Rising longevity and US wealth inequality

some empirical evidence

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Income and Wealth inequality: Drivers and consequences
Gdańsk 2023
Motivation
Rising longevity and wealth inequality in the US

Life expectancy at retirement ↑ substantially
Rising longevity and wealth inequality in the US

Life expectancy at retirement ↑ substantially

Up 5+ years: 14.1 years (1950) → 19.5 years (2015)
Rising longevity and wealth inequality in the US

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**Theory:** longevity affects accumulation patterns
Rising longevity and wealth inequality in the US

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Rising longevity and wealth inequality in the US

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2. STRUCTURAL:
   ↑ cohorts close to retirement relatively more numerous
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**Question:** does longevity matter quantitatively for wealth inequality?
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Question: does longevity matter quantitatively for wealth inequality?
→ We study wealth inequality patterns across birth cohorts (SCF data)
Two dimensions of inequality: same year of birth (=cohort) vs same year
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Our contribution

- Contribution of between-cohort inequality to overall rise in wealth inequality is significant!
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- We identify which cohorts contribute the most to wealth inequality
  - Longer-lived birth cohorts contribute the most to inequality
Data & methods
Data source

Survey of Consumer Finances (SCF+) data for 1950-2020 by Kuhn et al. (2020)
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- **Assets** - Financial assets (including defined-contribution retirement plans), real estate, cars
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Demographic characteristics match Current Population Survey and U.S. Census data
Methods – what we do

1. **Inequality Decomposition** – Quantify significance of between cohorts inequality
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2. **LE65 vs \( GE_{between} \)** – Connect changes in between cohort inequality to changes in longevity
Methods – what we do

1. **Inequality Decomposition** – Quantify significance of between cohorts inequality
2. **LE65 vs $GE_{between}$** – Connect changes in between cohort inequality to changes in longevity
3. **RIF Regression** – We identify which cohorts contribute the most to wealth inequality
Methods – Generalized entropy:

Q: Significance and evolution of between cohort inequality?
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\[
Total = \text{Inequality Between Cohorts} + \text{Inequality Within Cohorts}
\]  

(1)
Methods – Generalized entropy:

Q: Significance and evolution of between cohort inequality?

\[ \text{Total} = \text{Inequality Between Cohorts} + \text{Inequality Within Cohorts} \] (1)

Gini can’t do this!
Q: Significance and evolution of between cohort inequality?

\[ \text{Total} = \text{Inequality Between Cohorts} + \text{Inequality Within Cohorts} \] (1)

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\[ \text{Generalized Entropy} = GE_{\text{between}} + GE_{\text{within}} \] (2)
Methods – Generalized entropy:

**Q**: Significance and evolution of between cohort inequality?

\[ \text{Total} = \text{Inequality Between Cohorts} + \text{Inequality Within Cohorts} \]  

(1)

Gini can’t do this!

\[ \text{Generalized Entropy} = GE_{between} + GE_{within} \]  

(2)

\[ \Delta GE = \Delta GE_{between} + \Delta GE_{within} \]  

(3)
Methods – Generalized entropy

\[
GE(\alpha) = \frac{1}{N\alpha(\alpha - 1)} \sum_{i=1}^{N} \left[ \left( \frac{a_i}{\bar{y}} \right)^{\alpha} - 1 \right],
\]  

- \( a_i \) - assets of individual \( i \)
- \( \bar{y} \) - arithmetic mean of assets
- \( N \) - population size
Methods – Generalized entropy

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Alpha comparison

The graph shows the Gini coefficient over time from 1950 to 2010. The Gini coefficient measures income inequality within a country. The values range from 0 to 1, with 0 indicating perfect equality and 1 indicating perfect inequality. The line chart indicates a trend of increasing inequality from the 1950s to the 2000s, with a notable dip in the 1970s.
Alpha comparison

- Gini coefficient, left axis
- GE(\(\alpha = 0.3\)), right axis
Alpha comparison

- Gini coefficient, left axis
- $GE(\alpha=1.5)$, right axis

Gini coefficient graph showing data from 1950 to 2010.
Alpha comparison
Methods – Generalized entropy:

\[ GE = GE_{between} + GE_{within} \] (5)
Methods – Generalized entropy:

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Between Cohorts component of GE
Methods – Generalized entropy:

\[ GE = GE_{between} + GE_{within} \] (5)

Between Cohorts component of GE

\[ GE_{between}(\alpha) = \frac{1}{\alpha(\alpha - 1)} \left[ \sum_{c=1}^{C} n_c \left( \frac{\bar{y}_c}{\bar{y}} \right)^\alpha - 1 \right] \] (6)

- \( \bar{y}_c \) - arithmetic mean of assets of cohort \( c \)
- \( \bar{y} \) - arithmetic mean of assets
- \( n_c \) - population share of cohort \( c \)
Methods – Generalized entropy:

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Rising longevity and US wealth inequality

Results

<table>
<thead>
<tr>
<th>Period over which change in GE inequality was computed</th>
<th>BETWEEN cohort contribution to change of GE</th>
<th>WITHIN cohort contribution to change of GE</th>
<th>overall change</th>
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<tr>
<td>1950/4–1970/4</td>
<td>−.3</td>
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<tr>
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<td>1990/4–2010/4</td>
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<td>1</td>
<td>2</td>
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</table>
Results

Generalized entropy ($\alpha=0.5$) BETWEEN cohort inequality levels

Generalized entropy ($\alpha=0.5$) WITHIN cohort inequality levels

Rising longevity and US wealth inequality
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<tr>
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<tr>
<td>1990/4–2010/4</td>
<td>0.1</td>
</tr>
<tr>
<td>1995/9–2015/6</td>
<td>0.15</td>
</tr>
</tbody>
</table>

- Contribution of BETWEEN cohort GE
- Contribution of WITHIN cohort GE
- Overall change
Results

Between cohorts inequality vs LE65 changes

Note: Population structure fixed at 1950 level
Between cohorts inequality vs LE65 changes

Note: Population structure fixed at 1950 level

Note: Population structure fixed at 1950 level; between cohort inequality smoothed
Between cohorts inequality vs LE65 changes

Note: Population structure fixed at 1950 level
Between cohorts inequality vs LE65 changes

Note: Population structure fixed at 1950 level

Note: Population structure as in the data
Total inequality vs LE65 changes

![Graph showing the relationship between total inequality and changes in life expectancy at 65. The graph includes a fitted line and 95% confidence interval, with data points indicated.]
Identifying the role of specific birth-cohorts
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Q: Do cohorts with ↑ LE65 contribute ↑ to overall inequality?
Identifying the role of specific birth-cohorts

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Pieces needed to answer:

\[ \text{Wealth}_i = \beta_{c \text{ birth cohort}} + \epsilon_i \]
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We need tricks:

- Deaton and Paxson (1994) decomposition
Identifying the role of specific birth-cohorts

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We need tricks:

- Deaton and Paxson (1994) decomposition
- Recentered Influence Functions (Firpo et al. (2009) & Rios-Avila (2020))
Final regression form

$$RIF\{wealth_i, GE(\alpha)\} = \beta_c birth\ cohort_c + \beta_a age_a + \beta_y year_y + \epsilon_i$$ (7)
Final regression form

\[ RIF\{wealth_i, GE(\alpha)\} = \beta_c \text{birth cohort}_c + \beta_a \text{age}_a + \beta_y \text{year}_y + \epsilon_i \] (7)

\[ GE(\alpha) = \mathbb{E}[RIF\{wealth_i, GE(\alpha)\}] \] (8)
Final regression form

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RIF\{wealth_i, GE(\alpha)\} = \beta_c \text{birth cohort}_c + \beta_a \text{age}_a + \beta_y \text{year}_y + \epsilon_i
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\[
GE(\alpha) = \mathbb{E}[RIF\{wealth_i, GE(\alpha)\}]
\]  \hspace{1cm} (8)

\(\beta_c\) – unconditional partial effect of cohort on distributional statistics (GE/GINI)
Evolution of $\beta_c$ across cohorts
Identifying the role of specific birth-cohorts

Rising longevity and US wealth inequality

Change in life expectancy at age=65, relative to cohort born in 1920–1924

GE: Cohort effects relative to cohort born 1920–24 (adjusting for age and year effects)

GE: CI (left axis)  GE: point estimate of effect size (left axis)
Relevance
Demography and life-cycle matters

- Structural models misspecification – \textit{infinitely lived agents}
  
e.g., Hubmer et al. (2021), Fagereng et al. (2019)
Demography and life-cycle matters

- Structural models misspecification – *infinitely lived agents*
  
e.g., Hubmer et al. (2021), Fagereng et al. (2019)
  
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- Possible policy misspecification
Conclusion & Discussion

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- We link this contribution to increases in LE65
- Cohorts with ↑ LE65 contribute ↑ to overall increases of wealth inequality
Questions or suggestions?
Thank you!

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Appendix
Ratio comparison

DATA: GE CI
DATA: GE point estimate of effect size
POPULATION STRUCTURE FROM 1950: GE CI
POPULATION STRUCTURE FROM 1950: GE point estimate of effect size

Change in life expectancy at age=65, relative to cohort born in 1920–1924

GE05: cohort effects relative to cohort born 1920–24 (adjusting for age and year effects)
Ratio comparison

- Graph showing the ratio comparison of between cohort inequality of new cohorts vs. old cohorts.
- The x-axis represents the ratio of between inequity of new cohorts to between inequity of old cohorts.
- The y-axis shows the 95% CI fitted values.
- The data points are plotted as triangles, indicating changes in between cohort inequality.

Legend:
- 95% CI
- Fitted values
- Change in between cohort inequality
Rising longevity and US wealth inequality

Appendix

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<tr>
<td>1990/4−2010/4</td>
<td>.5</td>
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Note: Population structure frozen at 1950
GE within

\[ GE_{within}(\alpha) = \sum_{c=1}^{C} \left( \frac{N_c}{N} \right)^{1-\alpha} s_c^\alpha GE_c(\alpha) \] (9)
## Intuition

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Intuition

![Graph showing trends in GE(α=0.5) and wealth share held by top 10%.](image)
Intuition
## Intuition

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Bibliography


