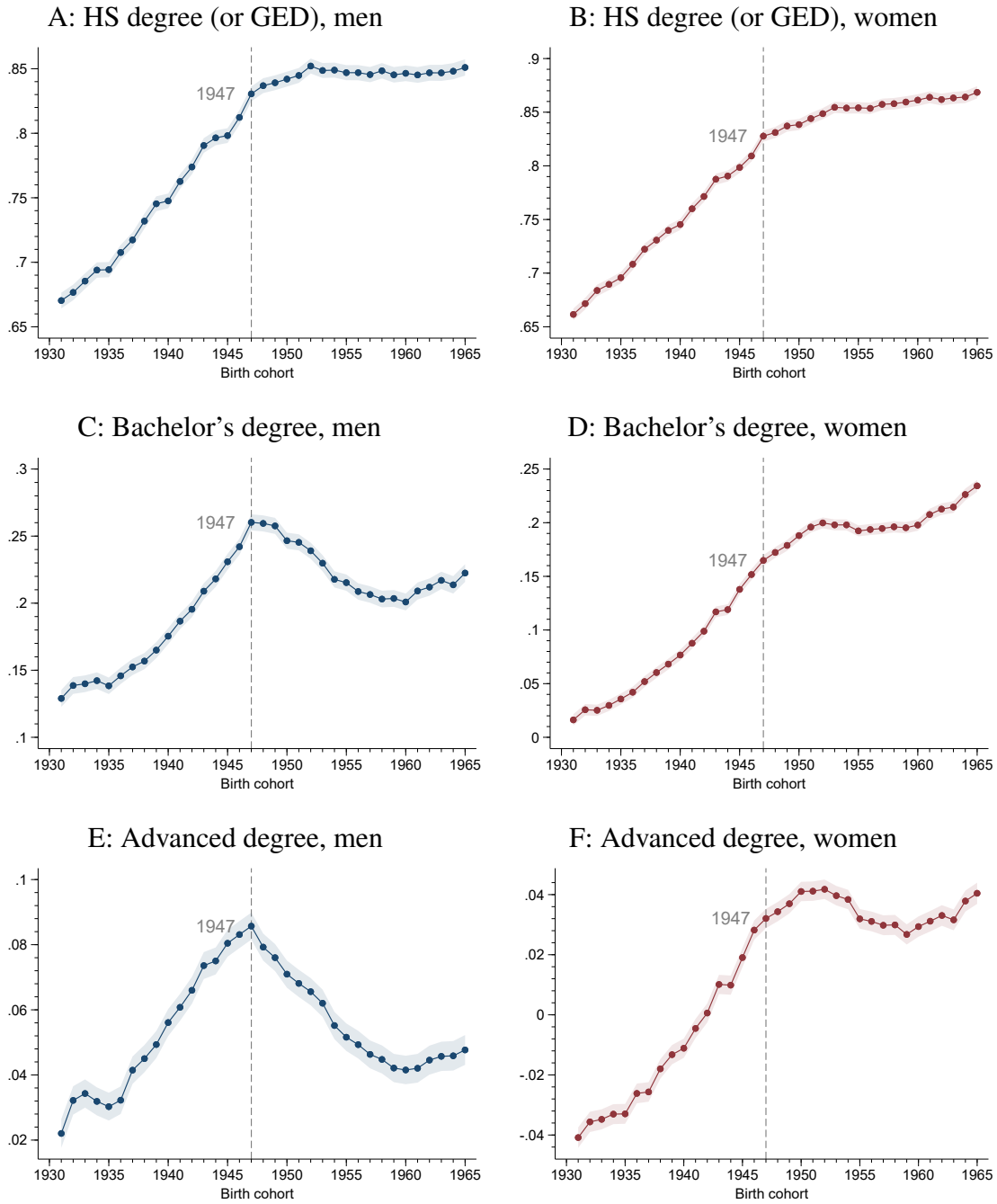**Supplementary Appendix for:**

"The Broad Decline of Health and Human Capital
of Americans Born after 1947"

by Nicholas Reynolds
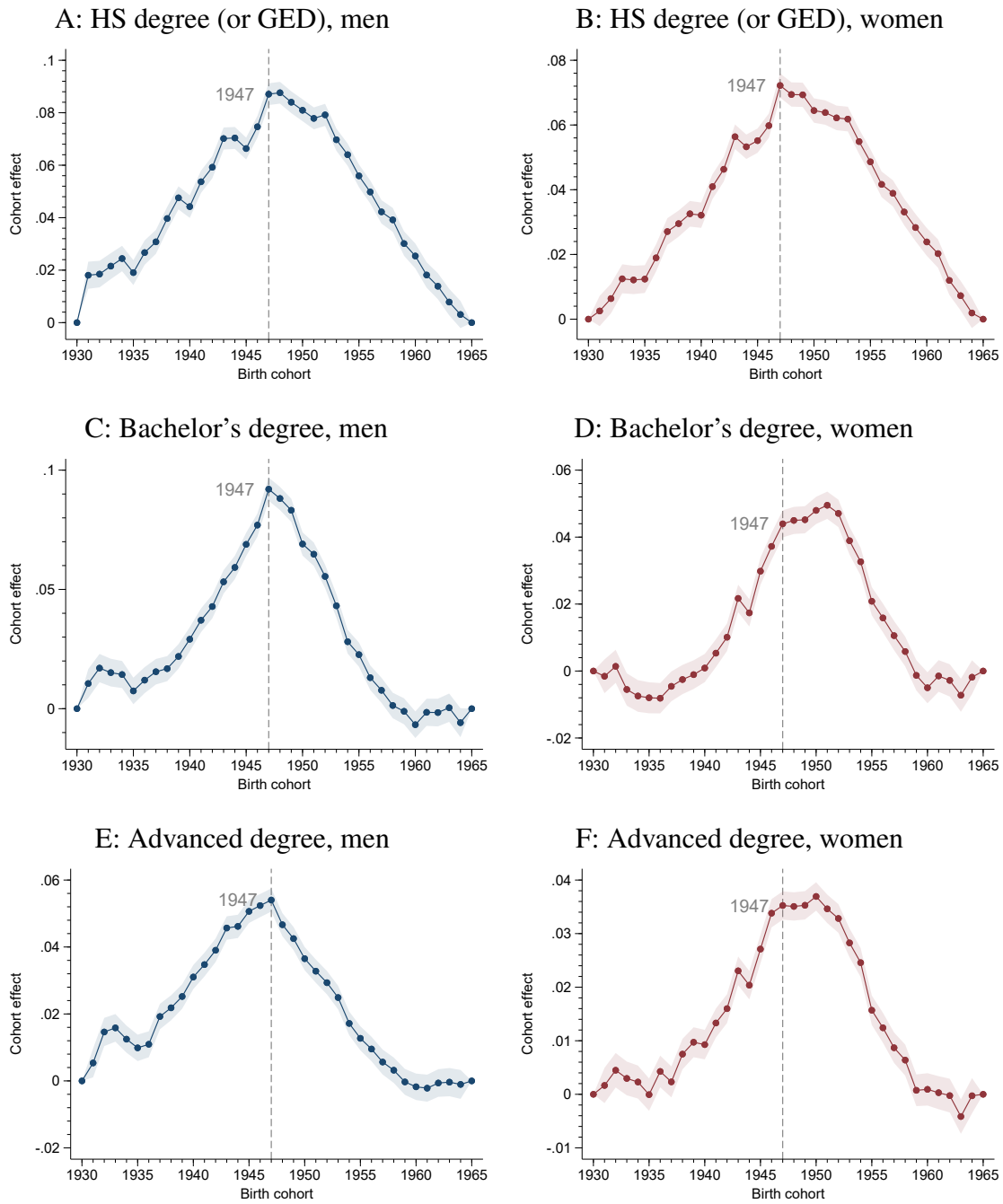
August 13, 2024

## Appendix Figure 1: Age-adjusted educational attainment by birth cohort

### A: HS degree (or GED), men



### B: HS degree (or GED), women



### C: Bachelor's degree, men



### D: Bachelor's degree, women



### E: Advanced degree, men



### F: Advanced degree, women



Each panel plots age-adjusted outcomes by birth cohort. Age adjustment is done by regressing the outcome on a full set of cohort fixed effects and age effects, and plotting predicted values. All panels are based on CPS-MORG data (Center for Economic and Policy Research, 2020), 1979-2016, and includes men and women aged 25-75, who were born from 1930 to 1965.

# Appendix Figure 2: Detrended cohort effects, educational attainment

## A: HS degree (or GED), men



## B: HS degree (or GED), women



## C: Bachelor's degree, men



## D: Bachelor's degree, women



## E: Advanced degree, men



## F: Advanced degree, women



Each panel plots detrended cohort effects from estimation of age-period-cohort models based on Equation 2. All panels are based on CPS-MORG data (Center for Economic and Policy Research, 2020), 1979-2016, and includes men and women aged 25-75, who were born from 1930 to 1965.

Appendix Figure 3: Detrended cohort effects, intergenerational infant birth weight, by mother's place of birth
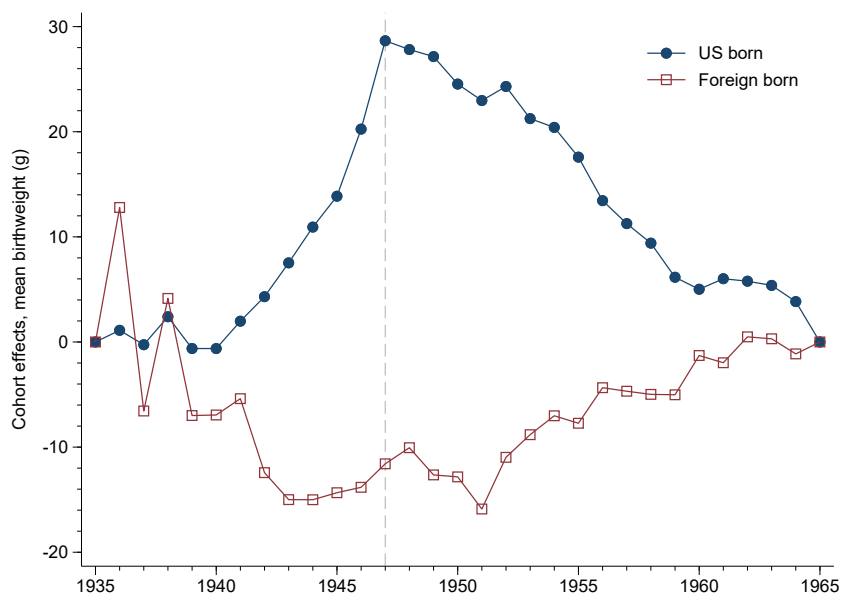


This figure plots detrended cohort effects from estimation of age-period-cohort models based on Equation 2 — separately for mothers born in one of the 50 states or D.C., and those born outside of the US. Results are based on Birth data files, (National Center for Health Statistics, n.d.*a*), 1970-1985, including mothers age 18-40, who were born from 1935-1965.

Appendix Figure 4: Scholastic Aptitude Test (SAT) score decline
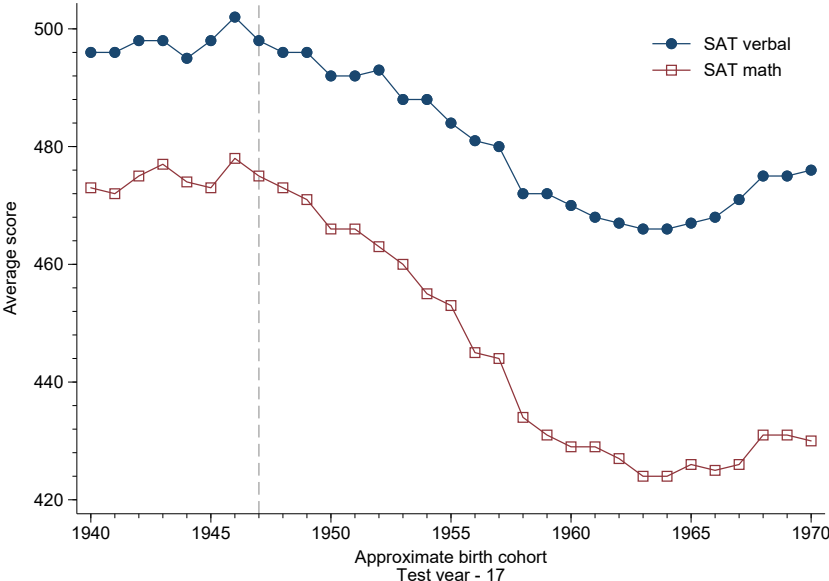


This figure shows verbal and mathematics scores on the Scholastic Aptitude Test. Approximate birth cohort is defined as the year the test was given minus 17. Data is from Harnischfeger and Wiley (1975).

## Appendix Table 1: Piecewise linear cohort effect models

robustness to varying age-by-year control function

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Panel A: Mean birth weight** | | | | |
| Size | -1.83 | -6.35 | -5.52 | -6.91 |
| | (0.13) | (0.35) | (0.54) | (0.70) |
| Location | 1948 | 1948 | 1947 | 1947 |
| | [1947, 1949] | [1948, 1948] | [1947, 1947] | [1947, 1947] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| **Panel B: Low birth weight percentage** | | | | |
| Size | 0.085 | 0.241 | 0.195 | 0.200 |
| | (0.004) | (0.014) | (0.022) | (0.029) |
| Location | 1947 | 1948 | 1947 | 1947 |
| | [1947, 1948] | [1948, 1948] | [1948, 1949] | [1947, 1947] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| **Panel C: Median log wage** | | | | |
| Size | -0.016 | -0.016 | 0.015 | -0.017 |
| | (0.0005) | (0.001) | (0.002) | (0.003) |
| Location | 1947 | 1947 | 1953 | 1947 |
| | [1947, 1947] | [1946, 1947] | [1946, 1947], [1952, 1953] | [1947, 1947] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| **Panel D: Log mortality, men** | | | | |
| Size | 0.016 | 0.028 | 0.029 | 0.029 |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| Location | 1942 | 1947 | 1947 | 1947 |
| | [1941, 1943] | [1947, 1947] | [1947, 1947] | [1947, 1947] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| **Panel E: Log mortality, women** | | | | |
| Size | 0.017 | 0.029 | 0.021 | 0.019 |
| | (0.000) | (0.001) | (0.001) | (0.002) |
| Location | 1948 | 1949 | 1950 | 1950 |
| | [1948, 1948] | [1949, 1949] | [1950, 1950] | [1949, 1950] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| Year FEs | Yes | Yes | Yes | Yes |
| Age FEs | Yes | Yes | Yes | Yes |
| Quadratic-age-by-year | No | Yes | No | No |
| Cubic-age-by-year | No | No | Yes | No |
| Quartic-age-by-year | No | No | No | Yes |

Each column shows the results of estimation of a model based on Equation 3, with the listed outcome in single age-by-year bins as the dependent variable. All models are estimated by least squares, following the approach outlined in (Hansen, 2000). The row titled "Size" reports the size of the trend break in cohort effects, $\delta$, with the standard error in parentheses. The row titled "Location" reports the estimated cohort at which a trend break occurs, with a 99 % confidence region in brackets calculated by inverting the likelihood ratio statistic. The row titled "P-value for existence" reports a p-value from an F-type test, based on 1000 bootstrap samples, for the null hypothesis that no trend break occurs, ie. that cohort effects are linear. Data and sample restrictions are the same as Table 1.

Appendix Table 2: Cohort decline concentrated among those born in the US — piecewise linear cohort effect models of intergenerational infant birth weight

robustness to varying age-by-year control function

|  | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Panel A: Mothers born in US** | | | | |
| Size | -4.178 | -7.939 | -6.027 | -7.164 |
|  | (0.155) | (0.454) | (0.632) | (0.820) |
| Location | 1948 | 1947 | 1947 | 1947 |
|  | [1948, 1949] | [1947, 1947] | [1947, 1947] | [1947, 1947] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| | | | | |
| **Panel B: Mothers born outside US** | | | | |
| Size | 2.151 | 2.485 | 5.088 | 7.339 |
|  | (0.348) | (1.400) | (1.977) | (1.846) |
| Location | 1944 | 1942 | 1942 | 1951 |
|  | [1942, 1951] | [1938, 1962] | [1938, 1962] | [1951, 1951] |
| P-value for existence | .109 | < .001 | < .001 | < .001 |
| | | | | |
| Year FEs | Yes | Yes | Yes | Yes |
| Age FEs | Yes | Yes | Yes | Yes |
| Quadratic-age-by-year | No | Yes | No | No |
| Cubic-age-by-year | No | No | Yes | No |
| Quartic-age-by-year | No | No | No | Yes |

Each column shows the results of estimation of a model based on Equation 3, with the listed outcome in single age-by-year bins as the dependent variable. All models are estimated by least squares, following the approach outlined in Hansen (2000). The row titled "Size" reports the size of the trend break of cohort effects, $\delta$, with the standard error in parentheses. The row titled "Location" reports the estimated cohort at which a trend break occurs, with a 99 % confidence region in brackets calculated by inverting the likelihood ratio statistic. The row titled "P-value for existence" reports a p-value from an F-type test, based on 1000 bootstrap samples, for the null hypothesis that no trend break occurs, ie. that cohort effects are linear. Results are based on Birth data files, (National Center for Health Statistics, n.d.*a*), 1970-1995, mothers age 18-40 who were born between 1930 to 1970.

Appendix Table 3: Trend break in cohort effects for share of employed men working in white-collar occupations — native-born versus foreign-born

| | robustness to varying age-by-year control function | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **Panel A: Born in US** | | | | |
| Size | -0.007 | -0.017 | -0.016 | -0.015 |
| | (0.0004) | (0.0008) | (0.002) | (0.002) |
| Location | 1947 | 1947 | 1947 | 1947 |
| | [1946, 1947] | [1947, 1947] | [1947, 1947] | [1947, 1947] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| | | | | |
| **Born outside US** | | | | |
| Size | -0.007 | 0.019 | 0.025 | 0.014 |
| | (0.001) | (0.003) | (0.007) | (0.006) |
| Location | 1942 | 1934 | 1934 | 1957 |
| | [1940, 1944] | [1933, 1935], [1944, 1945] | [1933, 1935] | [1933, 1943], [1946, 1948] |
| | | | | [1952, 1953], [1956, 1962] |
| P-value for existence | < .001 | < .001 | < .001 | < .001 |
| | | | | |
| Year FEs | Yes | Yes | Yes | Yes |
| Age FEs | Yes | Yes | Yes | Yes |
| Quadratic-age-by-year | No | Yes | No | No |
| Cubic-age-by-year | No | No | Yes | No |
| Quartic-age-by-year | No | No | No | Yes |

Based on Integrated Public Use Microdata Samples from the Decennial Censuses of 1970, 1980, 1990 and 2000 (Ruggles et al., 2024). The share of employed men in white-collar occupations corresponds to the "managers /professionals /technicians /finance /public safety" category in Autor and Dorn (2013), and I use the occupational crosswalk from these authors Autor and Dorn (n.d.) to obtain consistent occupational categories. Sample includes men age 25 to 54, born 1930 to 1965.

Each column shows the results of estimation of a model based on Equation 3, with the the share of employed men in white-collar occupations as the dependent variable in single age-by-year bins as the dependent variable. All models are estimated by least squares, following the approach outlined in Hansen (2000). The row titled "Size" reports the size of the trend break of cohort effects, $\delta$, with the standard error in parentheses. The row titled "Location" reports the estimated cohort at which a trend break occurs, with a 99 % confidence region in brackets calculated by inverting the likelihood ratio statistic. The row titled "P-value for existence" reports a p-value from an F-type test, based on 1000 bootstrap samples, for the null hypothesis that no trend break occurs, ie. that cohort effects are linear.

Appendix Table 4: Evidence of cohort decline across racial groups — piecewise linear cohort effect models controlling for age FEs and year FEs

|  |  | (1) White | (2) Black | (3) Hispanic | (4) Other races |
|---|---|---|---|---|---|
| Median log wage | *Size* | -0.0130 (0.0005) | -0.0251 (0.0018) | -0.0133 (0.0023) | -0.0142 (0.0036) |
|  | *Location* | 1946 [1945, 1947] | 1948 [1947, 1949] | 1949 [1946, 1953] | 1949 [1936, 1953] |
| Low birth weight (%) | *Size* | 0.10 (0.005) | 0.08 (0.01) |  | 0.07 (0.03) |
|  | *Location* | 1949 [1948, 1949] | 1947 [1945, 1949] |  | 1950 [1938, 1957] |
| Log mortality |  |  |  |  |  |
| Men | *Size* | 0.0236 (0.0005) | -0.0294 (0.0023) |  | .0118 (0.0012) |
|  | *Location* | 1944 [1944, 1945] | 1956 [1954, 1956] |  | 1945 [1943, 1947] |
| Women | *Size* | 0.0218 (0.0005) | 0.0125 (0.0007) |  | 0.0175 (0.0027) |
|  | *Location* | 1950 [1950, 1950] | 1945 [1944, 1947] |  | 1953 [1946, 1955] |

Shows the results of estimation of a model based on Equation 3, with the listed outcome as a dependent variable. All models are estimated by least squares, following the approach outlined in Hansen (2000). Intergenerational infant health results are based on Birth data files (National Center for Health Statistics, n.d.*a*) 1968-1990, mothers age 18-40 who were born between 1930 to 1960. Labor market results are based on CPS-MORG data (Bureau Of The Census, n.d.*a*,n), 1979-1993, and includes men age 25-54, who were born from 1930 to 1960. Log mortality results are based on death counts from the Multiple Cause of Death File (National Center for Health Statistics, n.d.*b*) and population counts from Surveillance, Epidemiology, and End Results (SEER), and include the years 1975-2019, ages 25-84, cohorts born from 1930 to 1960.

Appendix Table 5: Evidence of cohort decline across Census Regions — piecewise linear cohort effect models

|  |  | (1)<br>Northeast | (2)<br>Midwest | (3)<br>South | (4)<br>West |
|---|---|---|---|---|---|
| Median log wage | *Size* | -0.0104<br>(0.0008) | -0.0188<br>(0.0007) | -0.0166<br>(0.0009) | -0.0140<br>(0.0009) |
|  | *Location* | 1947<br>[1945, 1948] | 1947<br>[1946, 1947] | 1947<br>[1947, 1947] | 1947<br>[1946, 1948] |
| Low birth weight (%) | *Size* | 0.12<br>(.01) | 0.11<br>(.01) | 0.13<br>(.01) | 0.09<br>(.01) |
|  | *Location* | 1947<br>[1946, 1947] | 1949<br>[1948, 1950] | 1948<br>[1947, 1948] | 1948<br>[1946, 1949] |
| Log mortality |  |  |  |  |  |
| Men | *Size* | 0.0284<br>(0.0016) | 0.0287<br>(0.0014) | 0.0341<br>(0.0012) | 0.0286<br>(0.0015) |
|  | *Location* | 1946<br>[1946, 1946] | 1946<br>[1946, 1946] | 1946<br>[1946, 1946] | 1946<br>[1946, 1946] |
| Women | *Size* | 0.0320<br>(0.0019) | 0.0288<br>(0.0019) | 0.0331<br>(.0016) | 0.0269<br>(0.0019) |
|  | *Location* | 1948<br>[1948, 1949] | 1950<br>[1950, 1950] | 1950<br>[1949, 1950] | 1949<br>[1949, 1949] |

Each column shows the results of estimation of a model based on Equation 3, with the listed outcome as a dependent variable. All models are estimated by least squares, following the approach outlined in Hansen (2000). Wages and birth weight include controls for age fixed effects and year fixed effects — mortality also includes a separate quadratic-in-age in each year. The column titled "Size" reports the estimated size of the cohort break $\delta$, with the standard error in parentheses. The column titled "Location" reports the cohort at which the trend break is estimated to occur, with a 99 % confidence interval in brackets calculated by inverting a likelihood ratio statistic. The row titled "Existence" reports a p-value from an F-type test, based on 1000 bootstrap samples, for the null hypothesis that no trend break occurs, ie. that cohort effects are linear. Intergenerational infant health results are based on Birth data files (National Center for Health Statistics, n.d.*a*) 1968-1995, mothers age 18-40 who were born between 1930 to 1970. Labor market results are based on CPS-MORG data (Bureau Of The Census, n.d.*a*,n), 1979-1993, and includes men age 25-54, who were born from 1930 to 1965. Log mortality results are based on data from the United States Mortality Database (University of California, Berkeley, 2024), and include the years 1975-2019, ages 25-85, cohorts born from 1930 to 1965.

# References

**Autor, David, and David Dorn.** 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market." *The American Economic Review*, 1553–1597.

**Autor, David, and David Dorn.** n.d.. "Occupation codes.s." Accessed at https://www.ddorn.net/data.html as of 1 March 2024.

**Bureau Of The Census.** n.d.*a*. "Current Population Survey, Basic Monthly Data, 1994-2016." NBER. Accessed at https://data.nber.org/cps-basic3/dta/ as of 1 March 2024.

**Bureau Of The Census.** n.d.*b*. "Current Population Survey, Merged Outgoing Rotation Group, 1979-1993." NBER. Accessed at https://data.nber.org/morg/annual/ as of 1 March 2024.

**Center for Economic and Policy Research.** 2020. "CPS ORG Uniform Extracts, Version 2.5." Accessed at https://ceprdata.org/cps-uniform-data-extracts/cps-outgoing-rotation-group/cps-org-data/ as of 1 March 2024.

**Hansen, Bruce E.** 2000. "Sample splitting and threshold estimation." *Econometrica*, 68(3): 575–603.

**Harnischfeger, Annegret, and David E. Wiley.** 1975. *Achievement Test Score Decline: Do We Need to Worry?* CEMREL, Inc.

**National Center for Health Statistics.** n.d.*a*. "Birth data files." NBER. Accessed at https://www.nber.org/research/data/vital-statistics-natality-birth-data as of 1 March 2024.

**National Center for Health Statistics.** n.d.*b*. "Multiple cause of death files." NBER. Accessed at https://www.nber.org/research/data/mortality-data-vital-statistics-nchs-multiple-cause-death-data as of 1 March 2024.

**Ruggles, Stephen, Sarah Flood, Matthew Sobek, Daniel Backman, Annie Chen, Grace Cooper, Stephanie Richards, Renae Rodgers, and Megan Schouweiler.** 2024. "IPUMS USA: Version 15.0." https://doi.org/10.18128/D010.V15.0.

**Surveillance, Epidemiology, and End Results (SEER) Program.** n.d.. "County-Level Population Files - Single-year Age Groups." Accessed at https://seer.cancer.gov/popdata/download.html as of 1 March 2023.

**University of California, Berkeley.** 2024. "United States Mortality Database." Accessed at https://doi.org/10.18128/D010.V15.0 as of 1 March 2023.