



Postponement and Recuperation in Cohort Fertility: New Analytical and Projection Methods and their Application

Tomáš Sobotka (VID)

Kryštof Zeman (VID)

Ron Lesthaeghe (Free University of Brussels)

Tomas Frejka (Independent consultant)

Period and cohort fertility dynamics in the developed world.
The first Human Fertility Database Symposium, 3-4 November 2011, MPIDR, Rostock

Cohort fertility postponement and recuperation

Cohort fertility developments in Europe among women born after World War II: Shift of childbearing towards later ages and a concomitant decline in fertility level.

This broad trend has been studied using the notions of fertility **postponement** (fertility decline across younger ages) and subsequent **recuperation** (a compensatory fertility increase at higher reproductive ages).

Past analyses predominantly focused on period trends

Well-known problems with period approaches: tempo effects...

Cohort approach studies the real quantum of fertility

Internal consistency of cohorts

Cohort fertility postponement and recuperation

We apply order-specific data and extend and elaborate on two broad approaches to the process:

Basic benchmark model extensively used by Tomas Frejka and his colleagues

Relational model proposed by Ron Lesthaeghe (2001)

Three key indicators of the postponement transition:

- initial fertility level;
- absolute fertility decline at younger ages;
- relative degree of fertility ‘recuperation’ at older ages.

We demonstrate that each of these components is salient for explaining contemporary differences in cohort fertility.

Data sources

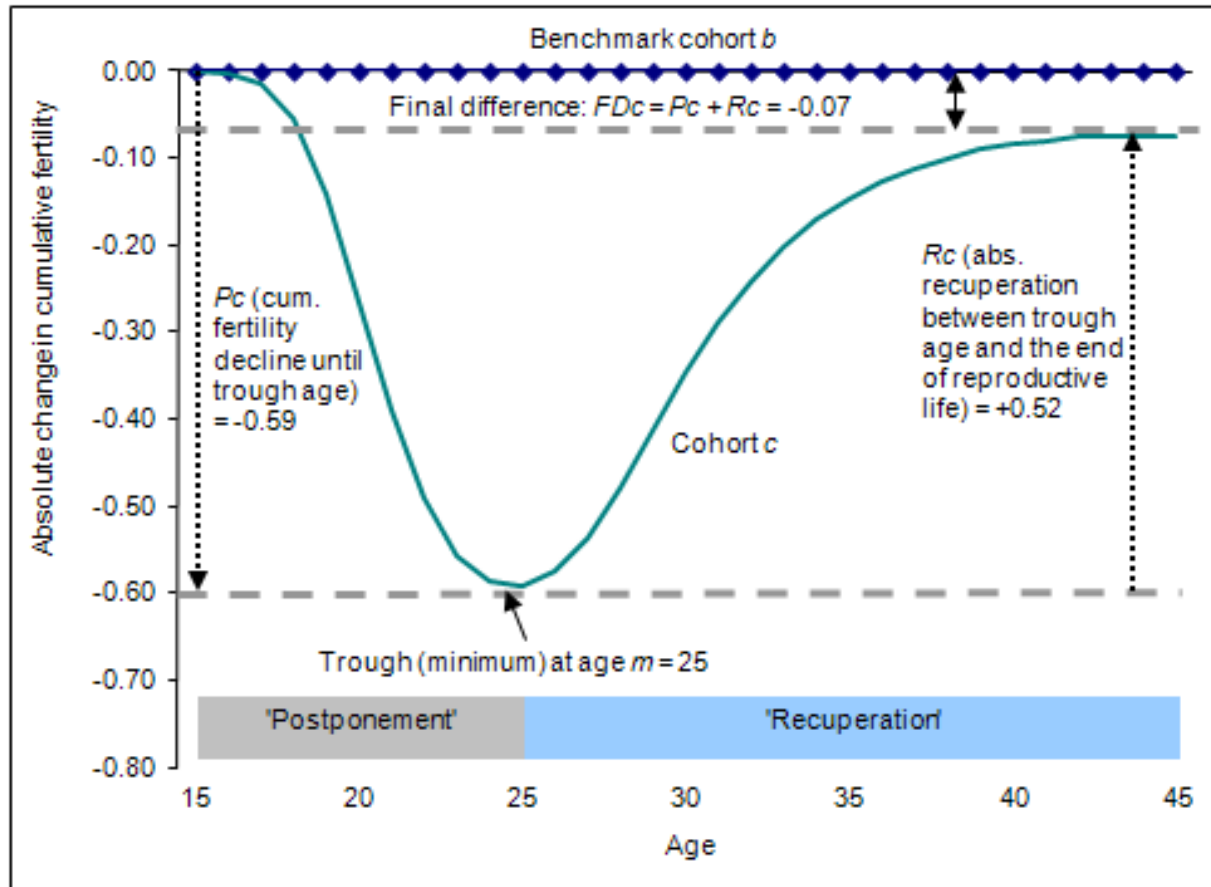
Eurostat, Statistics Austria, Czech Statistical Office, Human Fertility Database www.humanfertility.org

All calculations in R (script available on request)

Data for 4 countries used for illustration:

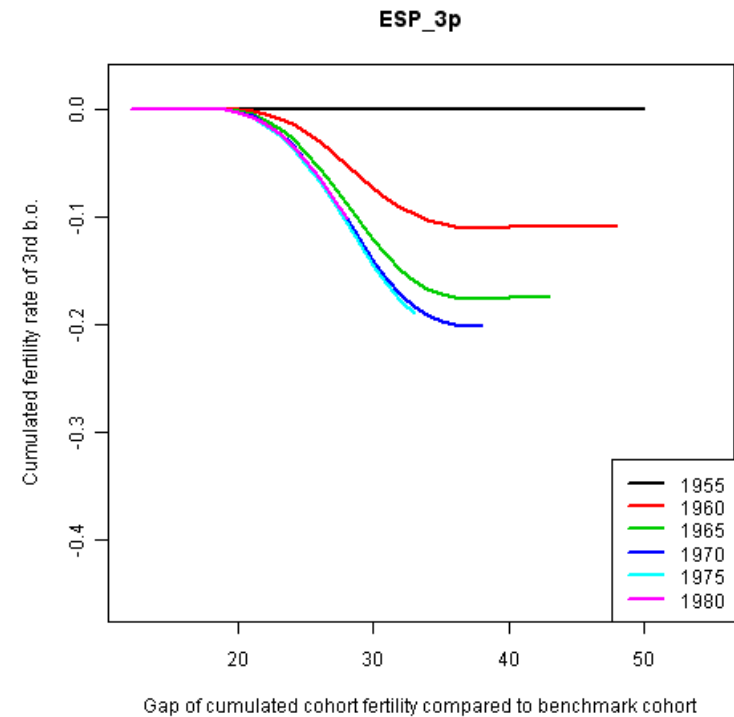
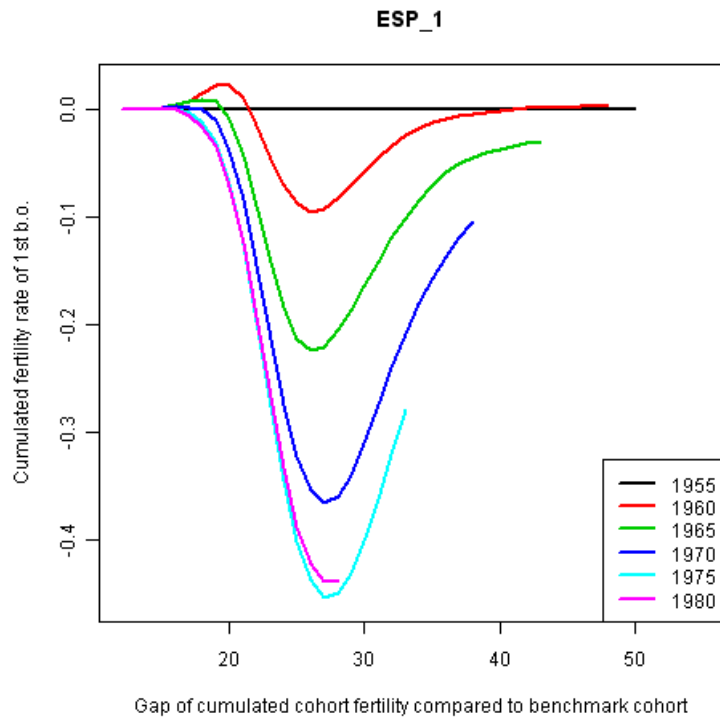
- Austria
- Czech Republic
- The Netherlands
- Spain

Basic benchmark model



$$\text{Recuperation Index } Rlc = (Rc / -Pc) = 88\%$$

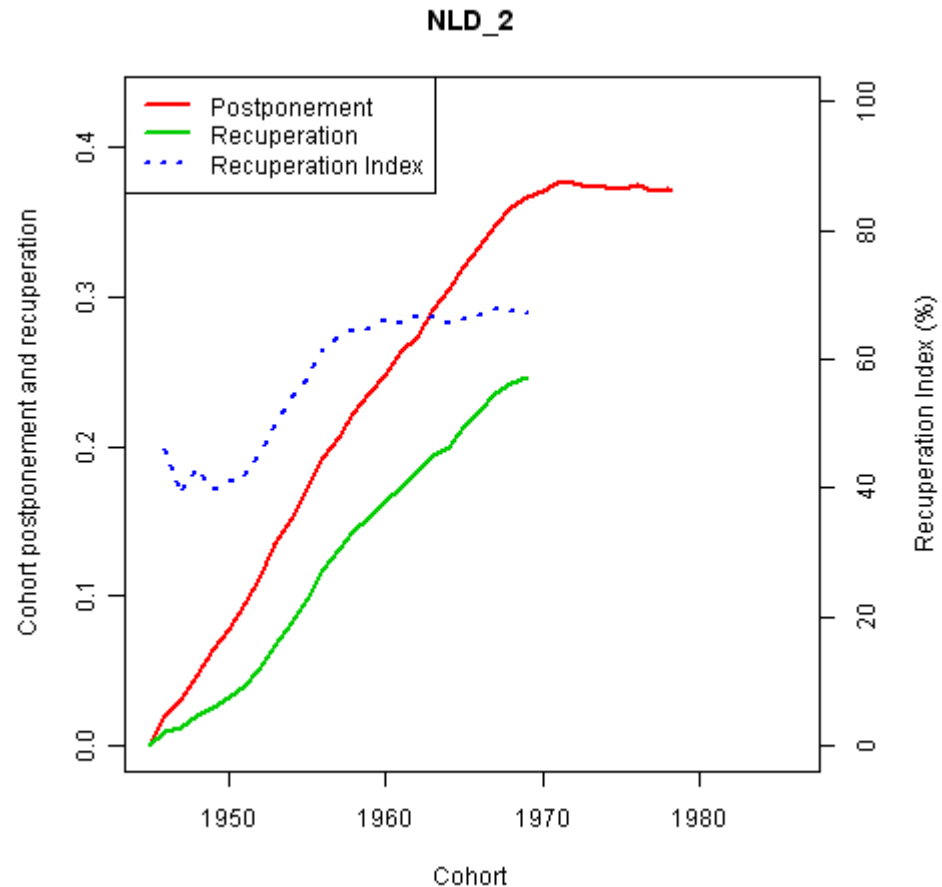
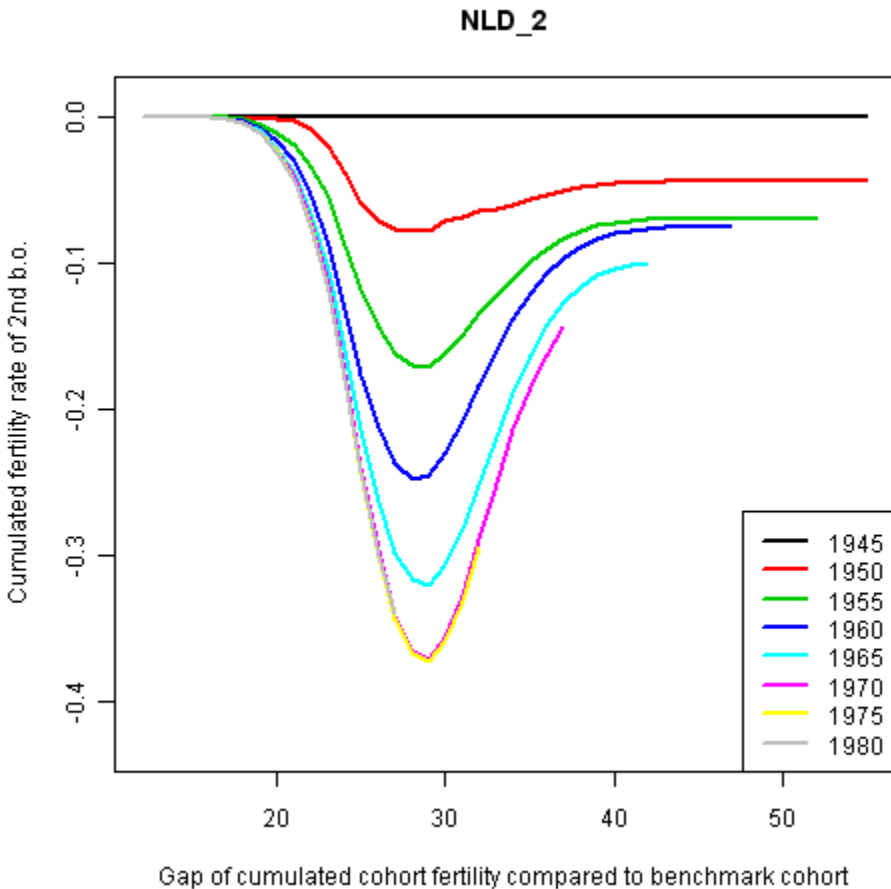
Basic benchmark model: New features



New features of our approach:

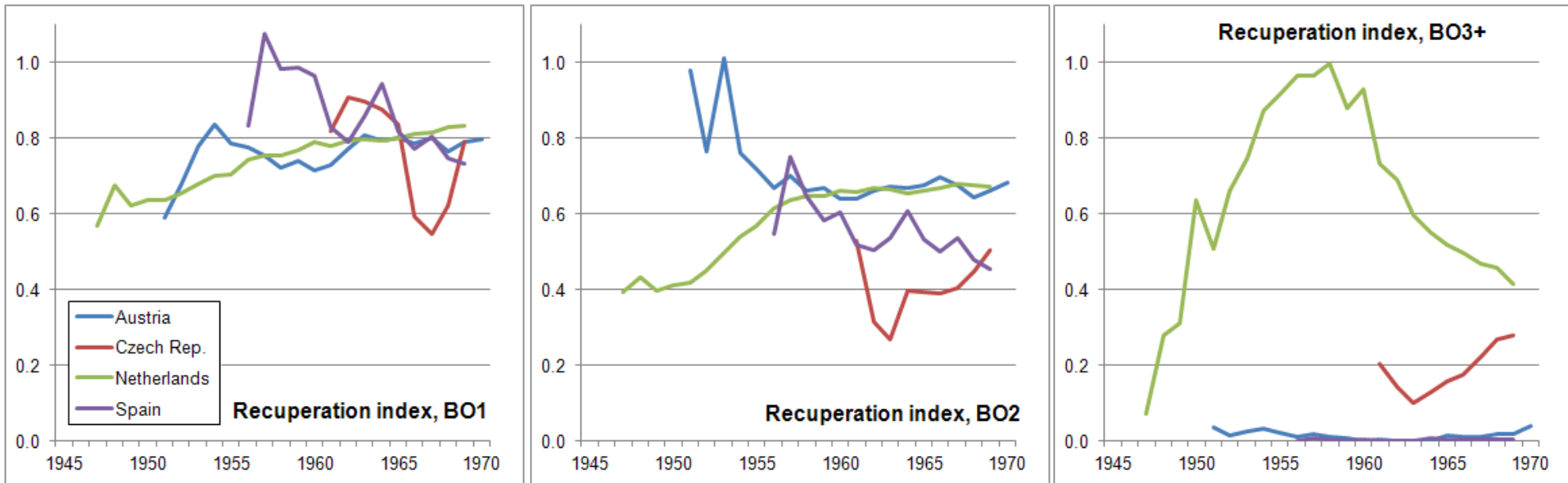
- 1) *The choice of a benchmark cohort reflects aims of the analysis*
- 2) *Focus on order-specific differences*
- 3) *Specifying age at maximum cumulative fertility decline individually*

Basic benchmark model: Recuperation Index



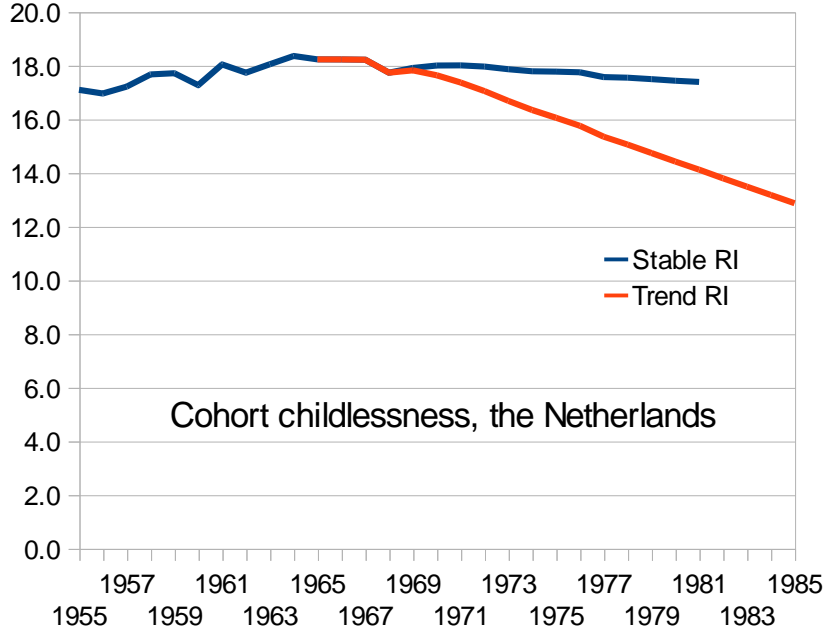
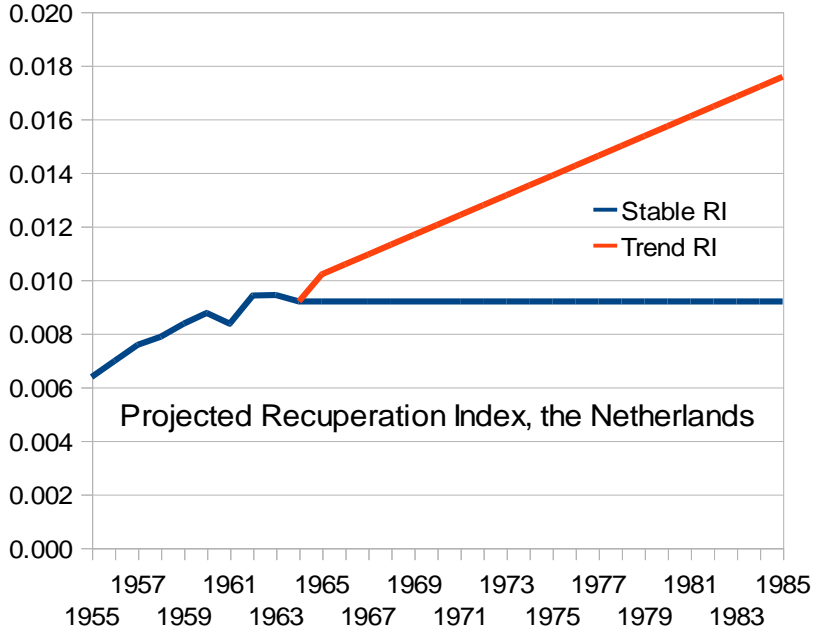
Identifying the regularities in postponement and recuperation

Basic benchmark model: comparing countries



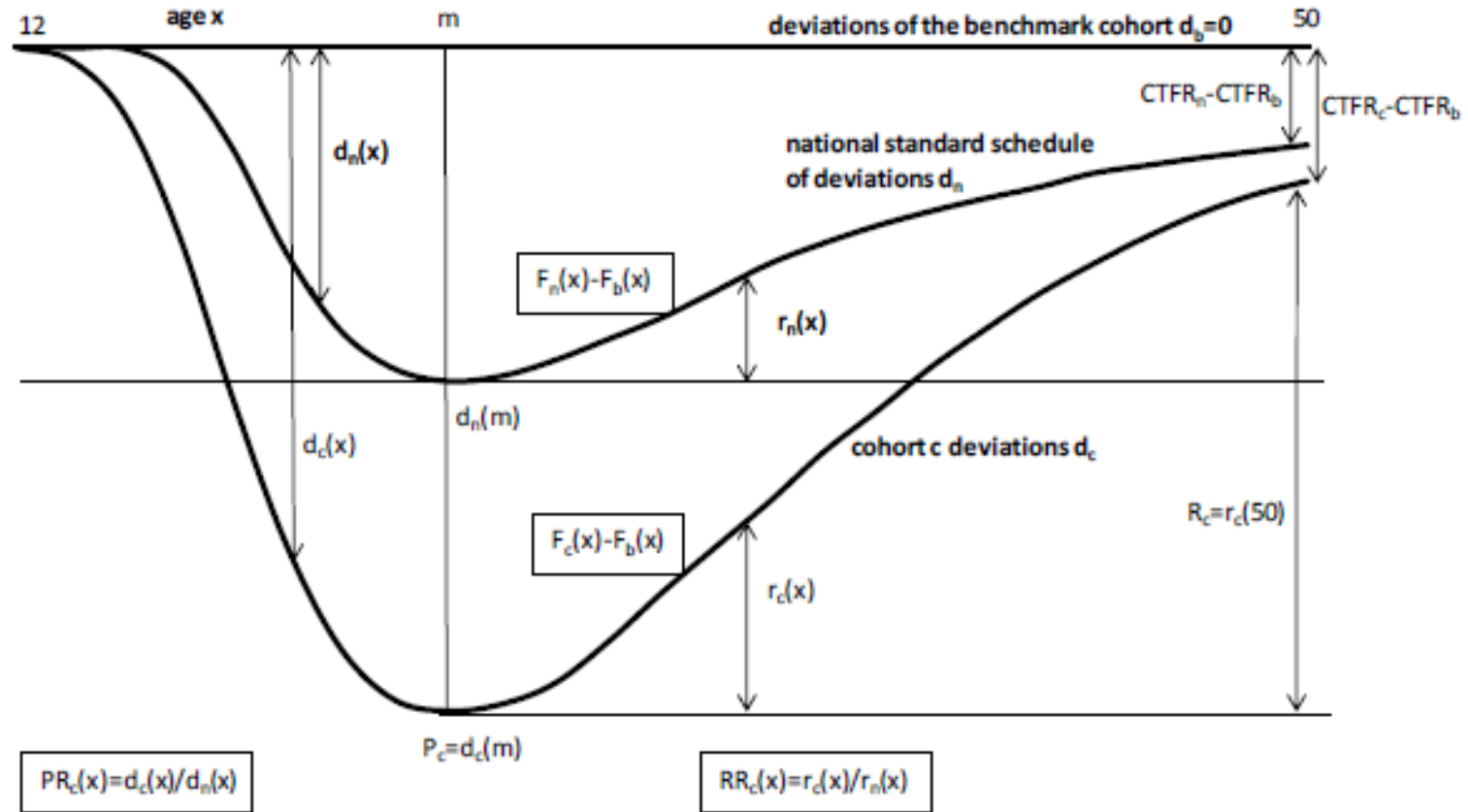
Country and parity specific developments in recuperation

BBM Extension: Projecting completed cohort fertility



Netherlands: Projecting *Recuperation Index* for first birth order using two scenarios (fixed, trend), and then recalculating back into CCFR40

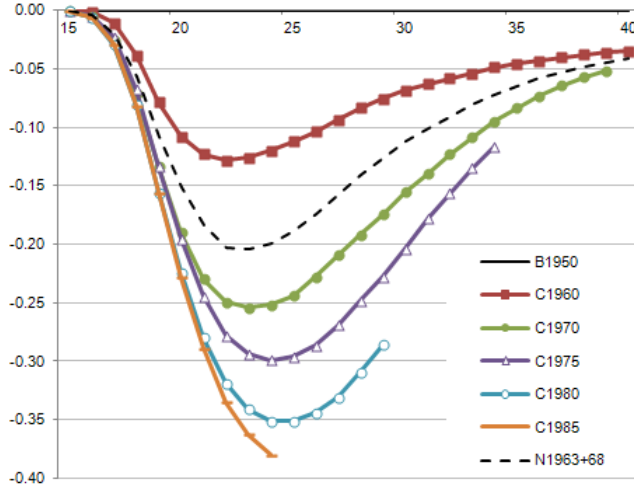
Relational model



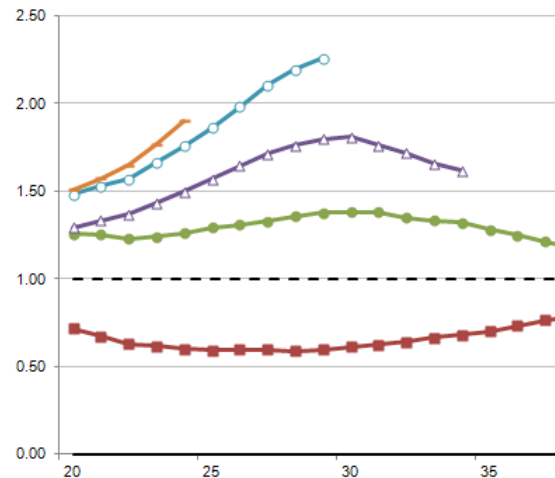
Transcribes the changing fertility of cohorts into *Postponement Ratio* and *Recuperation Ratio*
Postponement and *Recuperation* are relativised in respect to the *National standard schedule of deviations*

Relational model: Austria, 1st births

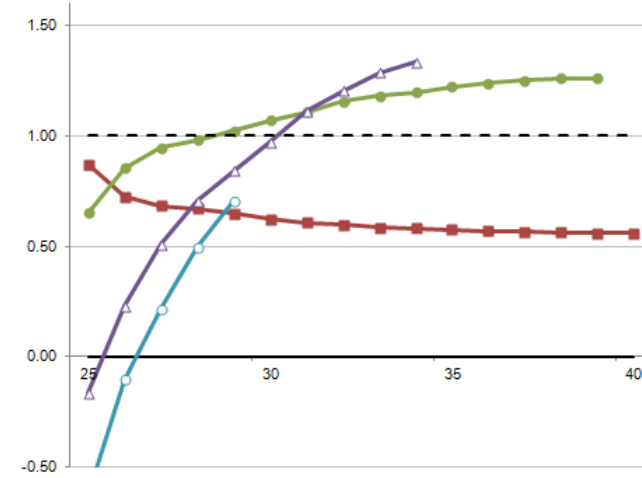
Cumulated deviations of different cohorts by age



Postponement Ratios of different cohorts by age



Recuperation Ratios of different cohorts by age



*National standard schedule of deviations: Postponement Ratio (PR) = 1;
Recuperation Ratio (RR) = 1*

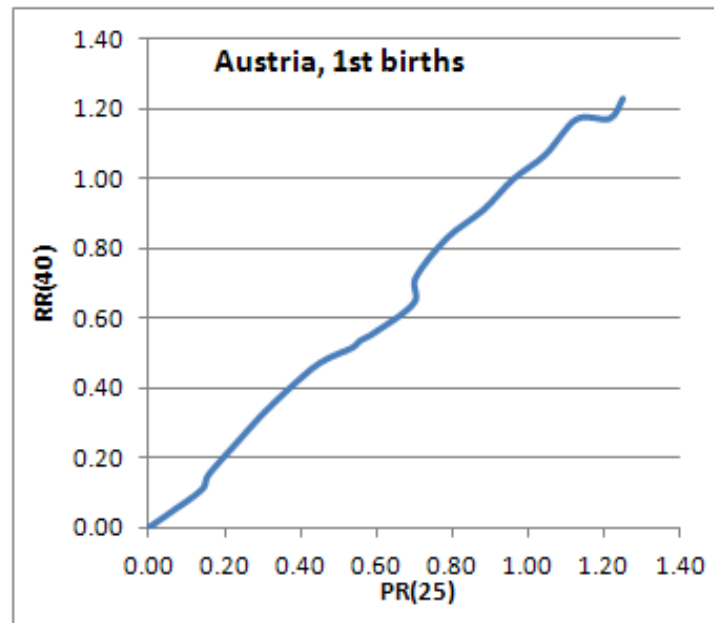
*Younger cohorts: accelerating postponement (PR > 1)
later age at maximum of cum.fertility decline (RR at younger ages < 0)
recuperation accelerating at ages > 30*

RM Extension: Projecting completed cohort fertility

Projecting *Postponement Ratio* and *Recuperation Ratio* using different scenarios, and then recalculating back into CCFR40...

$$pRR_c(40) = \alpha \cdot PR_c(m) + \beta + \varepsilon$$

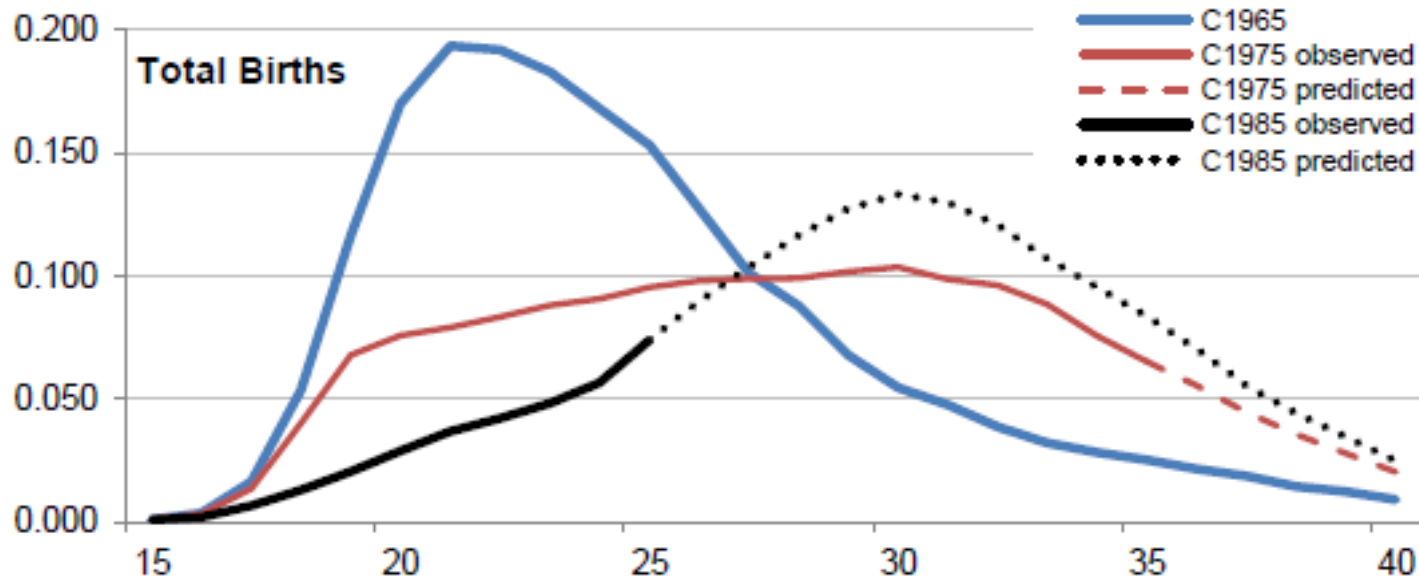
$$pRR_c(40) = \alpha \cdot PR_c(m) + \beta \cdot c + \chi + \varepsilon$$



RM Extension: Projecting completed cohort fertility

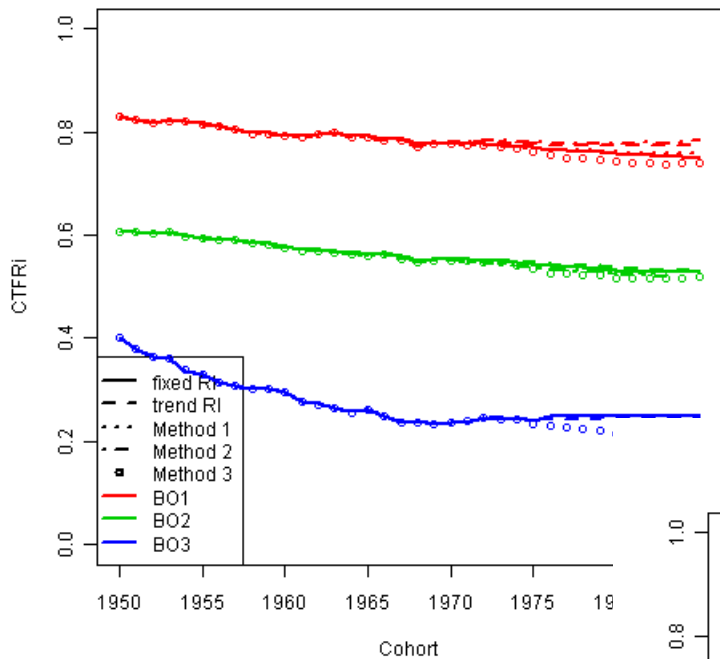
Projecting *Postponement Ratio* and then recalculating back into full fertility schedule (Czech Republic, cohorts 1965-85)

$$pPR_c(x) = \alpha \cdot PR_c(x-1) + \beta + \varepsilon$$

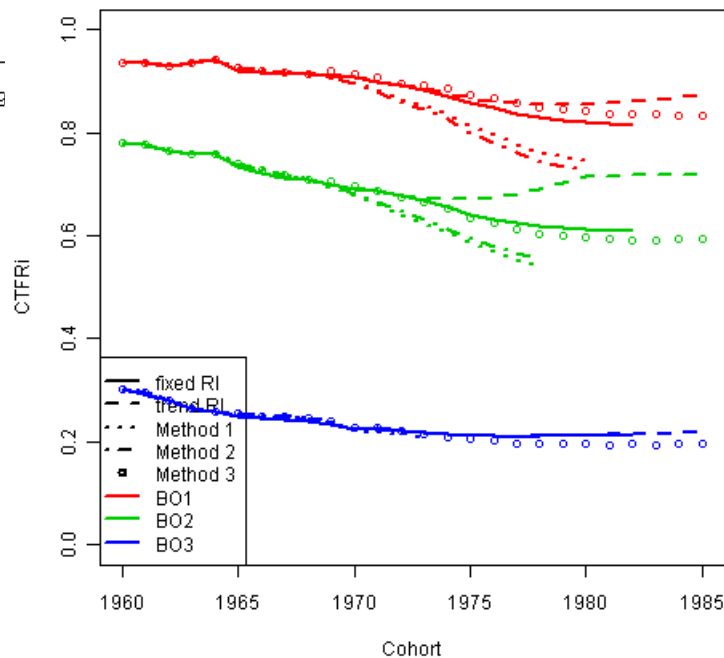


Projections compared

Austria



Czech Republic



	CCFR1985(40)	
	First birth	Total
Austria		
RI	0.77	1.55
M3	0.74	1.48
Diff	-0.03	-0.07
Czech Republic		
RI	0.86	1.72
M3	0.83	1.62
Diff	-0.02	-0.09
the Netherlands		
RI	0.85	1.71
M3	0.80	1.70
Diff	-0.06	0.00
Spain		
RI	0.68	1.23
M3	0.78	1.39
Diff	0.10	0.16

Conclusions

The presented methods are useful for descriptive, analytical and projecting purposes

Recuperation is strongly differentiated by birth order (Austria, Spain)

Typically, low recuperation is associated with low completed fertility (Spain)

Postponement has come to an end in some countries (the Netherlands, Spain) around mid-1970s cohorts

Projections suggest stabilization of cohort fertility in countries where postponement process is advanced (Austria, the Netherlands)

Limitations: *Useful only during postponement transition*

Increasing projection uncertainty with continuing fertility aging

Relational model needs further testing and elaboration

Thank you for attention

Correspondence: Tomáš Sobotka tomas.sobotka@oeaw.ac.at
Kryštof Zeman krystof.zeman@oeaw.ac.at

Paper available as VID European Demographic Research Paper 2/2011 on
http://www.oeaw.ac.at/vid/publications/p_demographicresearchpapers.shtml

Short version forthcoming in Comparative Population Studies