
Australian
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# Workshop on Decomposition Methods

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# Decomposing Fertility Measures

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



## 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

# Completed Cohort Fertility

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

# CCF decomposition

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

# 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.

# CCF decomposition

Table 1: CCF decomposition

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

DEMOGRAPHY ISSUES

RESEARCH ARTICLE | FEBRUARY 01 2021

# Cross-Sectional Average Length of Life Childless

Ryohei Mogi; Jessica Nisén; Vladimir Canudas-Romo

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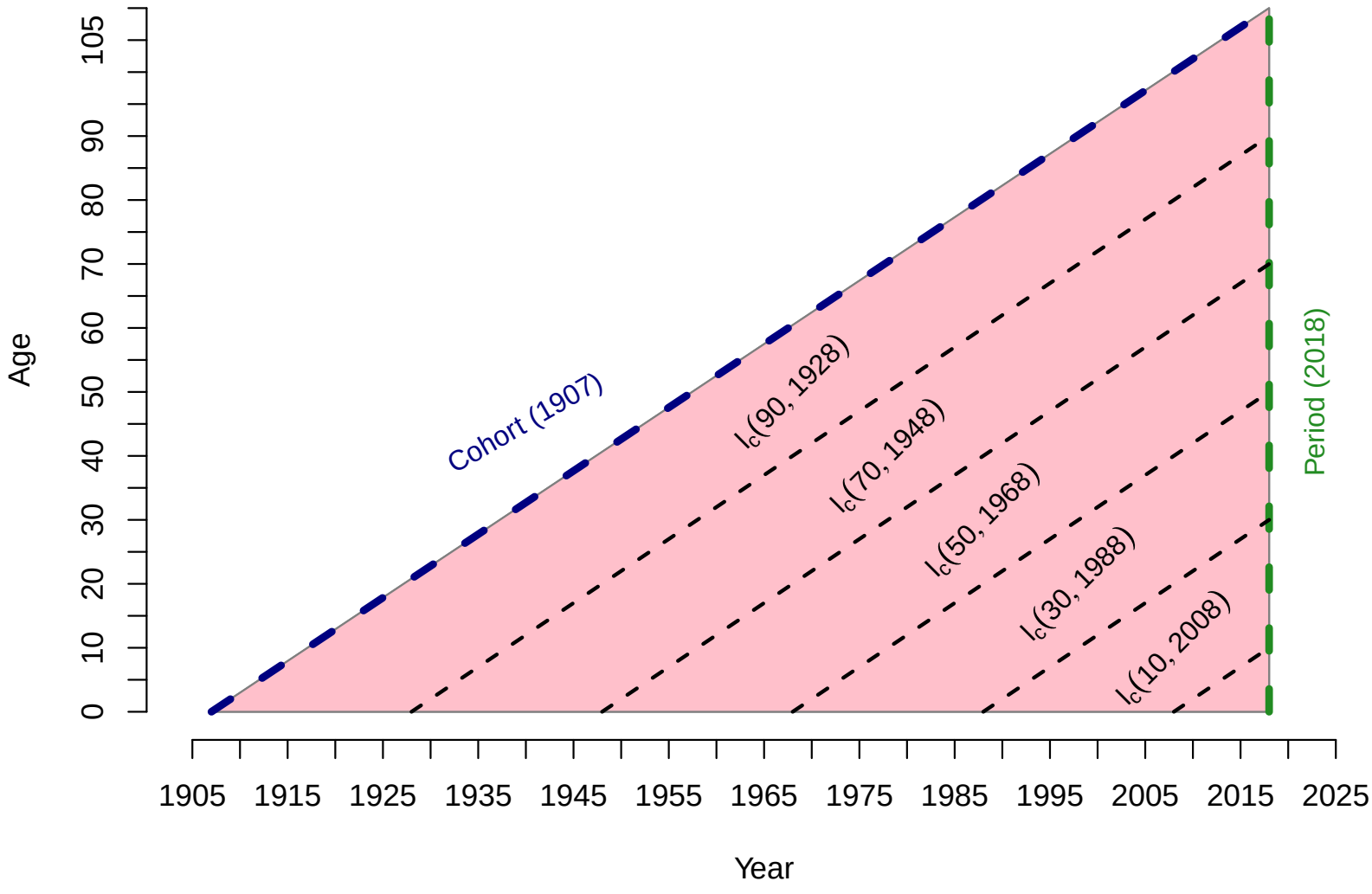
https://doi.org/10.1215/00703370-8937427



## 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

# Cross-sectional Average Length of Life (CAL)



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

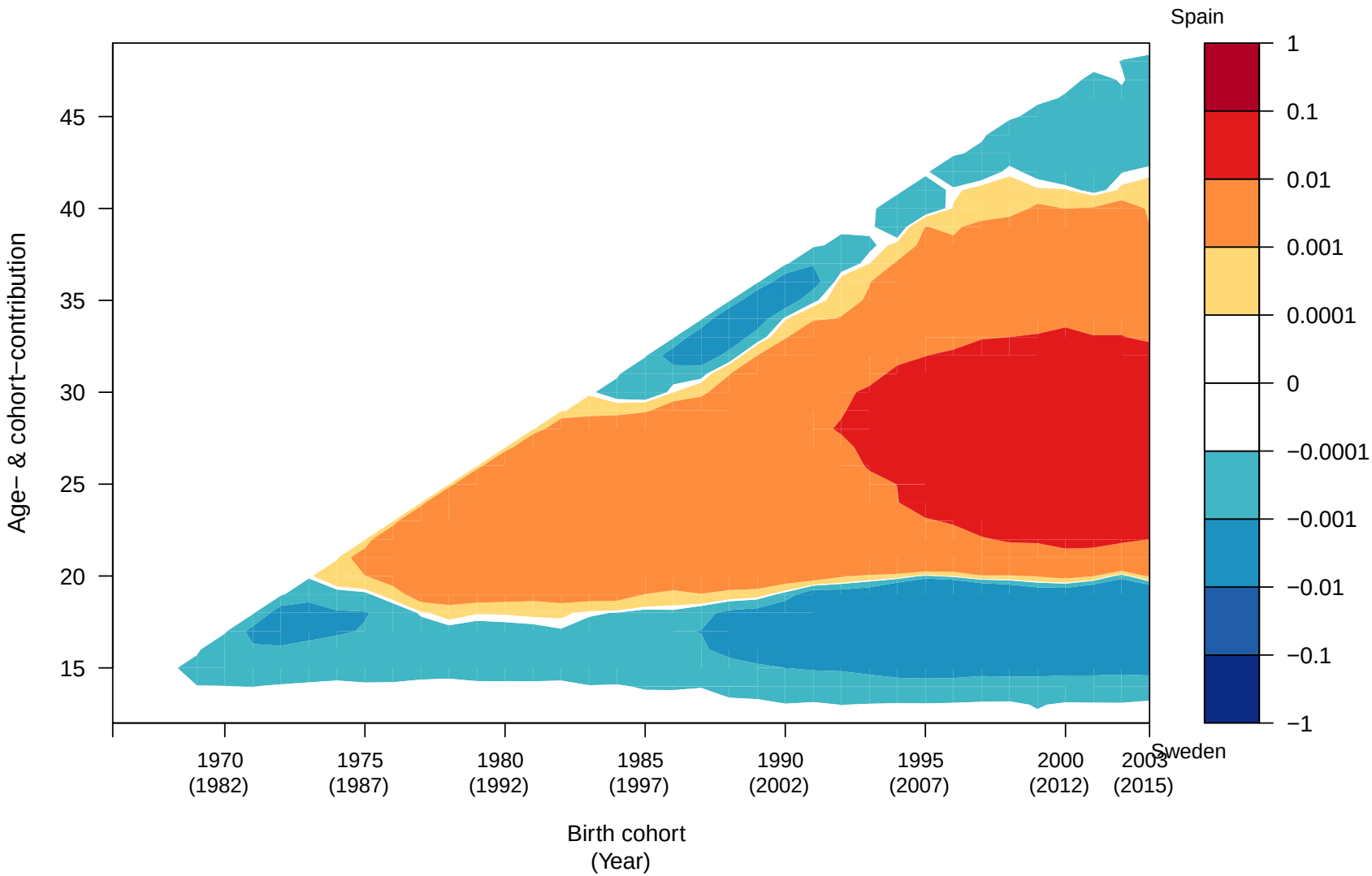
$$CALC(t) = \int_{12}^{50} \ell_c(x, t-x)\, dx$$

CALC

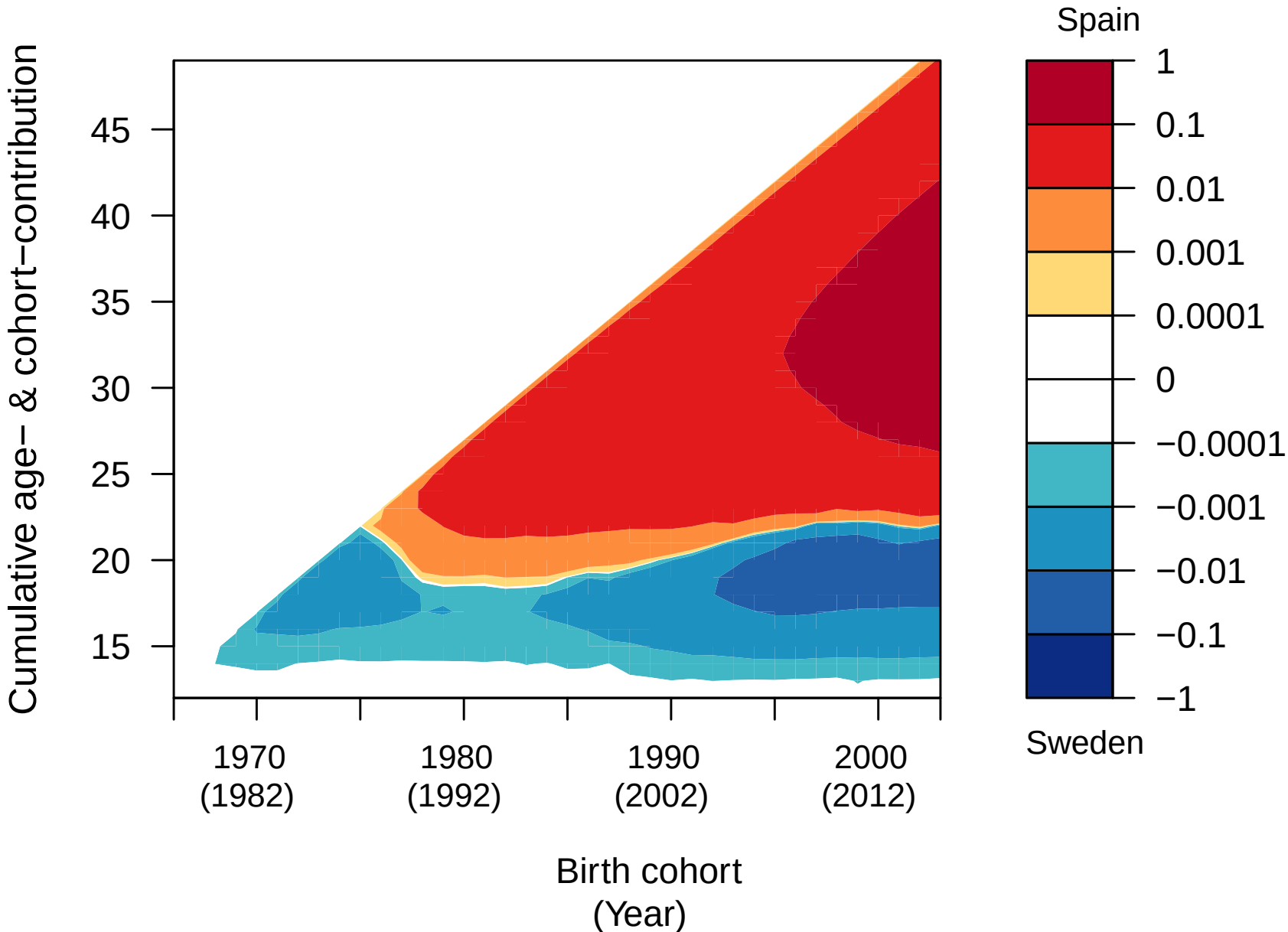
$$\dot{CALC}(t,\xi) =$$

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

# CALC decomposition



# CALC decomposition



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

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## 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

## Net-Reproduction Rate

$$NRR(t) =$$

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

# Net-Reproduction Rate

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

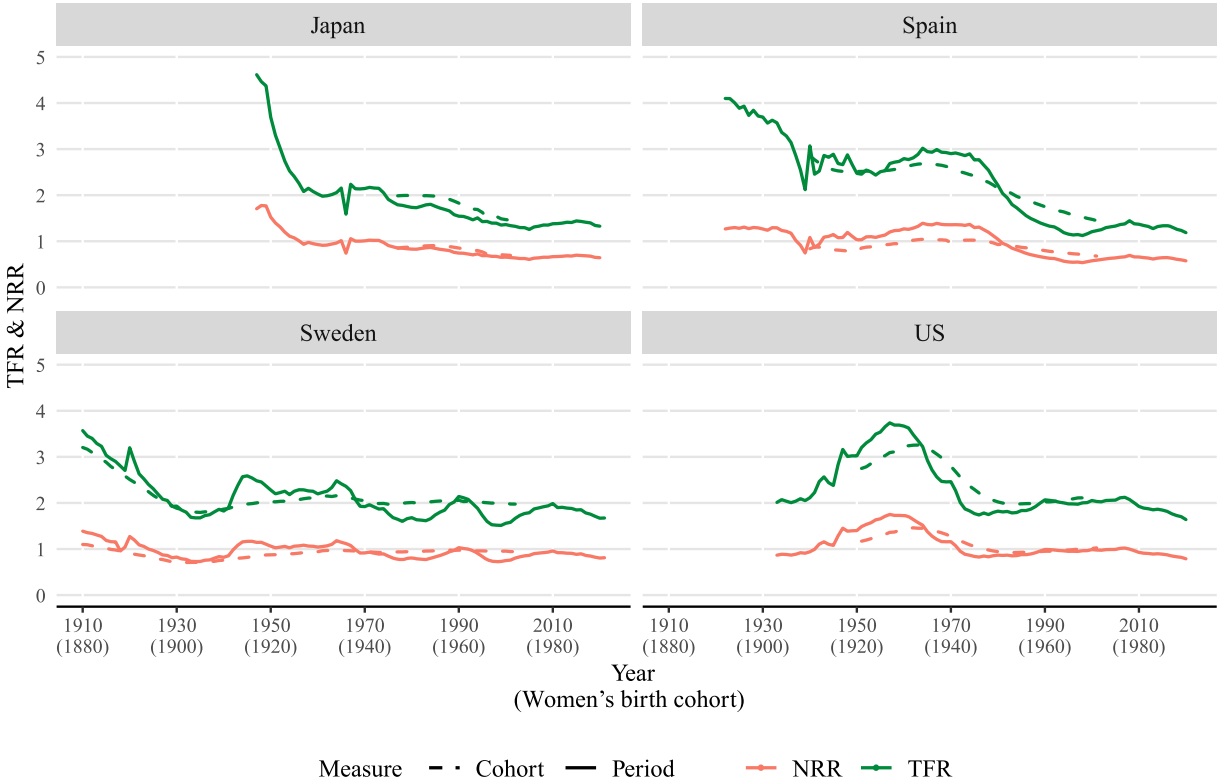


**Figure 1(a)** TFR and NRR for periods 1910–2021[1] and cohorts 1880–1972[2], selected high-income countries

[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

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

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

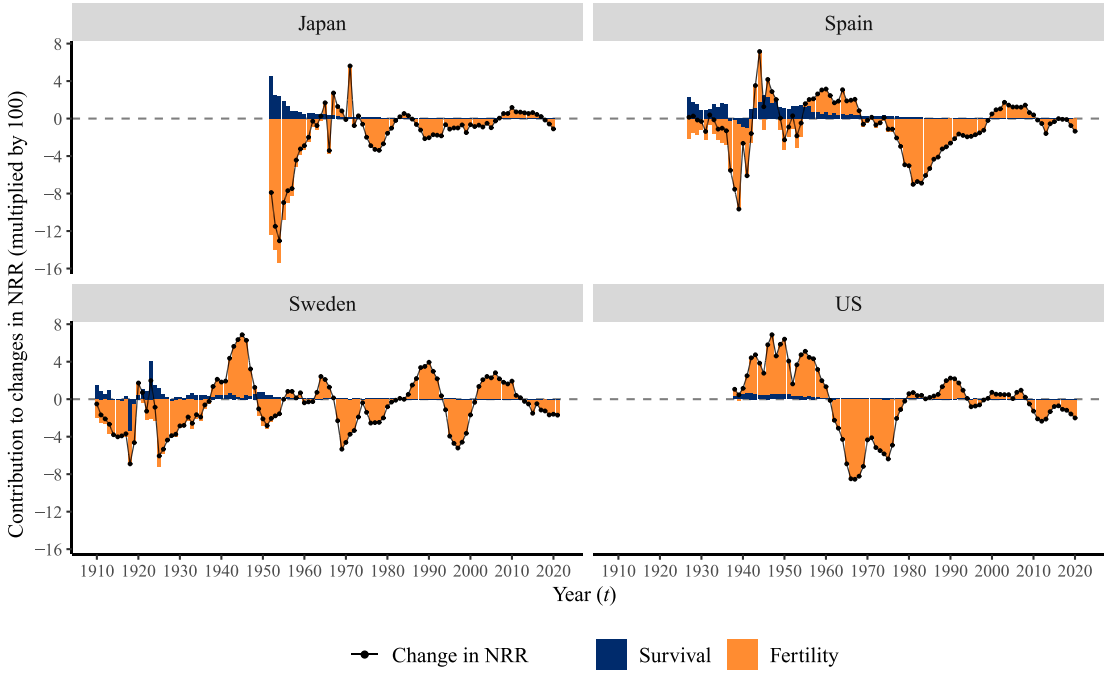


**Figure 2(a)** Change in period NRR and its components between 1910[1] and 2021[2], selected high-income countries

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

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

*Note*: Change in NRR is calculated over five years, for periods from year ($t$−5) to $t$. For example, the first year for the US, 1938, corresponds to the change in NRR from 1933 to 1938.

*Source*: As for Figure 1(a).

# 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.