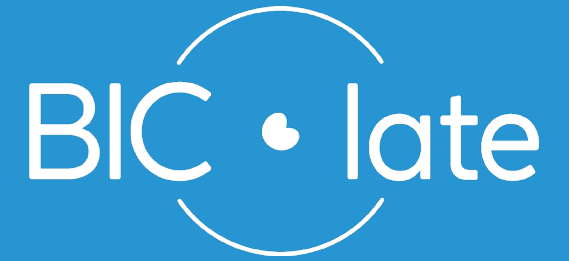




Wittgenstein Centre

FOR DEMOGRAPHY AND
GLOBAL HUMAN CAPITAL



Fertility delay, infertility and Medically Assisted Reproduction

Eva Beaujouan & the BIC.Late team

University of Vienna (Wittgenstein Centre); University of Rostock



Social Implications of Medically Assisted Reproduction Workshop
November 24-25, Seville



Broad research question

- Increase in age at first birth
 - Decrease in capacity to give birth to a live child with age
- How far are **biological factors** and **assisted reproduction** becoming increasingly important for fertility levels given the rising age at childbearing?

This talk: link later childbearing and rise in ART births

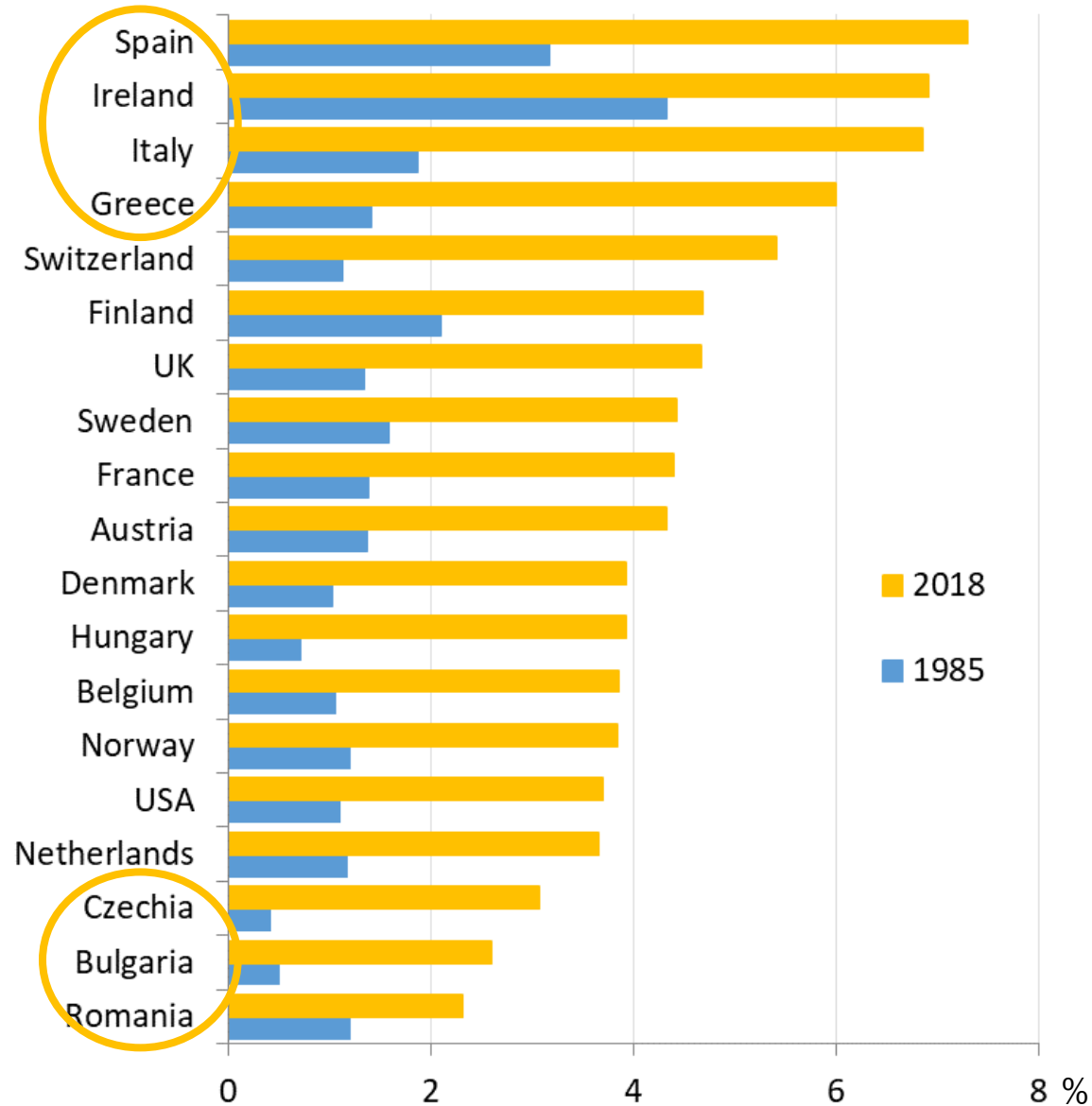
- We quantify, across the Western countries,
 - the rise in late fertility
 - the rise in ART use and its age structure
 - the importance of *age-related* biological capacity to reproduce and of MAR for fertility across birth cohorts
- Based on scattered data/countries, and different definitions (ART, IVF)

Rise in late childbearing
and in late ART births



Remarkable increase in childbearing at age 40 and above across the Western countries

Figure. Share of fertility rates at ages 40+ in total fertility; selected European countries, 1985 and 2018



Increase in late fertility for both men and women

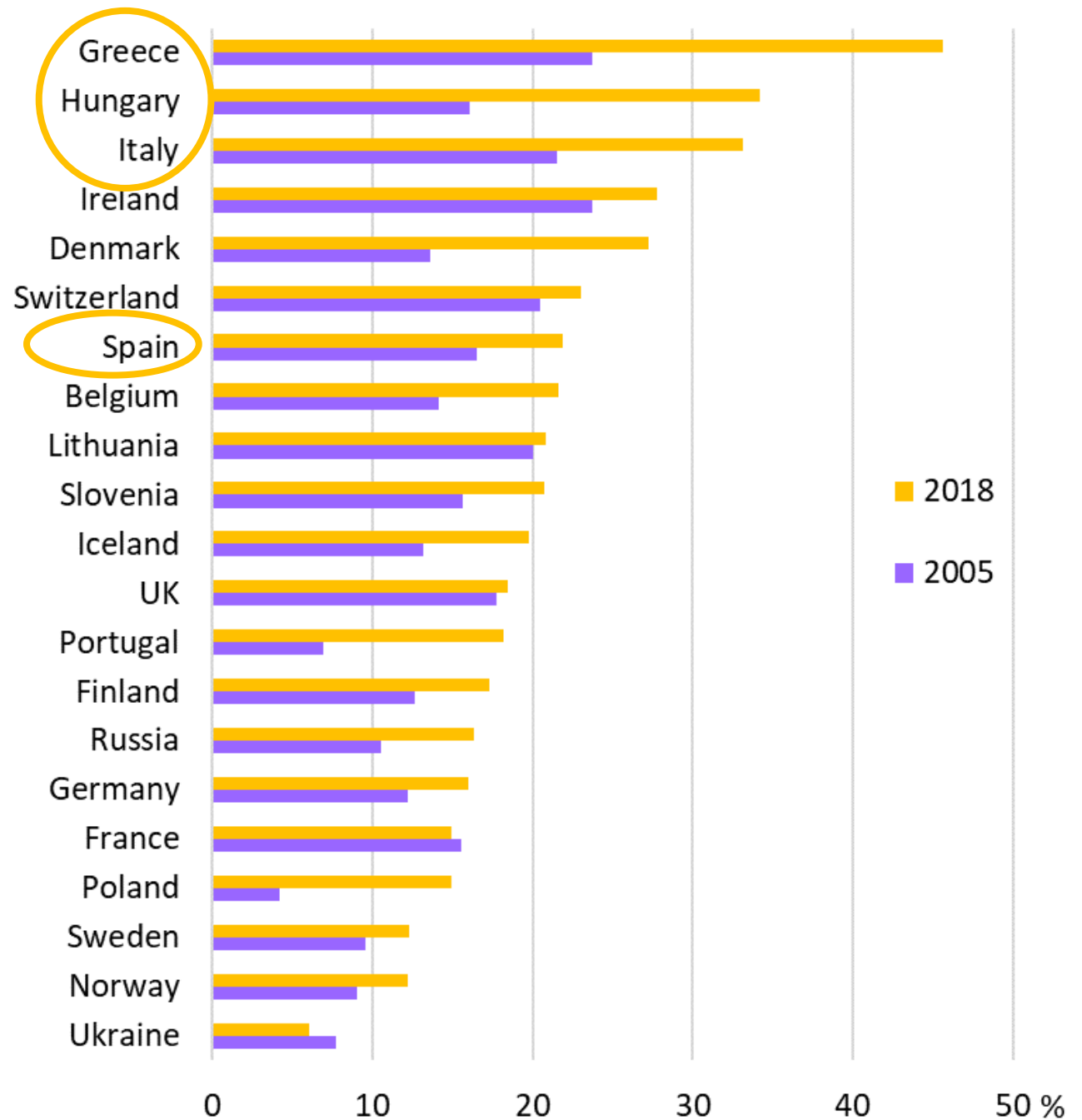
Figure. Contribution of births at age 40+/45+ to TFR; selected European countries, 1990 to 2015, women and men



Data. Human Fertility Database (HFD, HFC, special collection on men)

Across Europe, about 15% of IVF/ICSI treatments to women 40+ in 2005, 22% in 2018

Figure. Share of IVF/ICSI treatments at ages 40+; selected European countries, 2005 and 2018



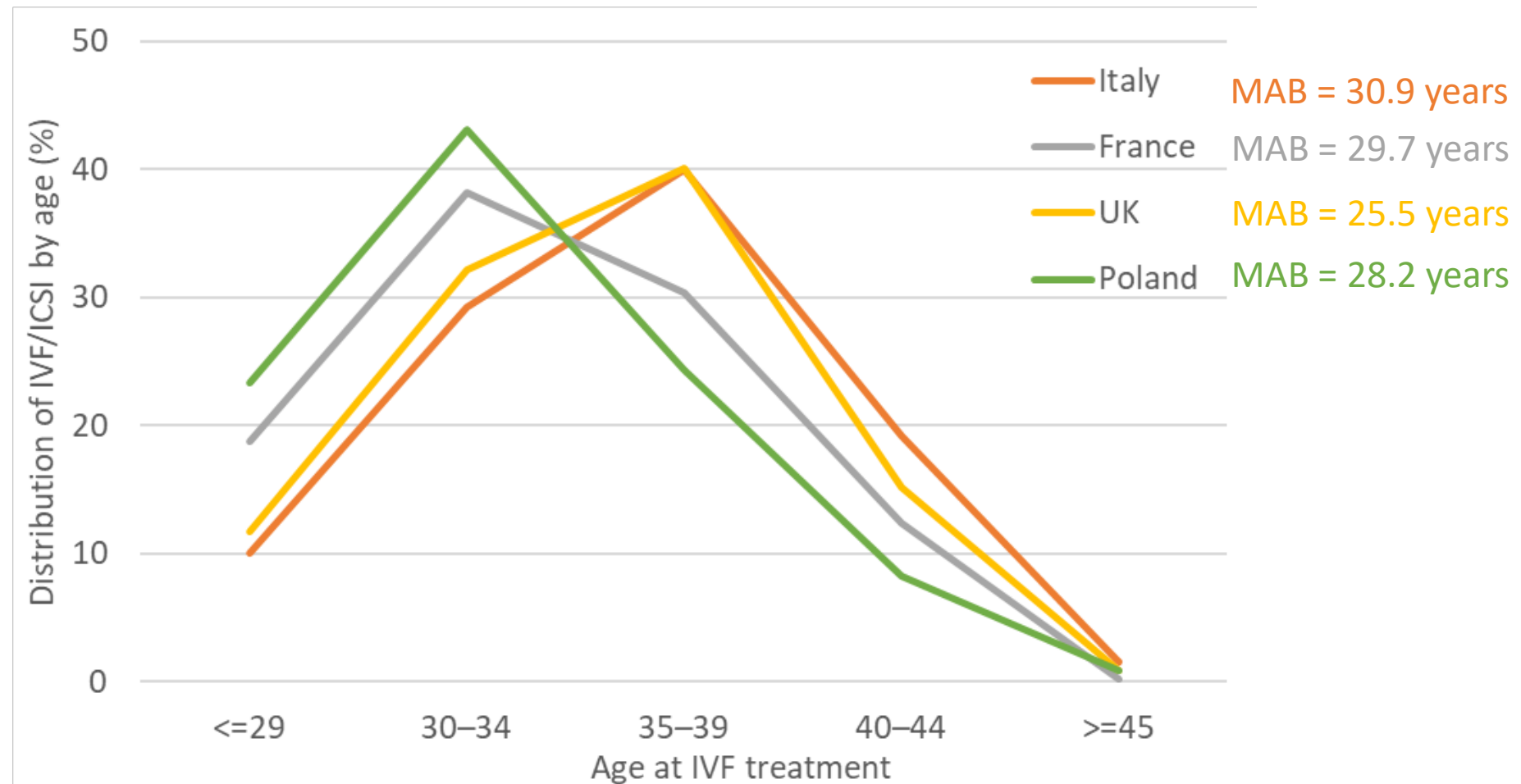
Note. Cross-borders ART frequent in Belgium, Spain, Czech Republic, Denmark...

Data. Assisted reproductive technology in Europe, results generated from European registers by ESHRE

Age profile of treatment use *partly* responds to age at birth in the countries (2005)

Figure. Share by age of IVF + ICSI treatments (in %), selected countries, 2005

MAB = Mean age at birth in 2005



Very late births



Emergence of very late first births for women, probably associated to assisted reproduction

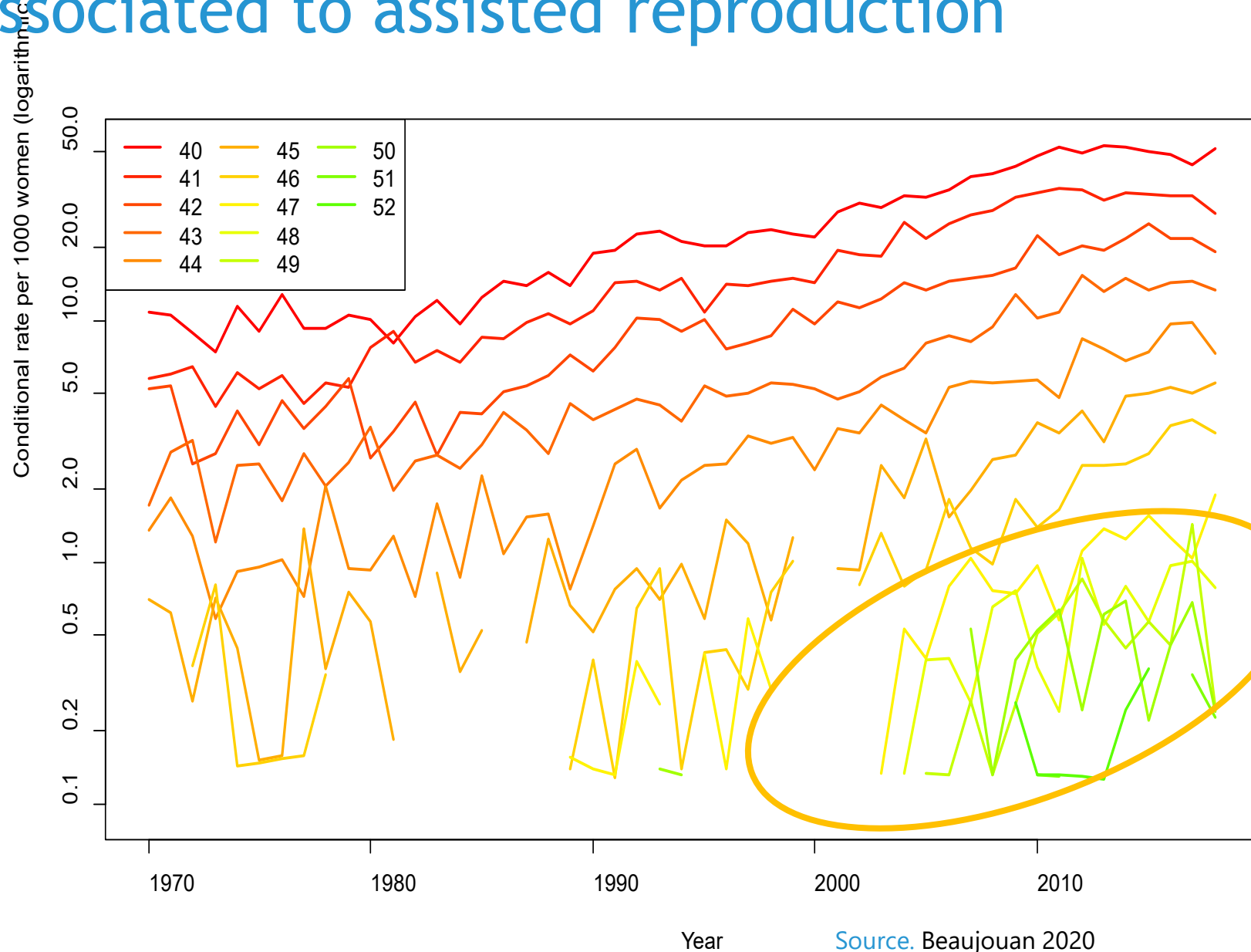
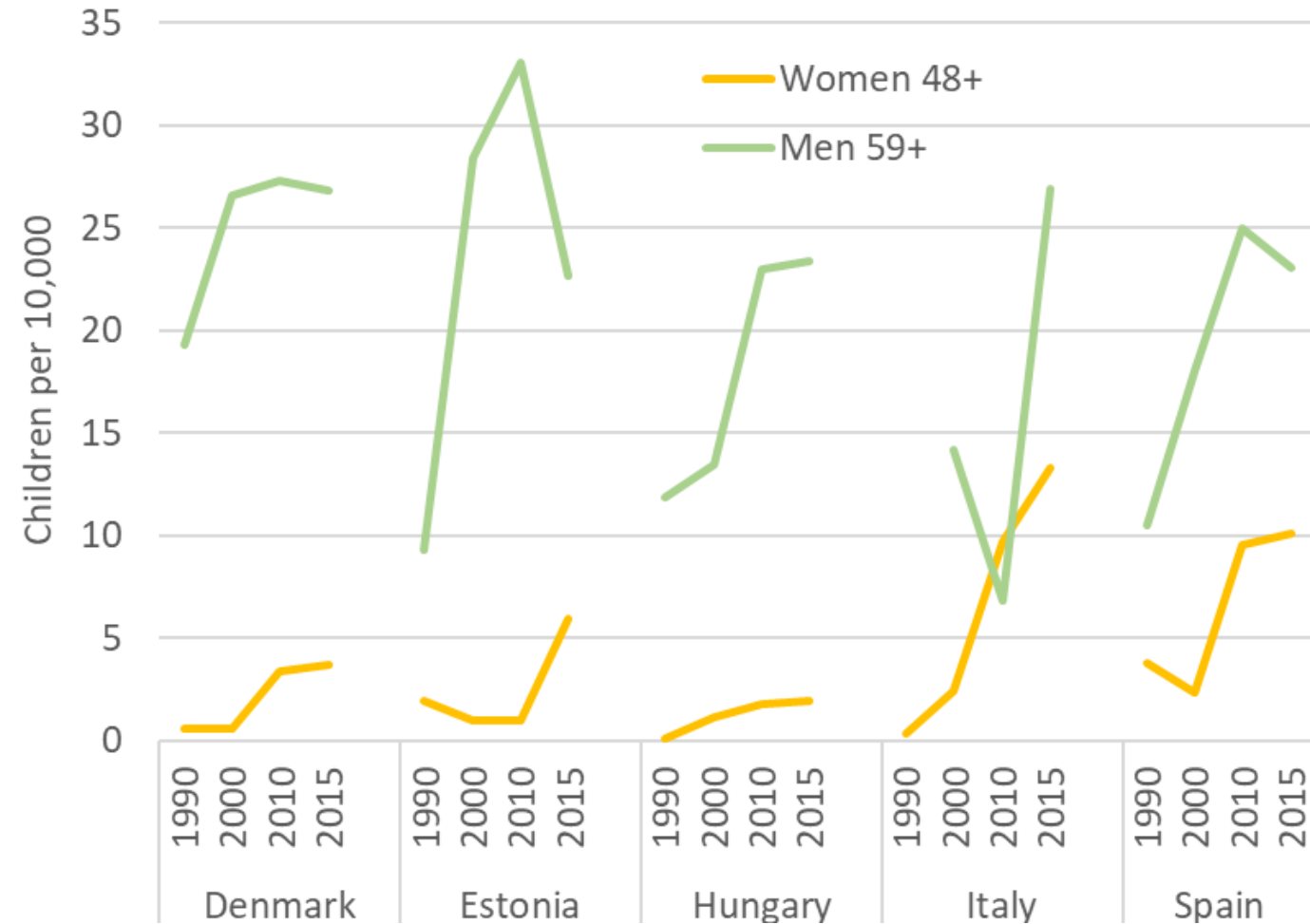


Figure. First birth rate by age for 1000 childless women, ages 40-52, Sweden

Ages 47-52:
Represents 30
children in 2018,
i.e. very few

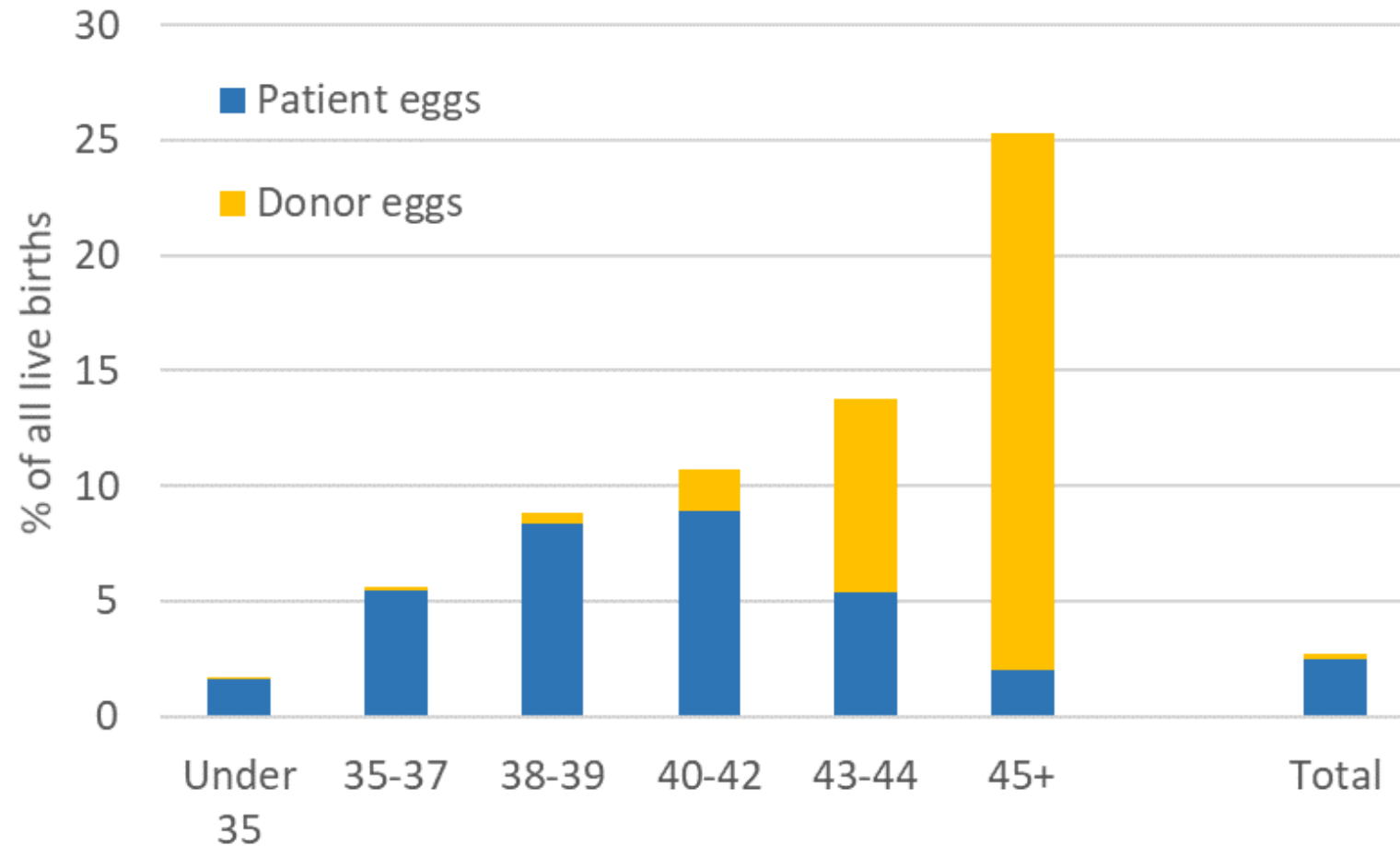
Beyond the biological limits for women - while very late births are less new for men

Figure. Age Specific fertility rate by age, women ages 48+ and men ages 59+, selected European countries



Share of live births resulting from IVF surges with age

Figure. Share of all live births by age that follow an IVF(incl. ICSI) treatment, UK, 2018



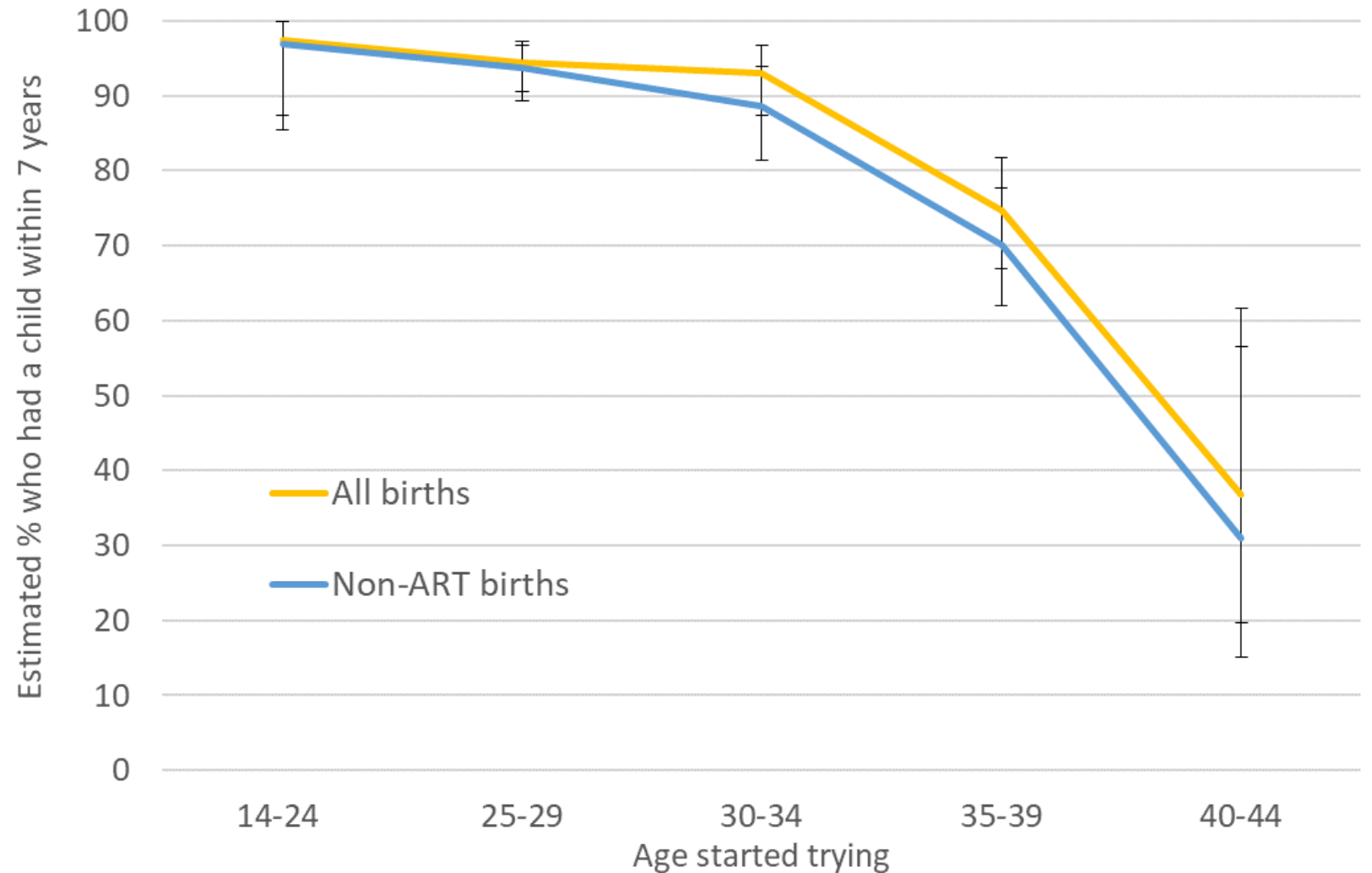
Source: Beaujouan and Sobotka (2022)
Data: HFEA, HFD



Ever later births?
Biological limits

Probability to “ever” have a child when trying strongly decreases with age with or without ART

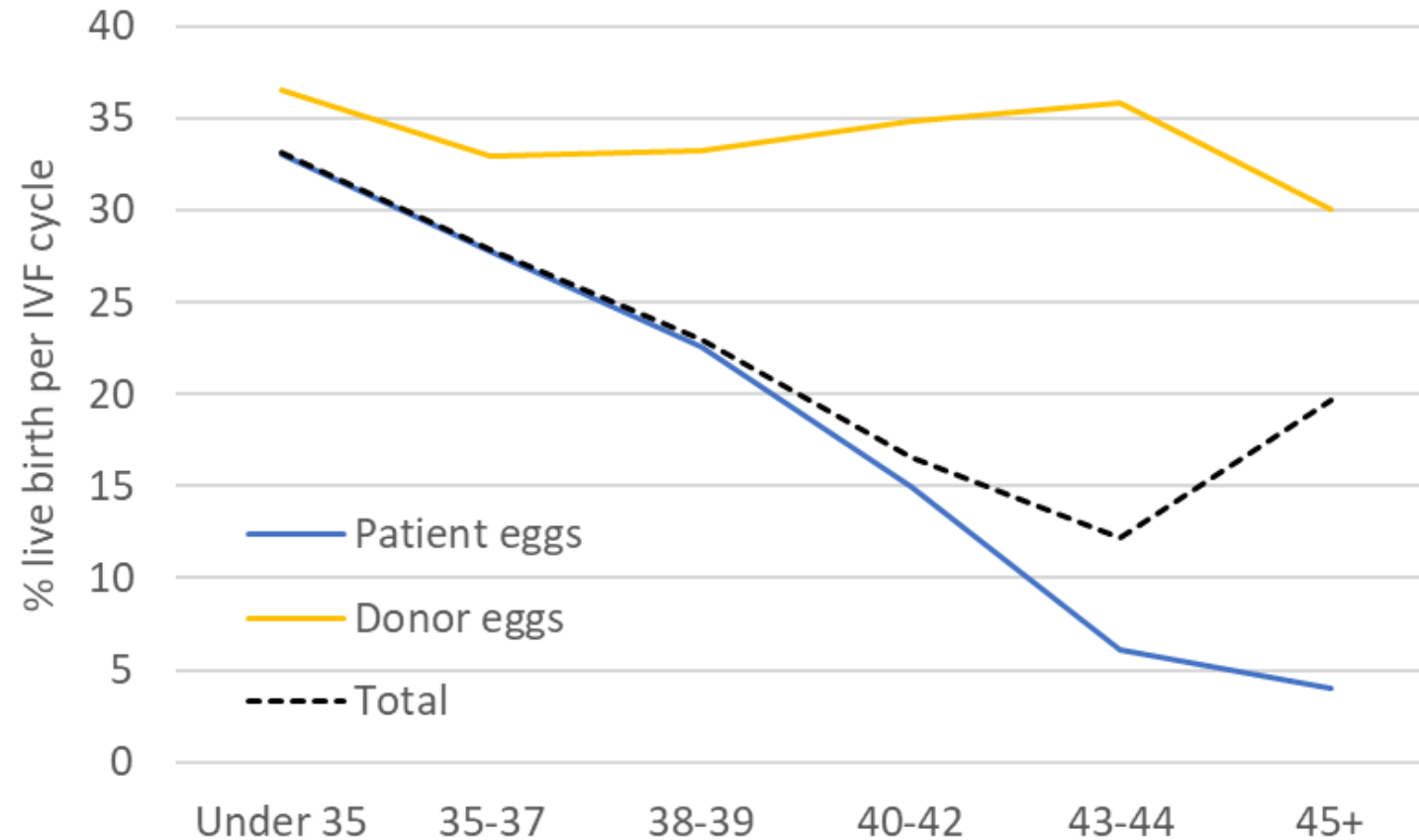
Figure. Probability to have a child within 7 years from starting trying, all births *versus* non-ART births, Germany, 2010s



Source: Beaujouan & Köppen (in progress)
Data: pairfam

Chances to have a child from IVF using own eggs strongly decrease with age

Figure. Live births per IVF treatment (incl. ICSI) by age (in %), UK, 2018



Source: Beaujouan and Sobotka (2022)
Data: HFEA, HFD

An illustration of a woman with long, wavy blonde hair, wearing a pink jacket over a light-colored top and brown pants. She is pushing a red shopping cart. Inside the cart, a green book with the letters 'A.R.T.' and a small illustration of a fetus is visible. The background shows a window with a view of a cityscape and other people in a public space.

ART use and
contribution to
fertility in Australia
Lazzari et al.
(forthcoming)

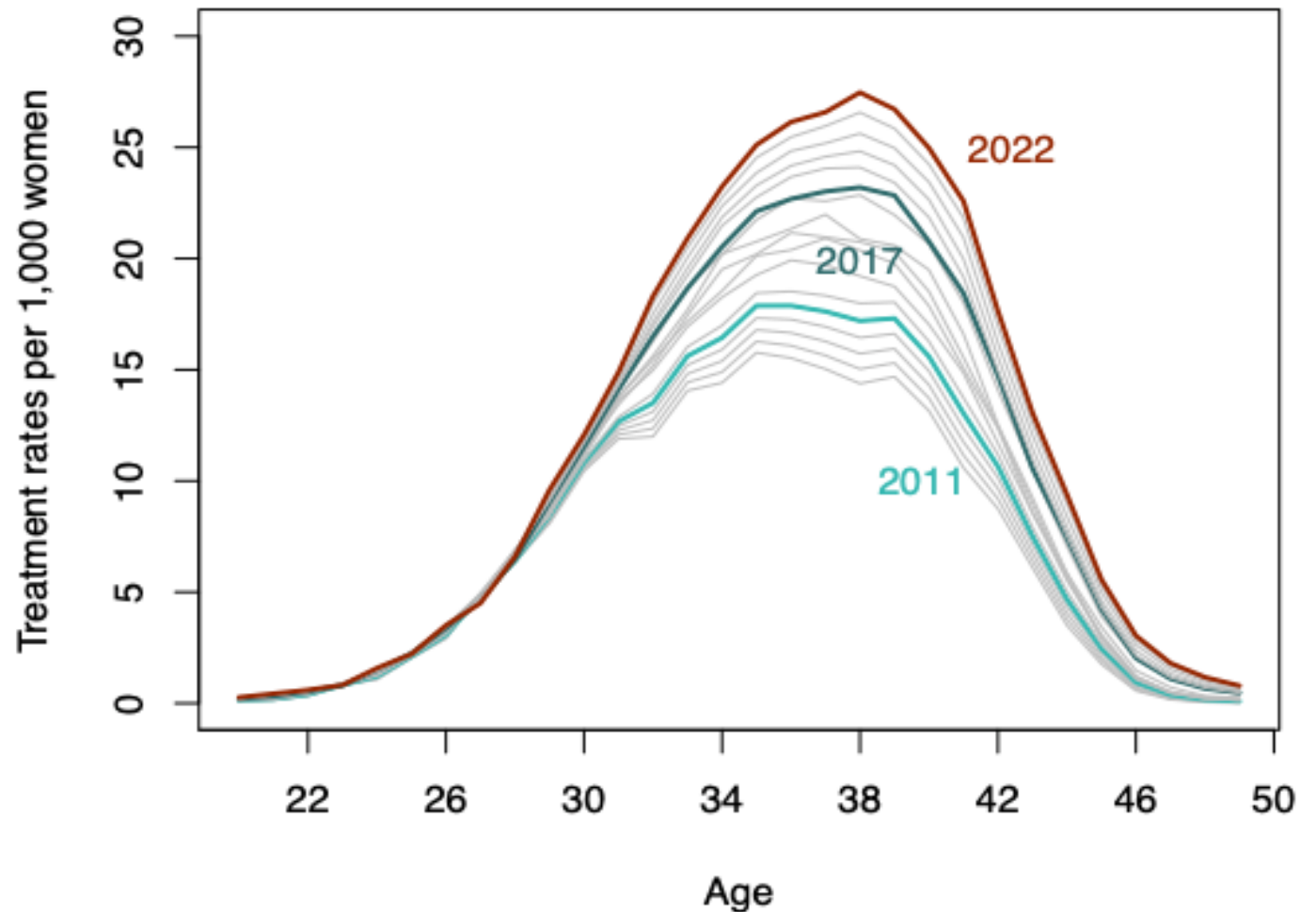
Importance of ART in times of birth postponement

- We have seen that
 - ART and non-ART births are increasingly frequent at later ages
 - But strong biological constraints remain (whether using ART or not)
 - There is a large country disparity in uptake of ART at later ages
 - Possibly linked to different norms and laws
- Recap taking Australia as an example
 - How far does ART contribute to fertility?
 - how may this change with delayed fertility?
 - And with different scenarios of uptake and success of ART

The share of women using ART treatments has particularly increased in their late 30s-early 40s

Figure. Observed (2009-2017) and extrapolated (2018-2022) ART age-specific treatment rates by age, Australia

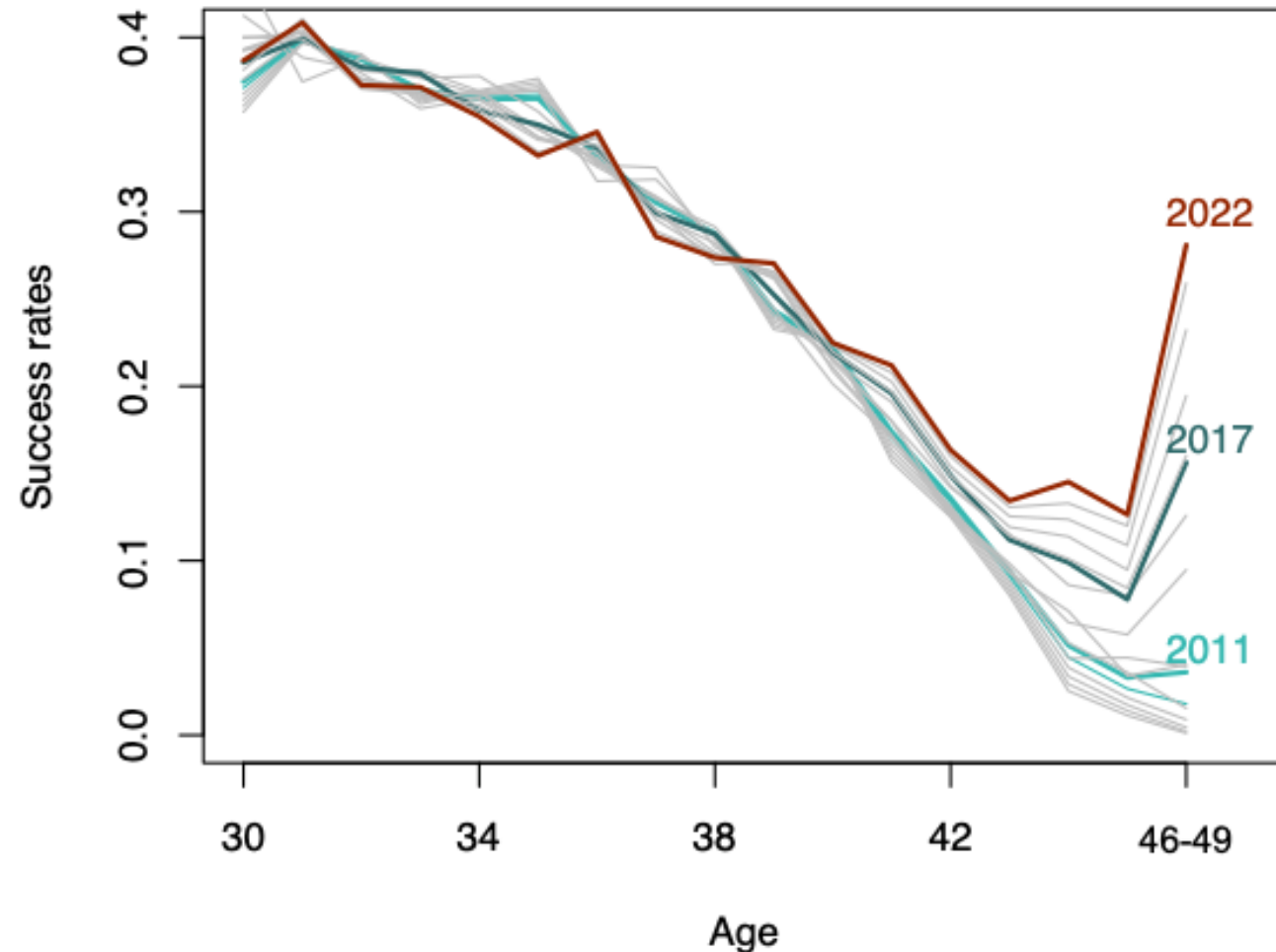
(number of women using ART treatment/number of women)



Success rate has increased at later ages (driven by rising use of donor eggs + elective egg-freezing)

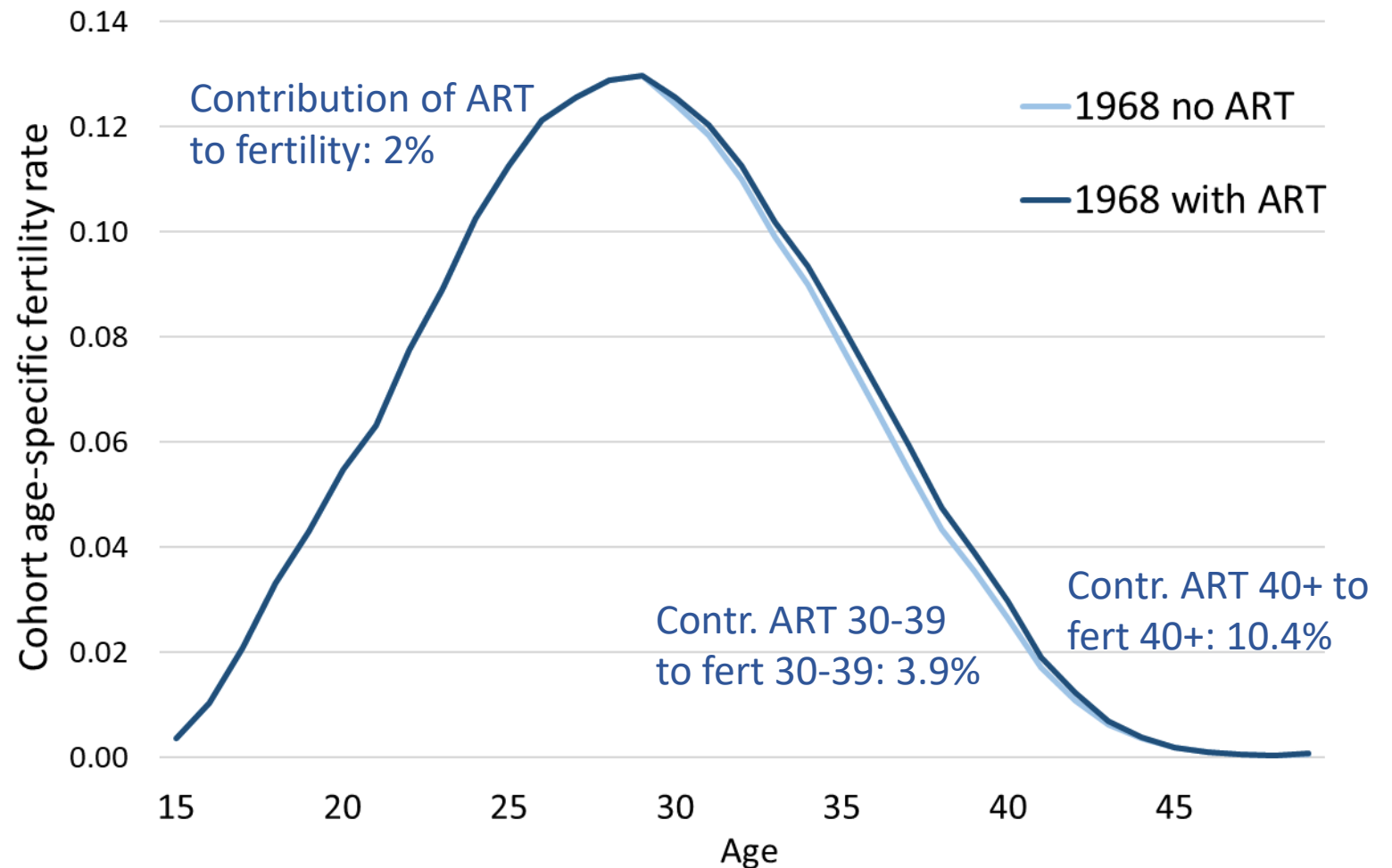
Figure. Observed (2009-2017) and extrapolated (2018-2022) ART success rates by age, Australia

(number of ART births/number of women using ART treatment)



Contribution of ART births to cohort fertility rate larger at older ages

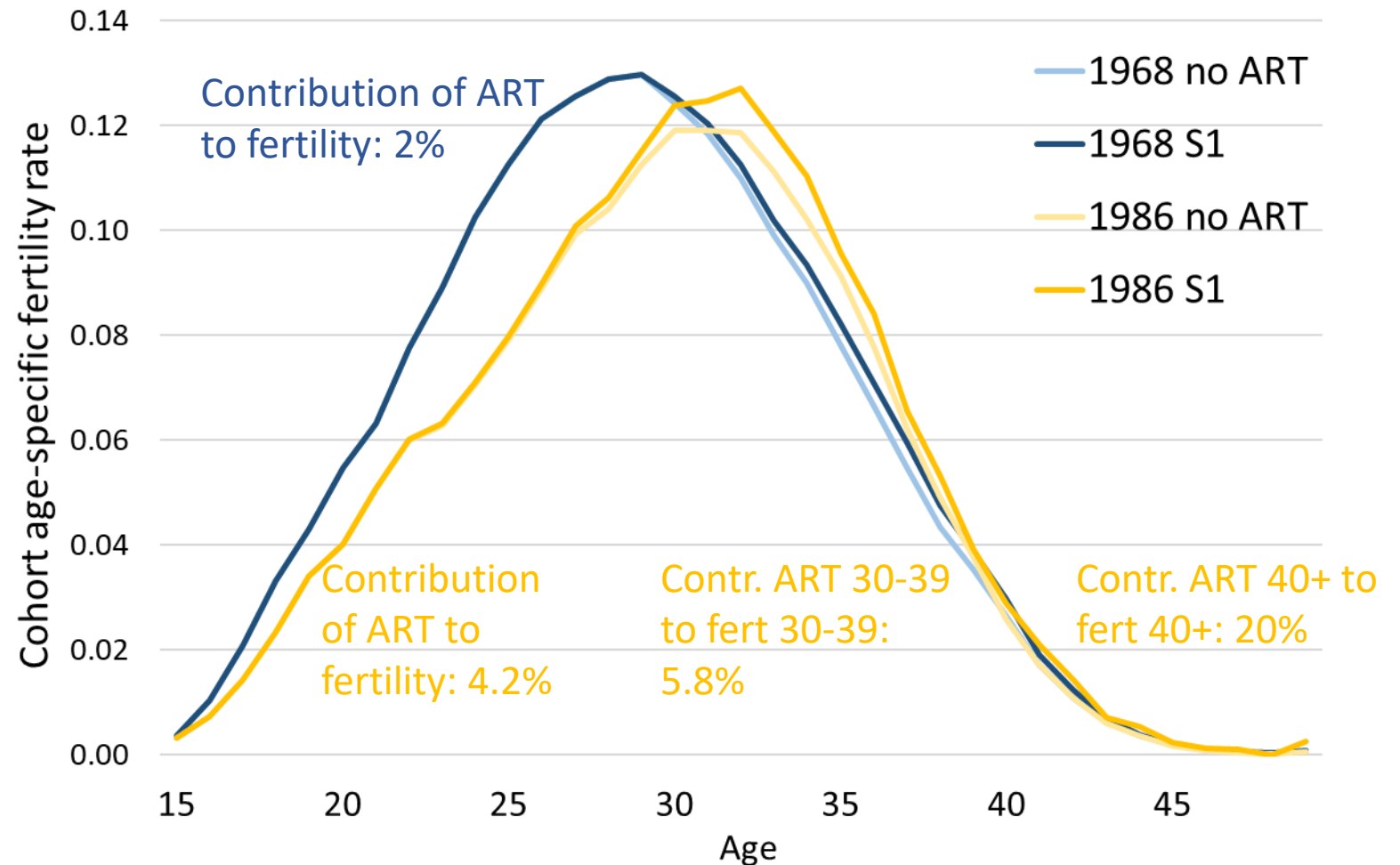
Figure. Observed (cohort 1968) age-specific fertility rates, without versus with ART



With fertility delay, share of ART births will increase also without change in treatment use and success

Figure. Observed (cohort 1968) and projected (cohort 1986) age-specific fertility rates, without versus with ART

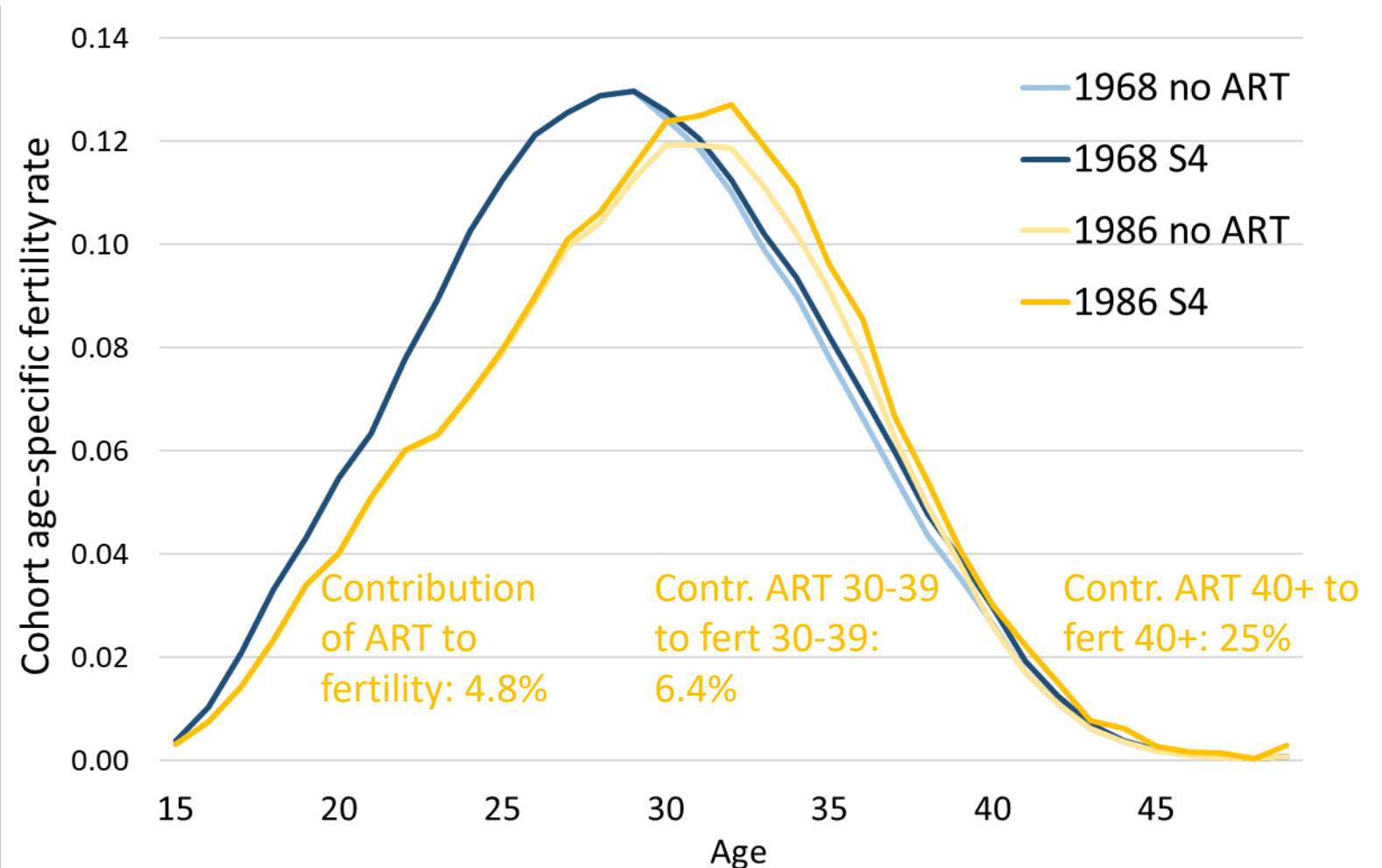
Using the constant success and treatment rates Scenario (S1)



With extrapolated change in treatment use and success, slightly larger contribution of ART to fertility

Figure. Observed (cohort 1968) and projected (cohort 1986) age-specific fertility rates, without versus with ART

Using the extrapolated success and treatment rates Scenario (S4)



Limitations and discussion

- Very disparate data across high-income countries
 - Still, the possibility to use ART and its actual uptake at later ages seem to vary a lot across countries
 - To explore further: success rates (non donor eggs) and infertility **by age** probably do not vary much across countries
- ART partly compensates some of the drop in cohort fertility due to fertility delay
 - But we do not anticipate that this will ever be sufficient for people to have all the children they may want at later ages
 - Because as seen, IVF success rate even with donor eggs remains around 35% and not higher in women's 40s.
 - There will be some variation depending on use of donor eggs and social egg freezing



European Research Council
Established by the European Commission

BIC.LATE receives funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant Agreement No 101001410).