Australian
National
University

Workshop on Decomposition Methods

Vladimir Canudas-Romo, Joo Won Park and Wen Su

Decomposing Fertility Measures

Population Studies ›
A Journal of Demography
Volume 75, 2021 - Issue 2

Submit an article | Journal homepage

Research Article

Educational composition and parity contribution to completed cohort fertility change in low-fertility settings

Ester Lazzari, Ryohei Mogi & Vladimir Canudas-Romo

Pages 153-167 | Received 17 Jun 2020, Accepted 12 Jan 2021, Published online: 29 Mar 2021

Download citation | https://doi.org/10.1080/00324728.2021.1895291 | Check for updates

Full Article | Figures & data | References | Supplemental | Citations | Metrics | Reprints & Permissions | Read this article

Abstract

Extensive literature has documented the contribution of rising women's education to decreases in completed cohort fertility (CCF). A key question related to the education–fertility relationship is to what extent the decrease in fertility is the result of changes in educational composition vs changes in fertility behaviours within educational categories. This study quantified the effect of educational expansion on fertility levels

Related

People also read

All-time lo
Demograph
cohort imp

Julia Hellst

Completed Cohort Fertility

$$CCF(t) = \frac{B(t)}{W(t)}$$

CCF

$$CCF(t) = \sum_{e=L}^{H} F^e(t) E^e(t)$$

Education composition

$$E^e(t) = \frac{W^e(t)}{W(t)}$$

Education-specific fertility

$$F^e(t) = \frac{B^e(t)}{W^e(t)}$$

CCF decomposition

$$C\dot{C}F =$$

$$\sum_{e=L}^{H} \left[\dot{E}^e(t) F^e(t) + E^e(t) \dot{F}^e(t) \right]$$

CFE database

COHORT FERTILITY AND EDUCATION

European Research Council
Established by the European Commission

Funded by the European Union

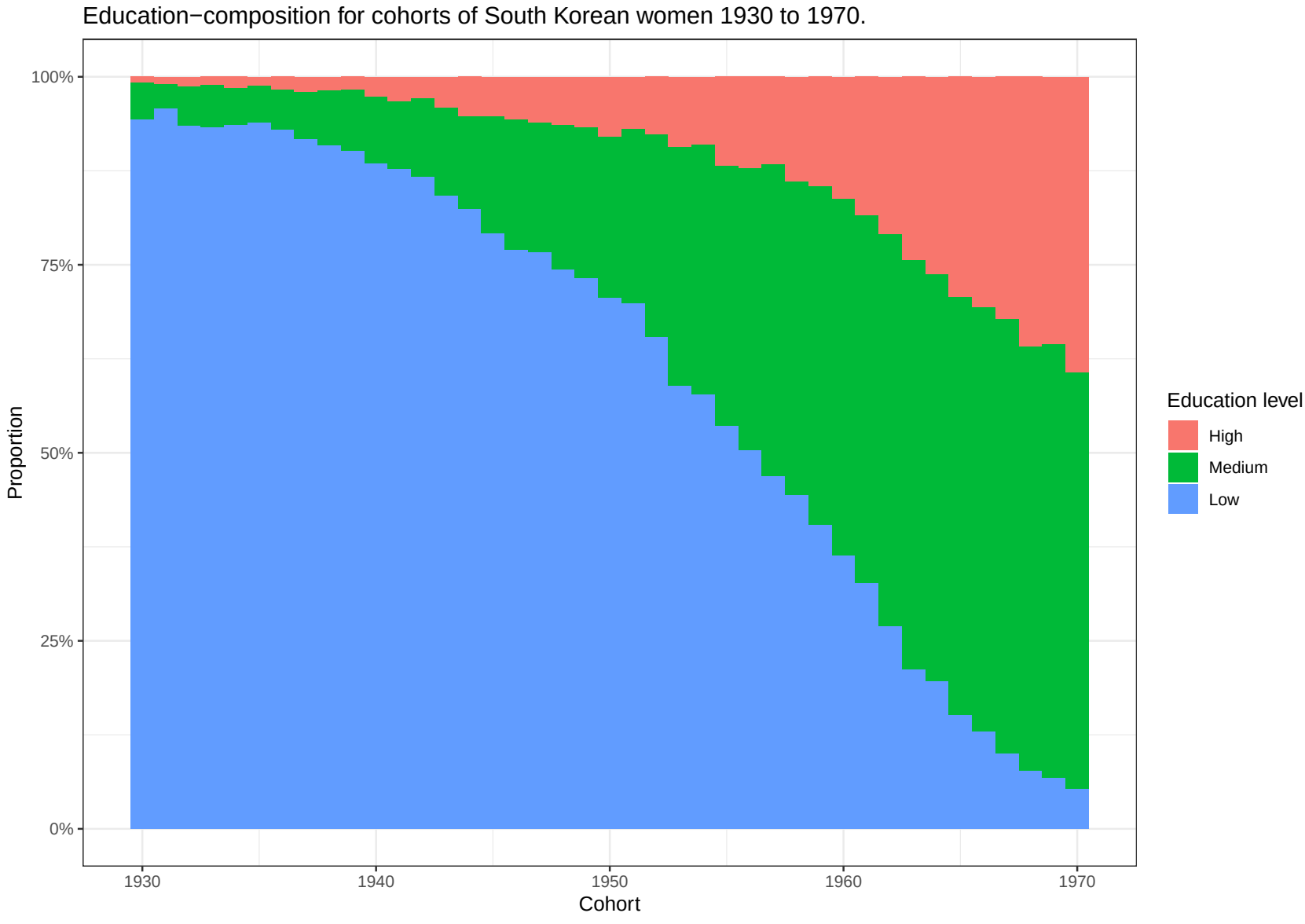
Please select country and survey.

Dataset: Country: South Korea Data source:

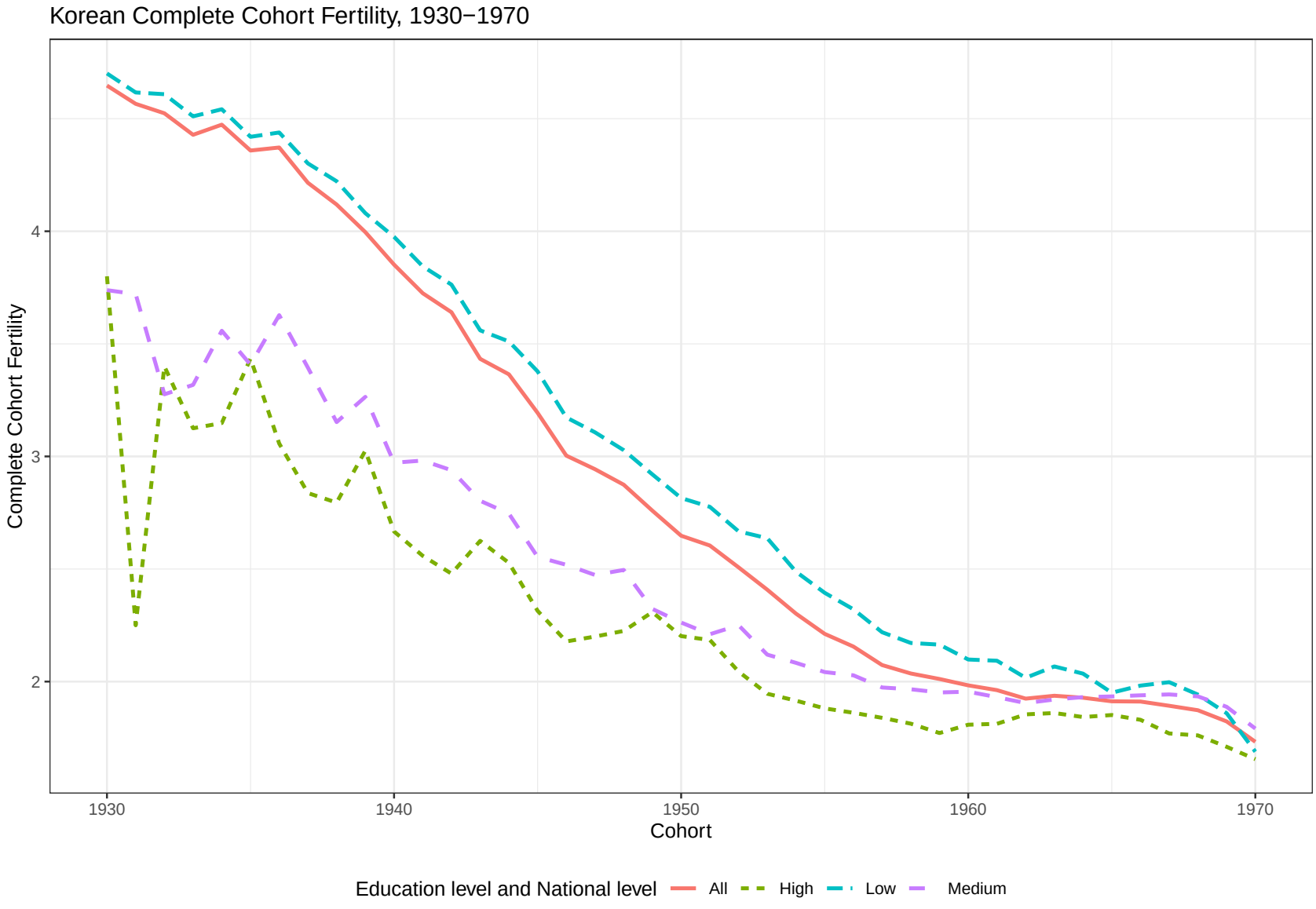
- Census 1966
- Census 1970
- Census 1975
- Census 1985
- Census 1990
- Census 2000
- Census 2005
- Census 2010

Subscribe to the RSS database updates.

Education composition



Fertility change

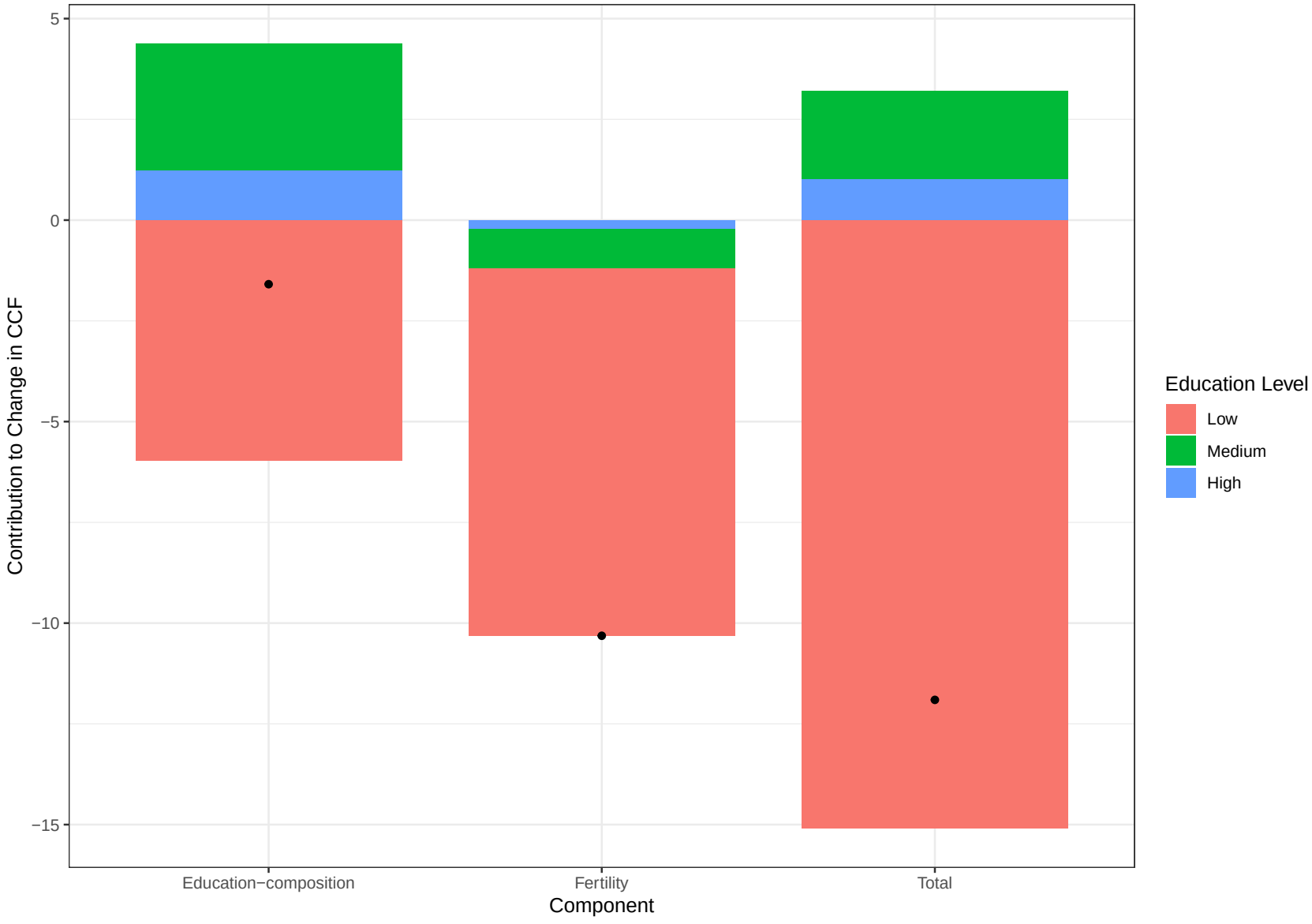


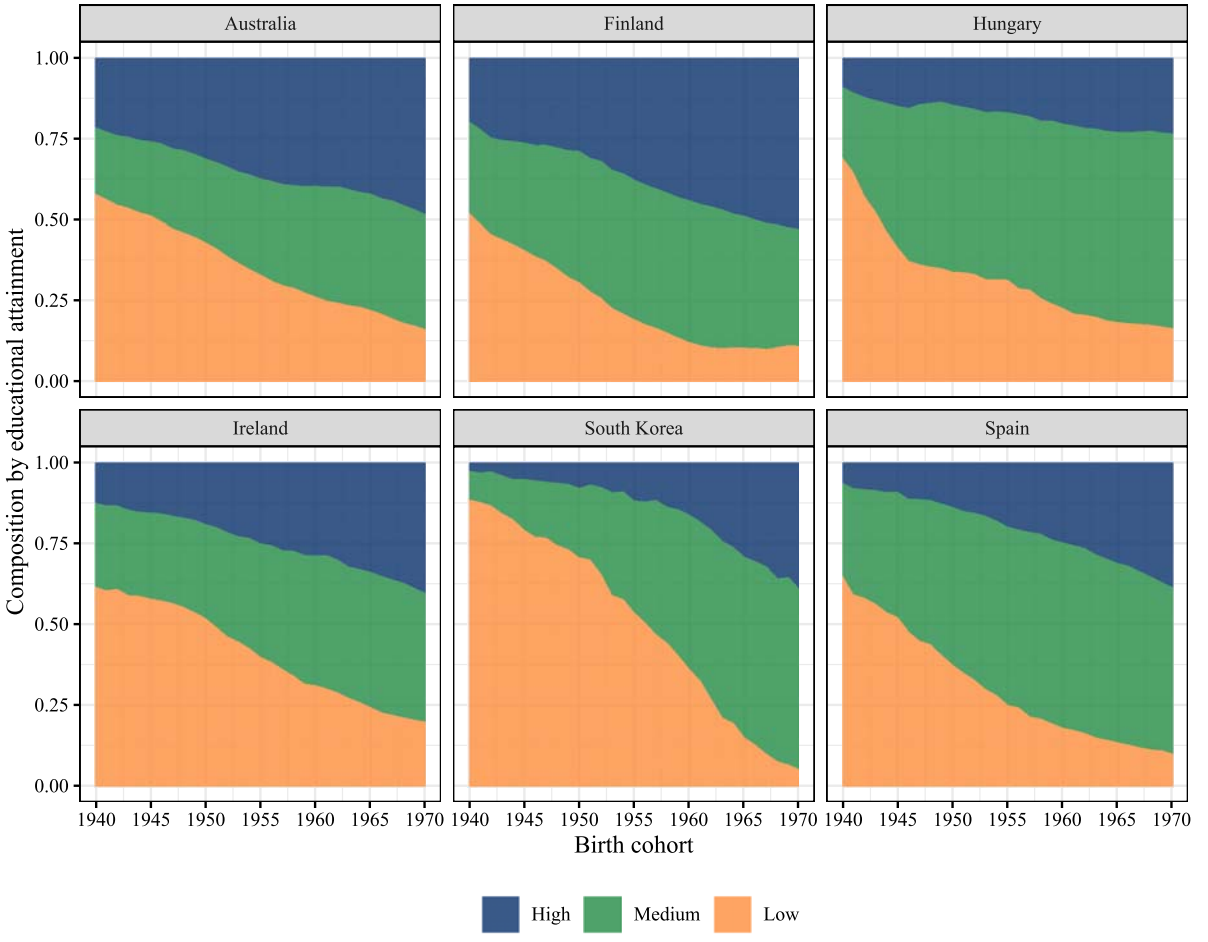
CCF decomposition

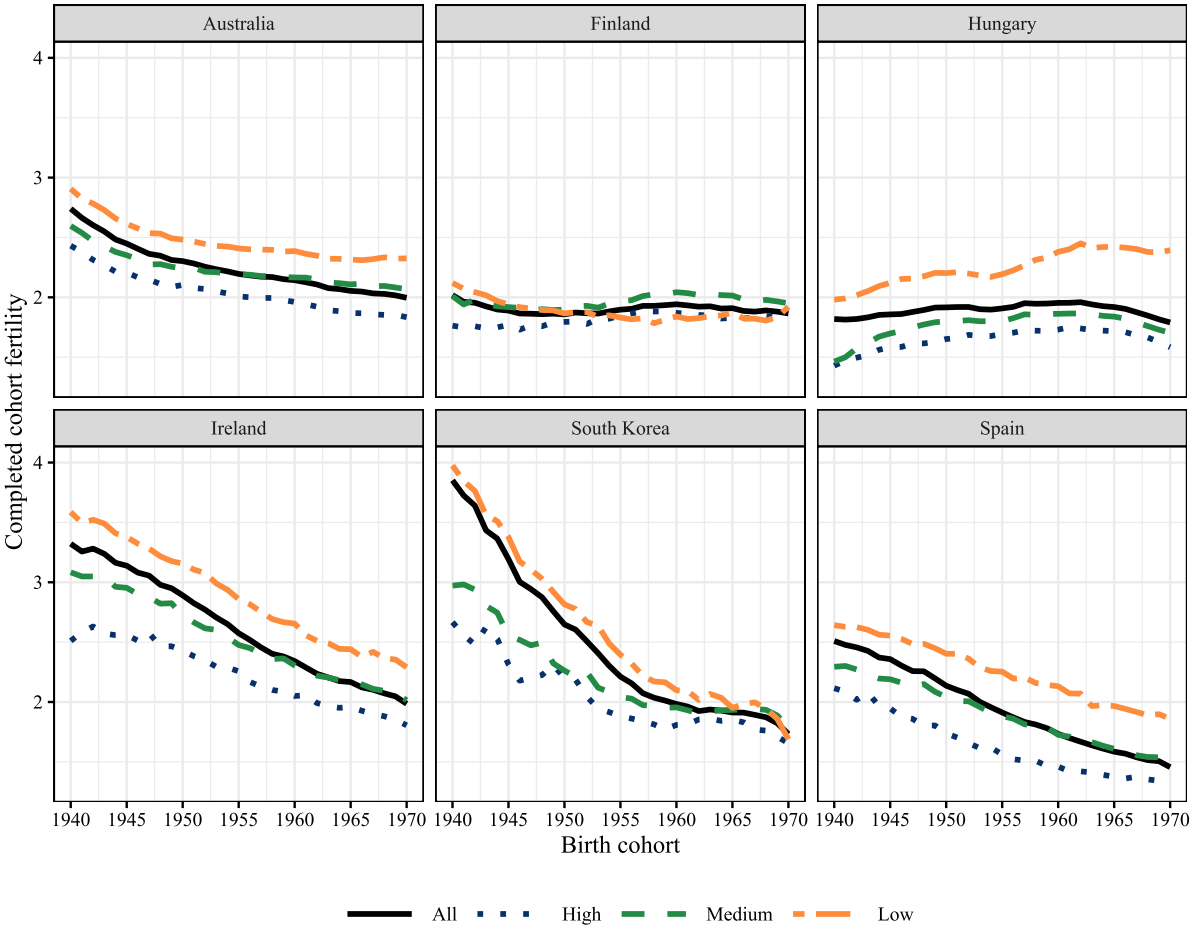
Table 1: CCF decomposition

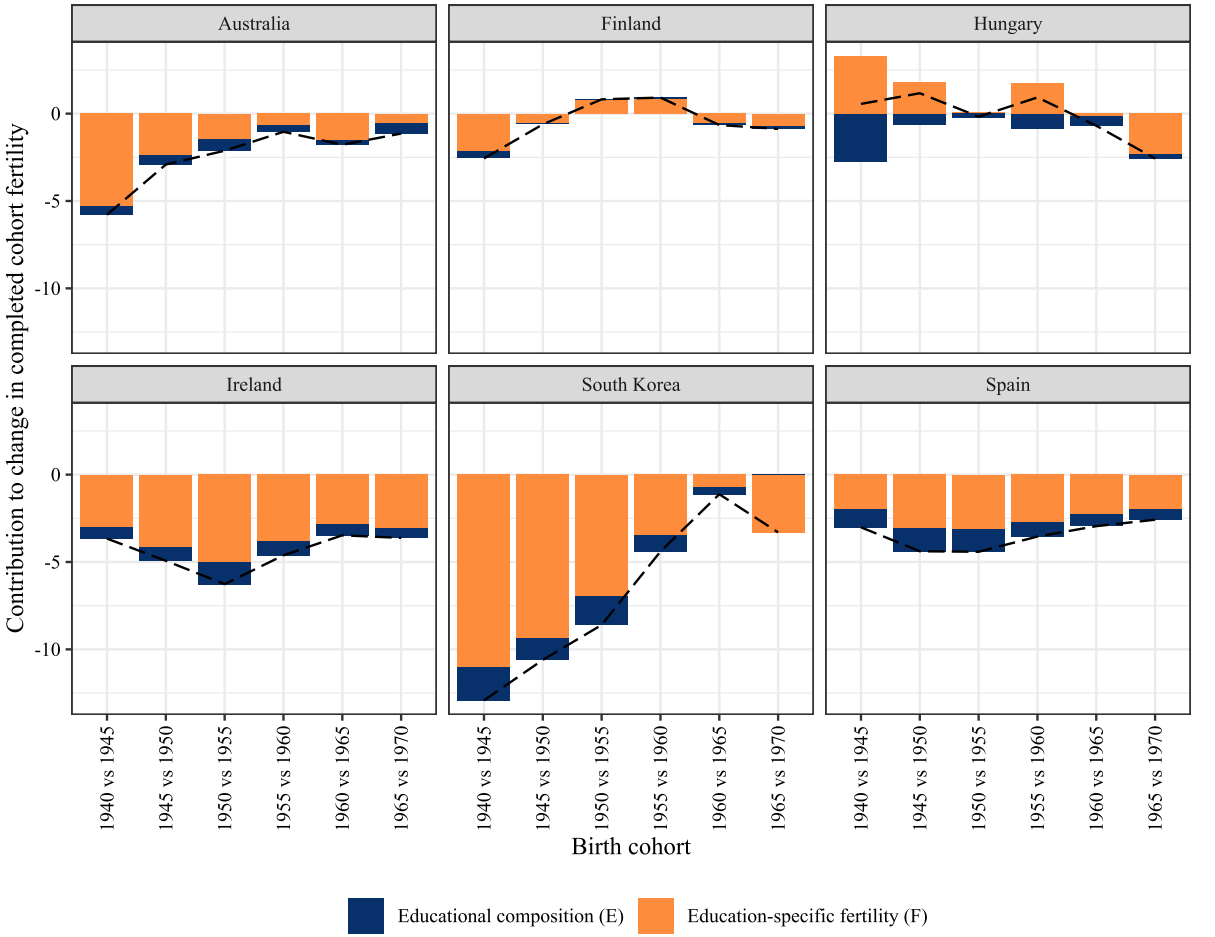
	Korea
CCF in 1940	3.850
CCF in 1950	2.650
Total annualized change	-0.119
Fertility component	-0.103
Education-composition component	-0.016

CCF decomposition




Australia
Finland
Hungary
Ireland
South Korea
Spain
Composition by educational attainment
1.00
0.75
0.50
0.25
0.00
1940
1945
1950
1955
1960
1965
1970
Birth cohort
High
Medium
Low


Australia
Finland
Hungary
Ireland
South Korea
Spain
Completed cohort fertility
4
3
2
1940
1945
1950
1955
1960
1965
1970
Birth cohort
All
High
Medium
Low


Australia
Finland
Hungary
Ireland
South Korea
Spain
Contribution to change in completed cohort fertility
0
-5
-10
1940 vs 1945
1945 vs 1950
1950 vs 1955
1955 vs 1960
1960 vs 1965
1965 vs 1970
Birth cohort
Educational composition (E)
Education-specific fertility (F)

DEMOGRAPHY ISSUES

RESEARCH ARTICLE | FEBRUARY 01 2021

Cross-Sectional Average Length of Life Childless

Ryohei Mogi; Jessica Nisén; Vladimir Canudas-Romo

Demography (2021) 58 (1): 321–344.

https://doi.org/10.1215/00703370-8937427

Standard View PDF Cite Share Permissions

Abstract

Increases in the average age at first birth and in the proportion of women remaining childless have extended the total number of years that women spend childless during their reproductive lifetime in several countries. To quantify the number of years that reproductive-age women live without children, we introduce the cross-sectional average length of life childless (CALC). This measure includes all the age-specific first-birth information available for the cohorts present at time *t*; it is a period measure based on

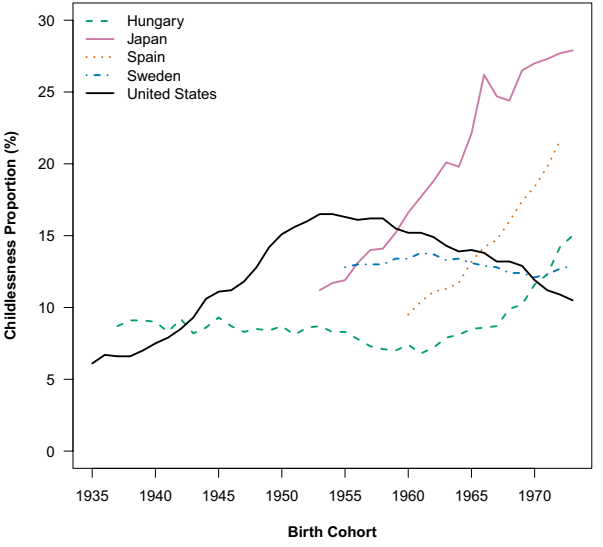
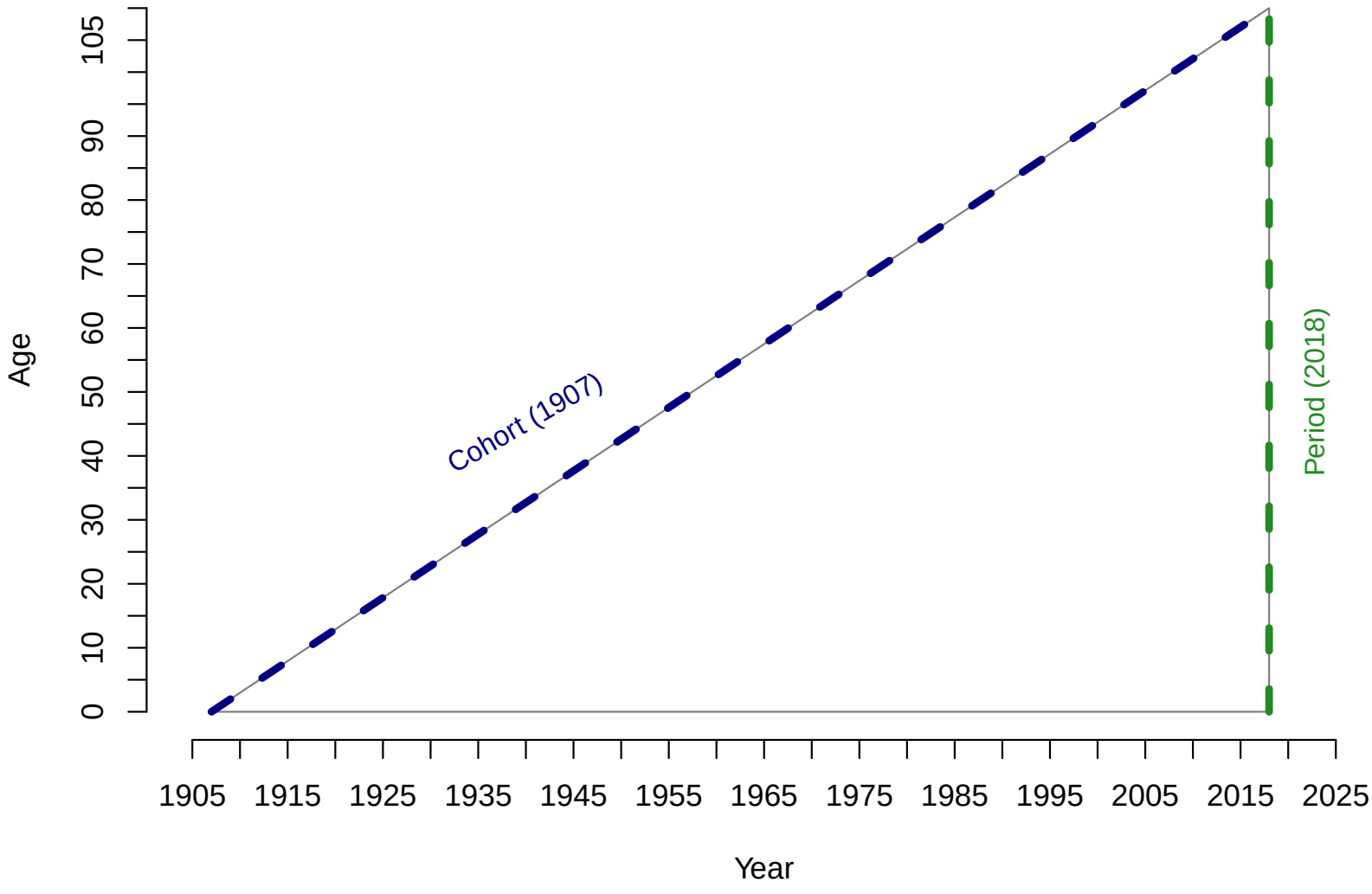
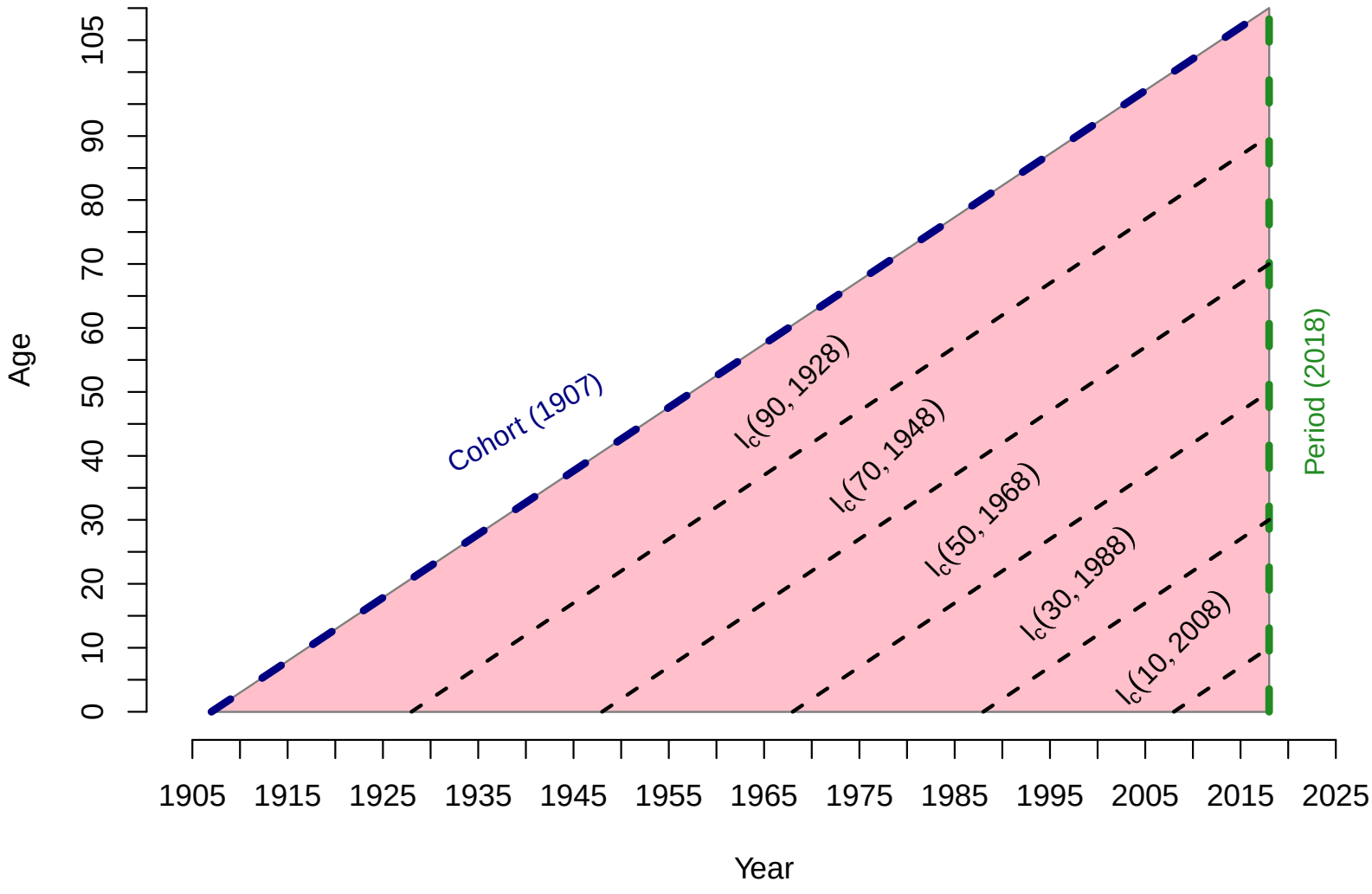


Fig. 2 Childlessness rate at age 44 or older among women born in 1935–1973 in selected countries. *Source*: Authors' calculations using the Human Fertility Database.

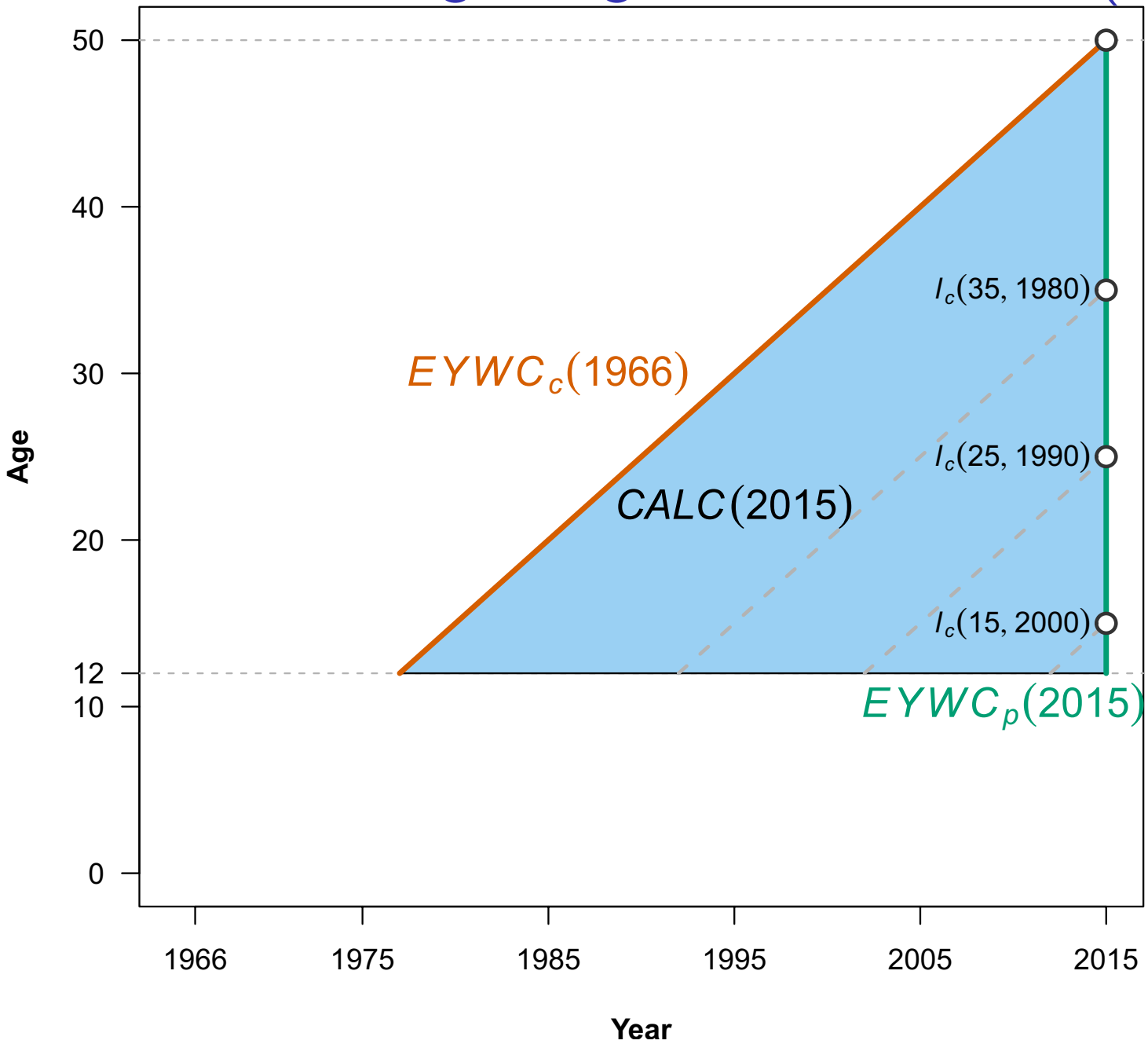
Cross-sectional Average Length of Life (CAL)



Cross-sectional Average Length of Life (CAL)



Cross-sectional Average Length of Life Childless ($\mathcal{CALC}$)



Cross-sectional Average Length of Life Childless ($CALC$)

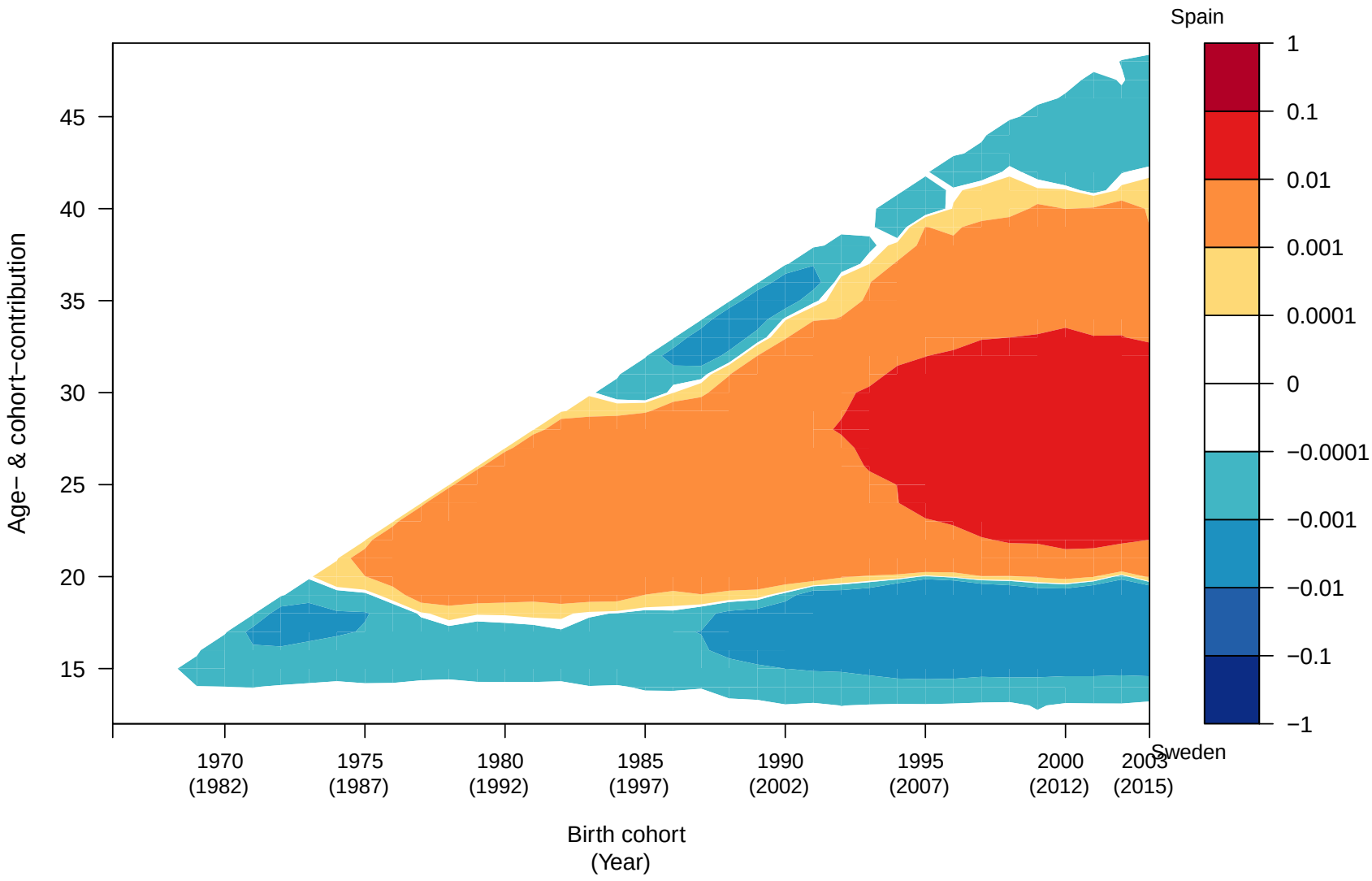
$$CALC(t) = \int_{12}^{50} \ell_c(x, t-x)\, dx$$

CALC

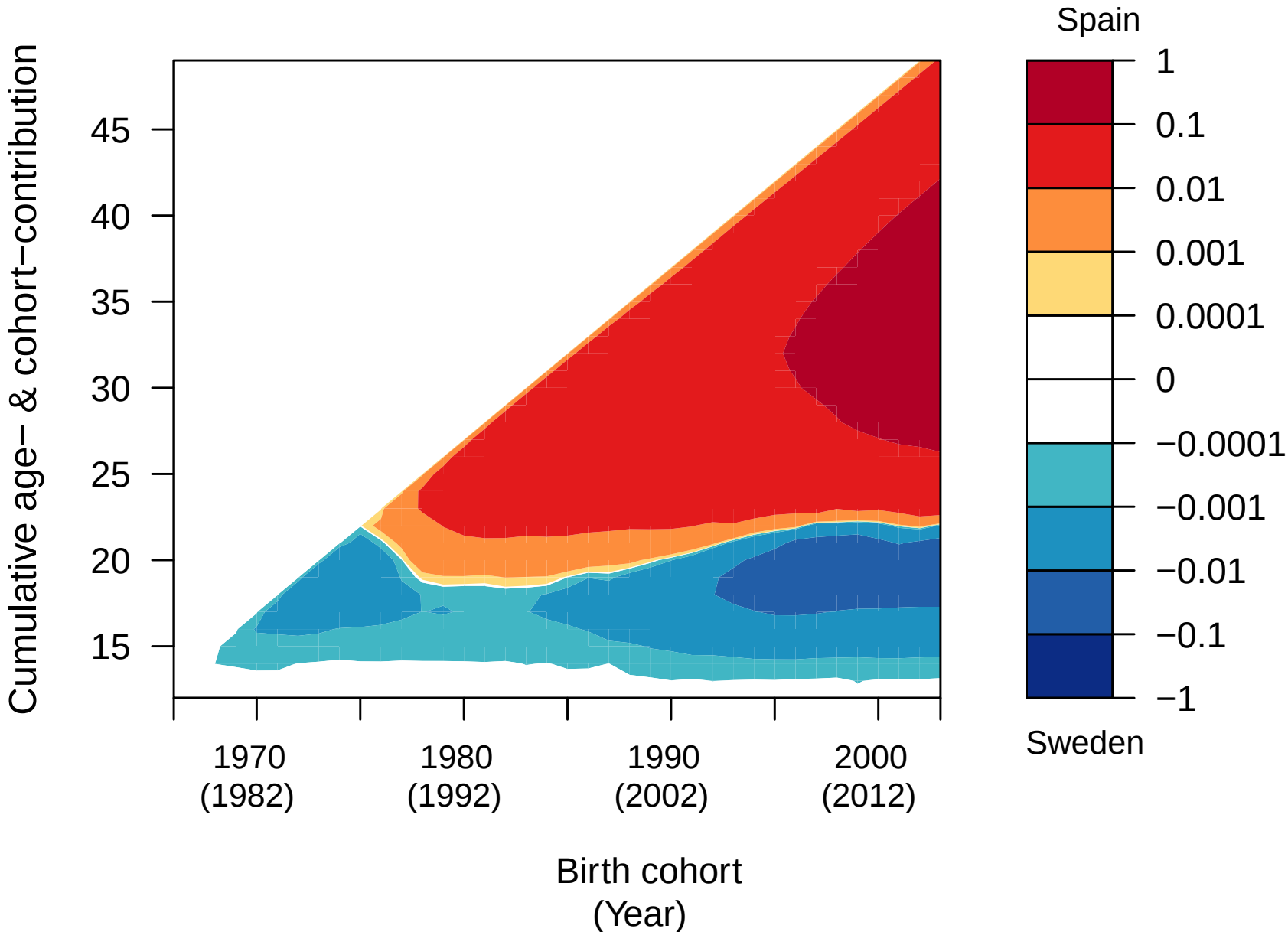
$$\dot{CALC}(t,\xi) =$$

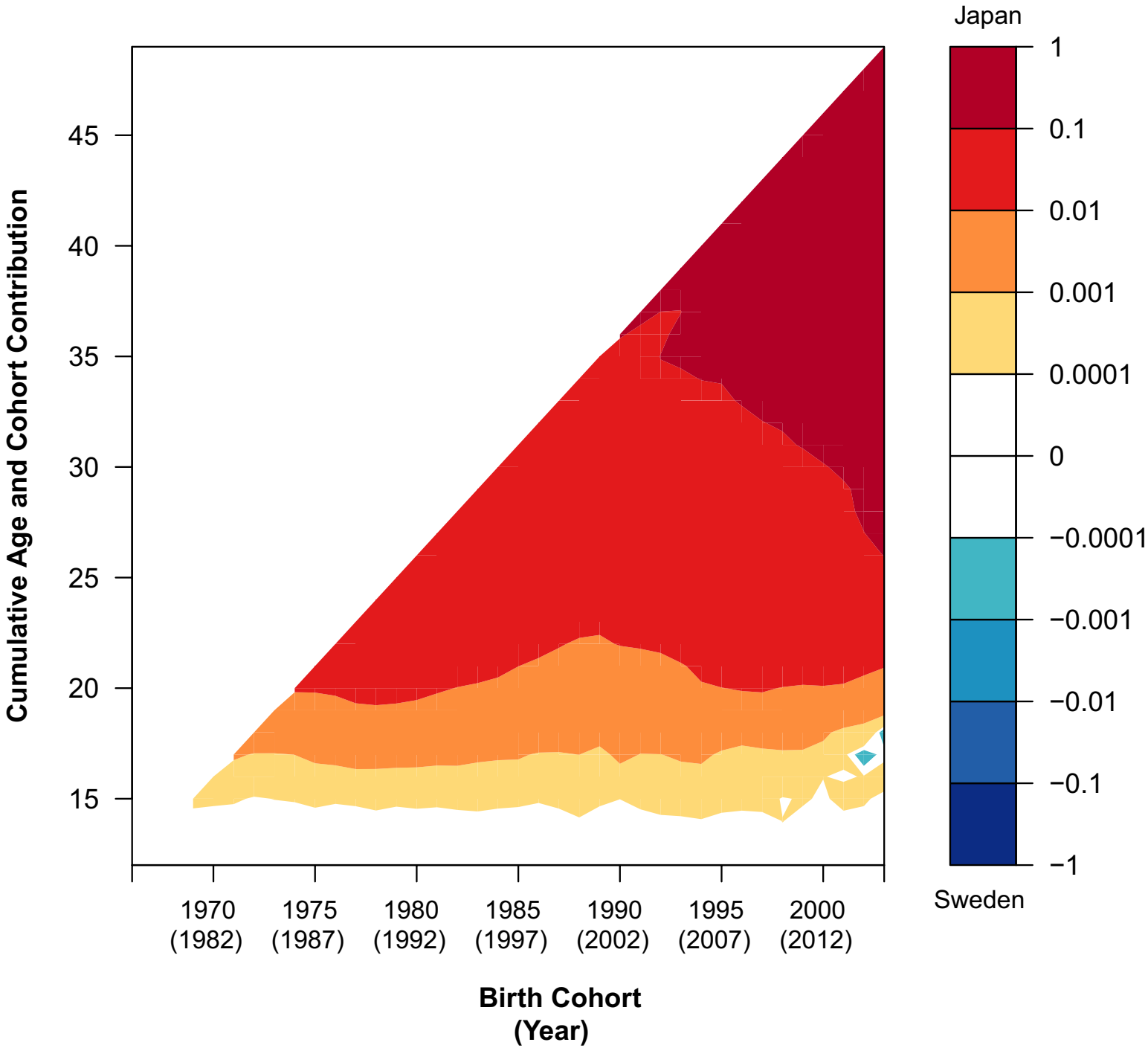
$$\int_{12}^{55} \ell_c(x, t-x, \xi) \sum_{a=12}^{x-1} \frac{\dot{p}_a(t-x,\xi)}{p_a(t-x,\xi)} dx$$

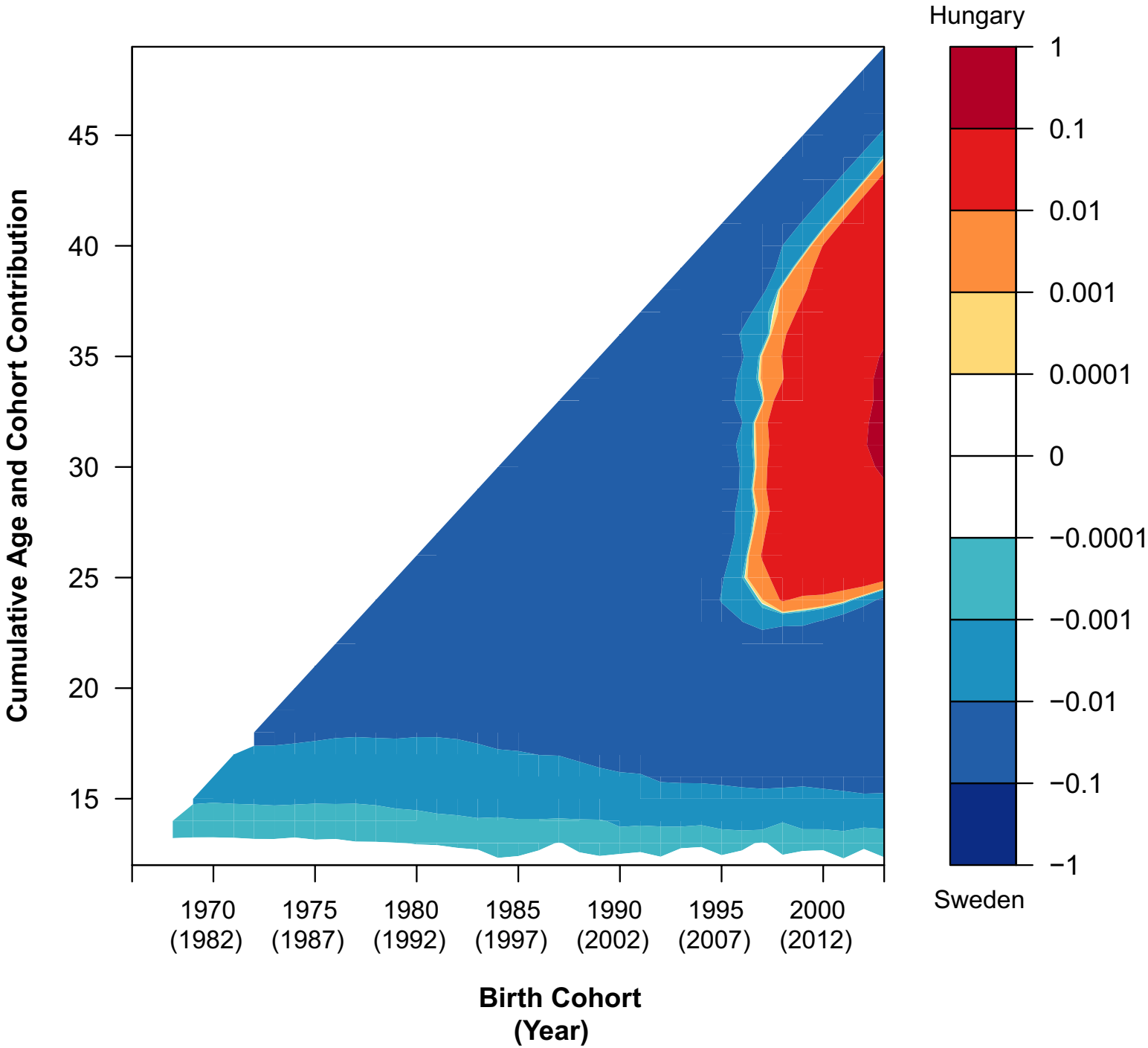
CALC decomposition

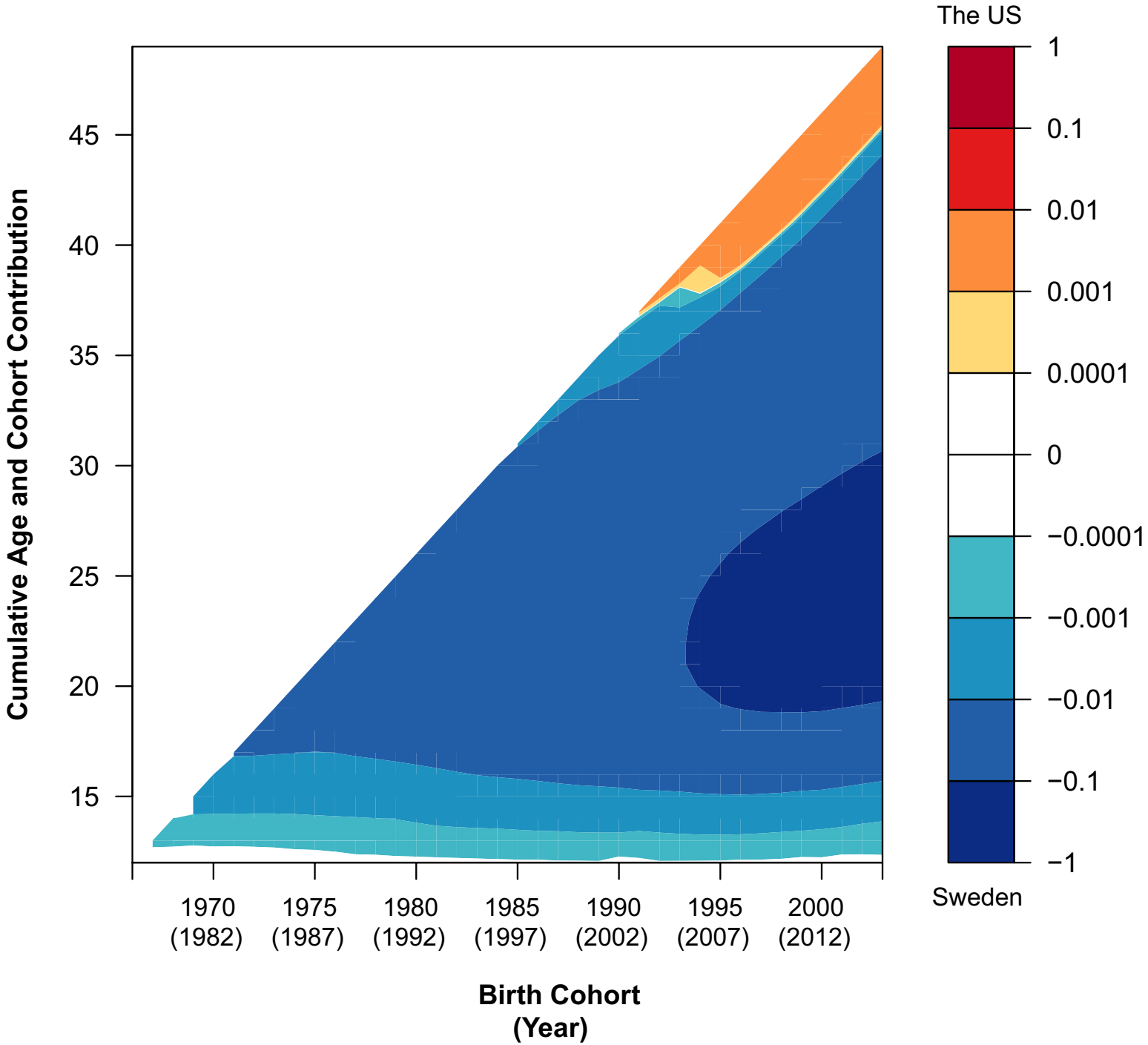


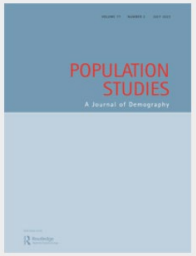
CALC decomposition




Japan
1
0.1
0.01
0.001
0.0001
0
−0.0001
−0.001
−0.01
−0.1
−1
Sweden
Cumulative Age and Cohort Contribution
45
40
35
30
25
20
15
1970
(1982)
1975
(1987)
1980
(1992)
1985
(1997)
1990
(2002)
1995
(2007)
2000
(2012)
Birth Cohort
(Year)


Hungary
1
0.1
0.01
0.001
0.0001
0
−0.0001
−0.001
−0.01
−0.1
−1
Sweden
Cumulative Age and Cohort Contribution
45
40
35
30
25
20
15
1970
(1982)
1975
(1987)
1980
(1992)
1985
(1997)
1990
(2002)
1995
(2007)
2000
(2012)
Birth Cohort
(Year)


Cumulative Age and Cohort Contribution
45
40
35
30
25
20
15
1970
(1982)
1975
(1987)
1980
(1992)
1985
(1997)
1990
(2002)
1995
(2007)
2000
(2012)
Birth Cohort
(Year)
The US
1
0.1
0.01
0.001
0.0001
0
−0.0001
−0.001
−0.01
−0.1
−1
Sweden



Population Studies ›
A Journal of Demography
Volume 77, 2023 - Issue 2

Submit an article | Journal

Research Article

The contribution of survival to changes in the net reproduction rate

Tianyu Shen, Ester Lazzari & Vladimir Canudas-Romo

Pages 163-178 | Received 15 Jan 2022, Accepted 14 Nov 2022, Published online: 28 Mar 2023

Download citation | https://doi.org/10.1080/00324728.2023.2187441 | Check for updates

Full Article | Figures & data | References | Supplemental | Citations | Metrics | Reprints & Permissions | Read this article

Abstract

The net reproduction rate (NRR) is an alternative fertility measure to the more common total fertility rate (TFR) and accounts for the mortality context of the population studied. This study is the first to compare NRR trends in high- and low-income countries and to decompose NRR changes over time into fertility and survival components. The results show that changes in the NRR have been driven mostly by changes in fertility. Yet improvements in survival have also played an important role in explaining changes in the NRR over the last century and represent a substantial component of change in some low-income countries today. Furthermore, the decomposition of the survival component by

Rela
Peop
re
Did t
1920
from
Hamp
Popul
Publis
Cross

Net-Reproduction Rate

$$NRR(t) =$$

$$\int_{\alpha}^{\beta} \ell(a,t)m(a,t)da$$

Net-Reproduction Rate

$$m(a,t) = s(a,t)f(a,t)$$

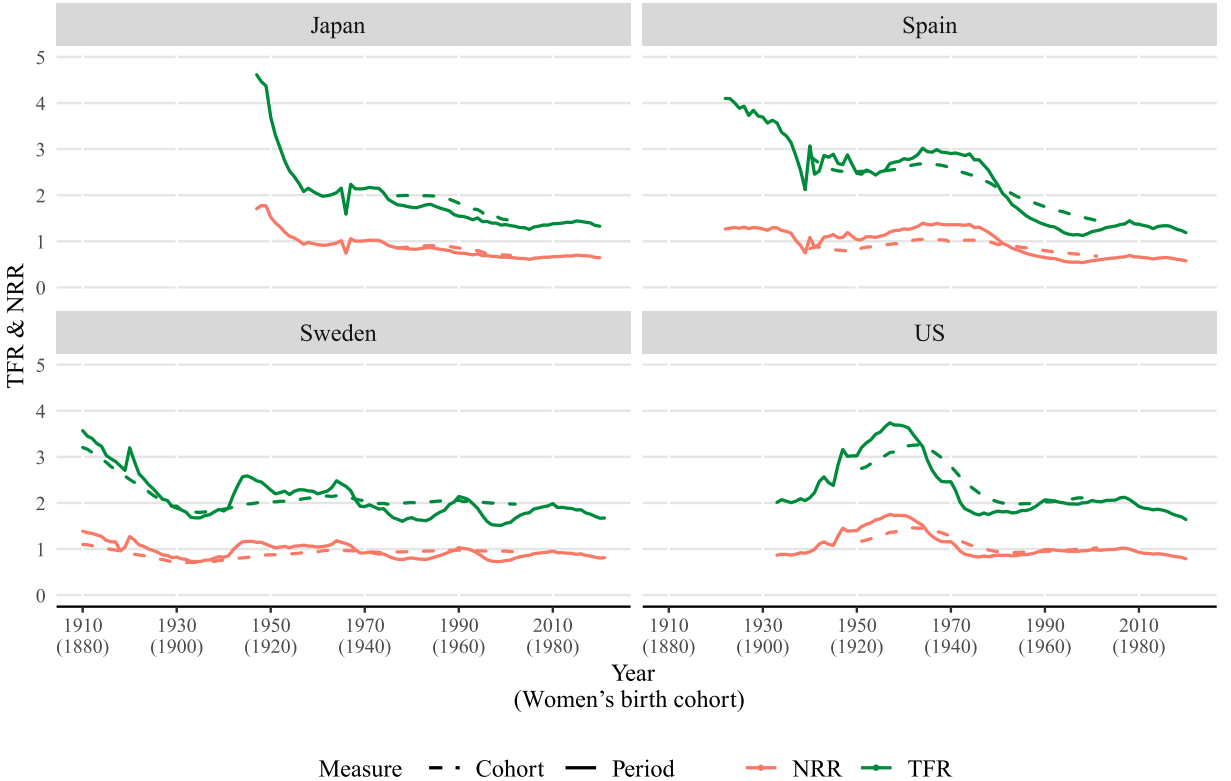


Figure 1(a) TFR and NRR for periods 1910–2021[1] and cohorts 1880–1972[2], selected high-income countries

[1]Or earliest and latest year available, as described in Table 1.

[2]Or earliest and latest birth cohort available, as described in Table A1.

Note: Cohort rates are lagged by 30 years.

Source: Authors' calculations based on Human Mortality Database (2022) and Human Fertility Database (2022).

$$N\dot{R}R =$$

$$\int_{\alpha}^{\beta} \dot{m}(a)\ell(a) + m(a)\dot{\ell}(a)\ da$$

NRR

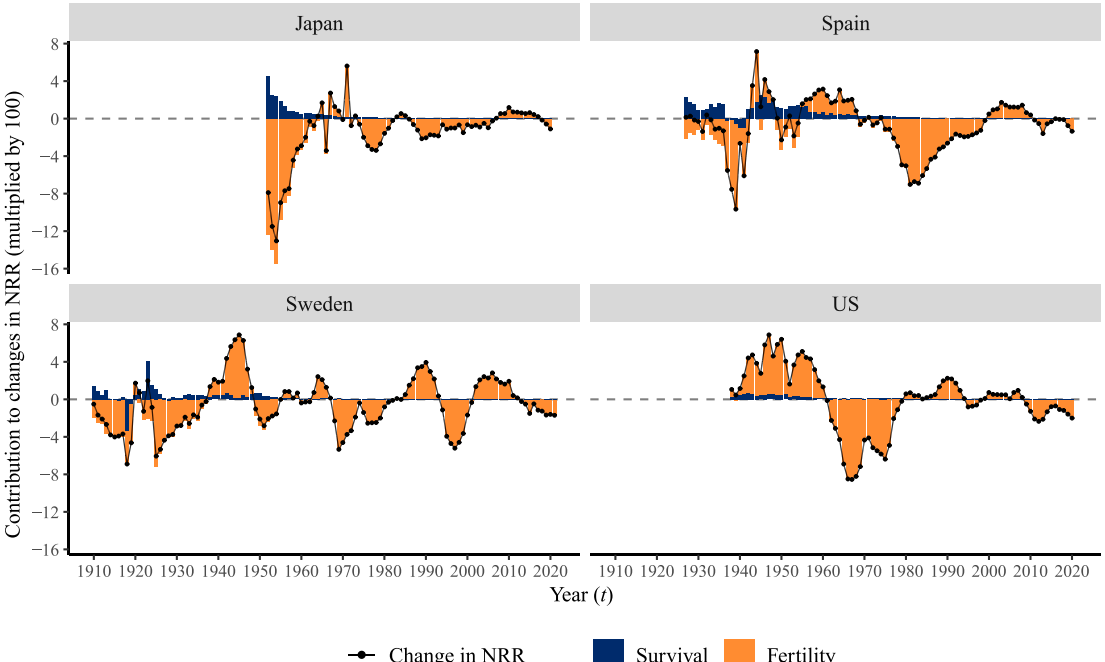
$$\dot{m}(a) =$$

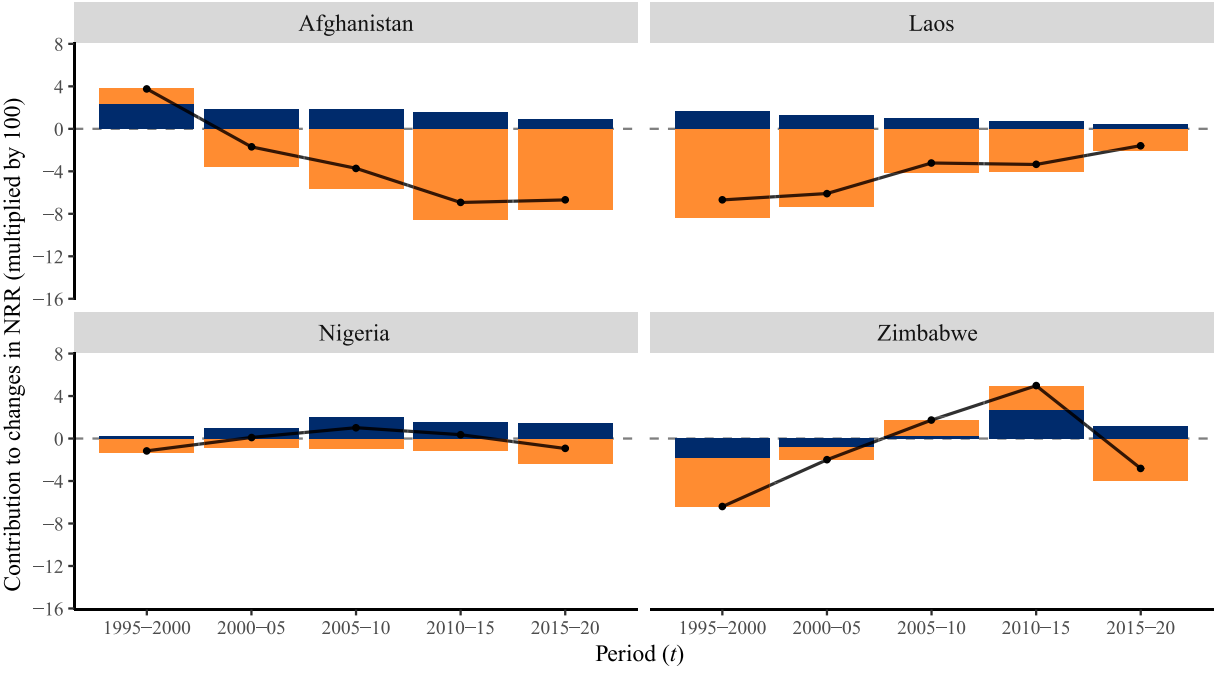
$$\left[\dot{s}(a)f(a) + s(a)\dot{f}(a)\right]$$

NRR

$$\int_{\alpha}^{\beta} m(a,t)\dot{\ell}(a,t) =$$

$$\sum_{x=0}^{\beta-1} \frac{\dot{p}_x}{p_x} \int_{x+1}^{\beta} m(a,t)\ell(a,t)\, da$$


Japan
Spain
Sweden
US
Contribution to changes in NRR (multiplied by 100)
8
4
0
−4
−8
−12
−16
1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020
Year (t)
Change in NRR
Survival
Fertility


Afghanistan
Laos
Nigeria
Zimbabwe
Contribution to changes in NRR (multiplied by 100)
8
4
0
−4
−8
−12
−16
1995−2000
2000−05
2005−10
2010−15
2015−20
Period (t)
Change in NRR
Survival
Fertility

Assignment 4

Select one of the measures in the examples of this section and apply to a different population from HMD or HFD.

Submit ONE page: one Figure (or Table) and a brief paragraph describing the results that you find.