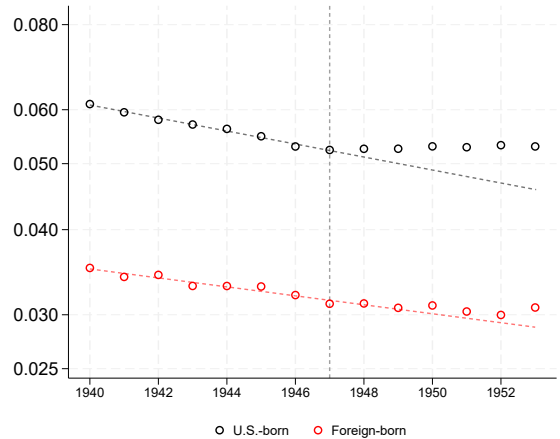
Pre- and post-1947 trends by state of birth



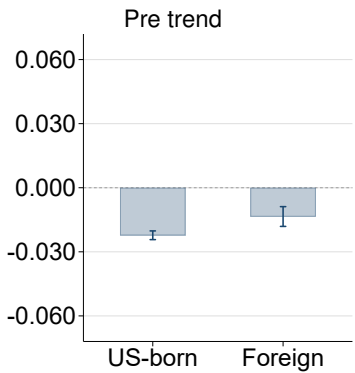


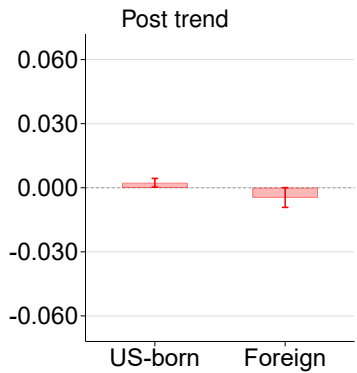
Nearly every state flips from improving (blue) to stalling (red).

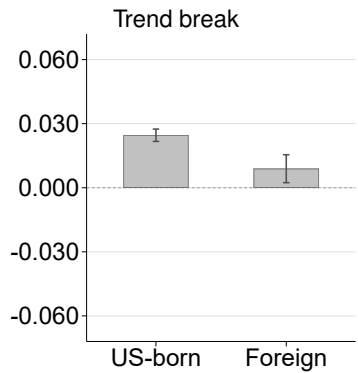
Death probability by nativity



Trend coefficients by nativity







Break is **larger among U.S.-born**.

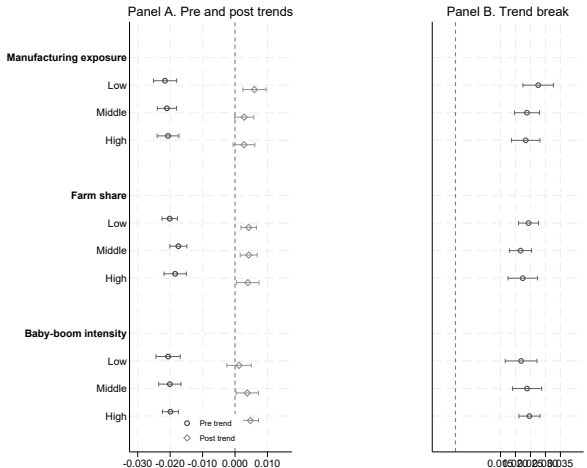
Structural heterogeneity

Additional analysis using county of birth

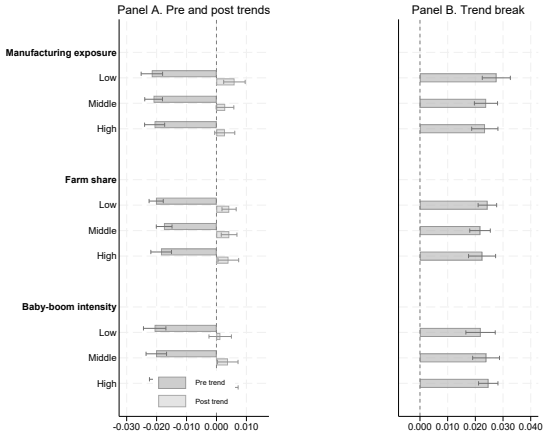
- **Manufacturing share** (1970 county employment)
- **Farm share** ($\approx$ 1950 county households)
- **Baby-boom intensity** (per-capita increase in peak baby-boom births, by county)

Does the break differ across these early-life environments?

Pre- and post-1947 trends across county features



Trend-break magnitudes across county features



The signature

- Sharp break tied to late summer 1947
- Cohort-based — not a period shock
- Pervasive — race, sex, geography, SES
- U.S.-specific — absent in peer countries

Mechanisms — light touch

- Broad material deprivation *unlikely* — break appears even at the top of SES
- **Baby boom**: timing mismatch (boom starts 1946, break mid-1947)
- **Manufacturing decline**: plausible on timing and place patterns

Cautious hypothesis worth pursuing: postwar environmental exposures (e.g., lead). *No causal claim here.*

Takeaways

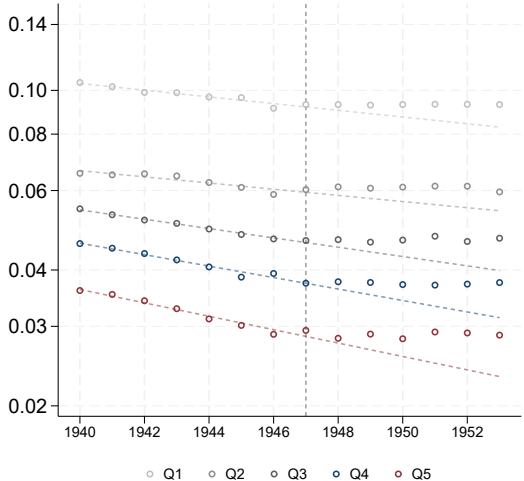
1. U.S. cohort mortality breaks sharply near **summer 1947**
2. Break is **unique** to the U.S., **pervasive** within the U.S.
3. Any successful explanation must reproduce all three features

Future work

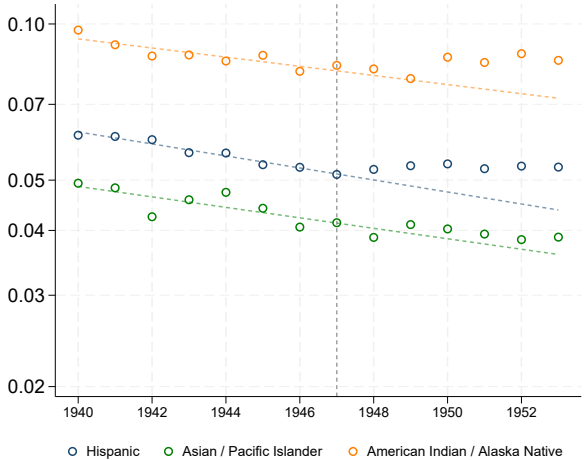
- Cohort DINA — income and wealth by birth cohort
- Biological signatures of the 1947 break
- International comparisons with Anglo peers
- RDC work with the 1950 Census
- High-frequency (monthly / weekly) cohort data

Thank you

Appendix: Adult income — all quantiles on one panel

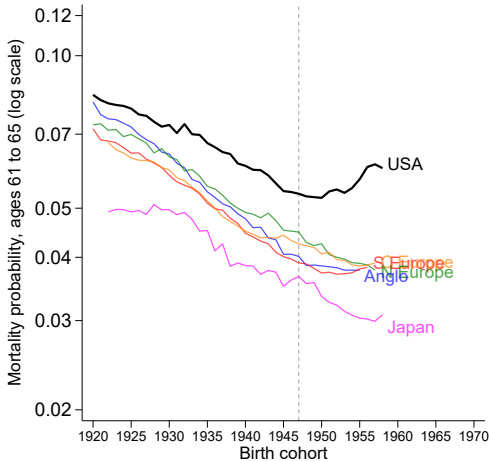


Appendix: Death probability by race — Hispanic, API, AIAN

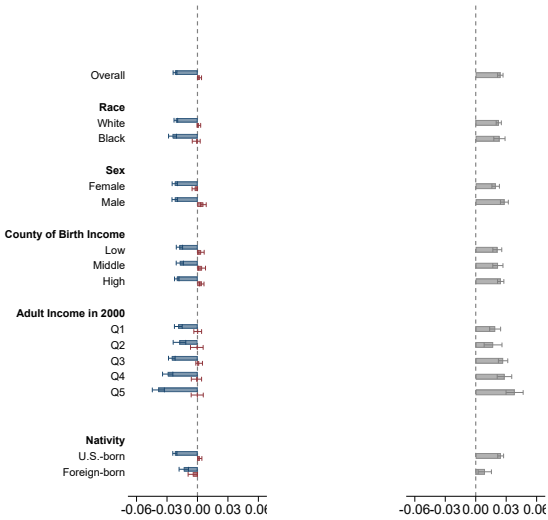


back

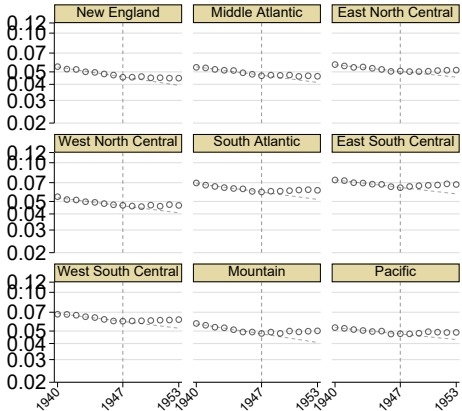
Appendix: Ages 61–65 — international



Appendix: Pervasiveness summary (coefficient plot)

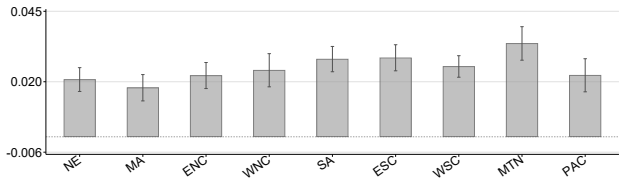


Appendix: Geography by Census division — series



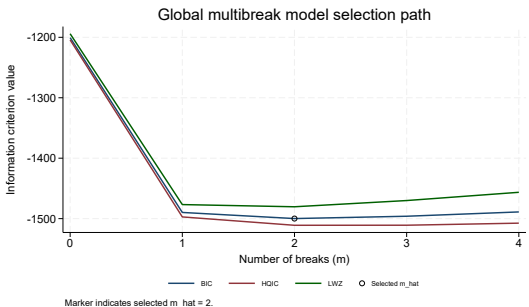
back

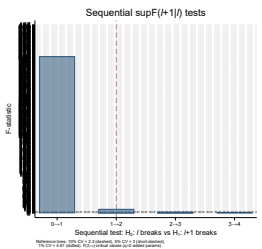
Appendix: Geography by Census division — trend breaks

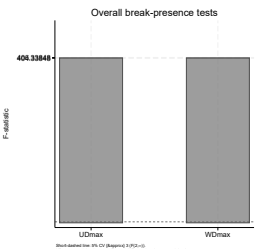


back

Appendix: Break selection and sequential tests

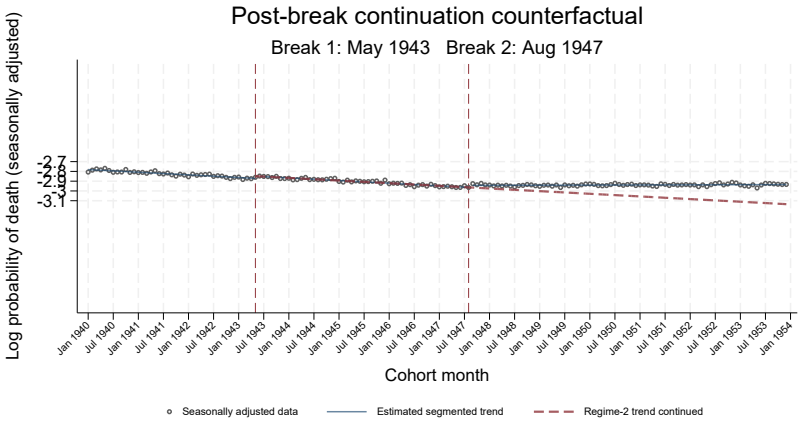






back

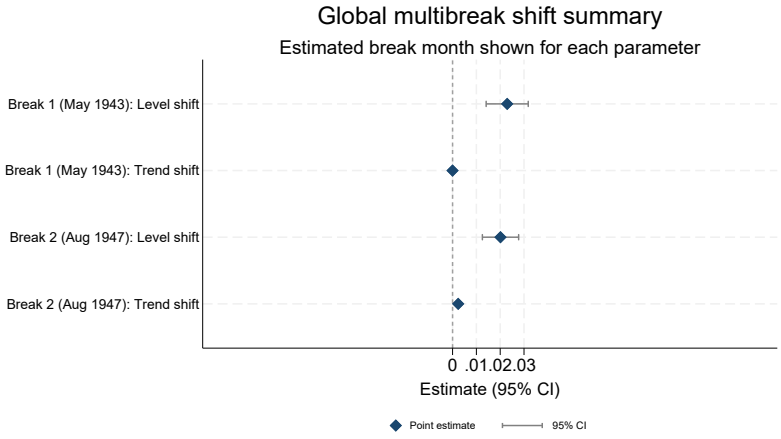
Appendix: Magnitude — counterfactual continuation



Dashed line: trend from regime 2 (between breaks 1 and 2), continued forward.
Gap at +60m from break 2 = 0.2.

back

Appendix: Magnitude — shift summary



Level shift: immediate jump at break. Trend shift: monthly slope change.

back