



Wittgenstein Centre

FOR DEMOGRAPHY AND  
GLOBAL HUMAN CAPITAL

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# Cohort fertility decline in low fertility countries: decomposition using parity progression ratios

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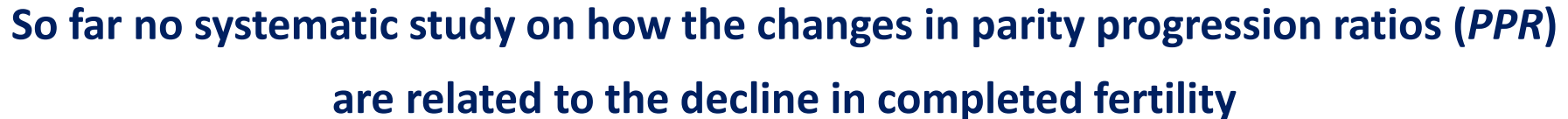


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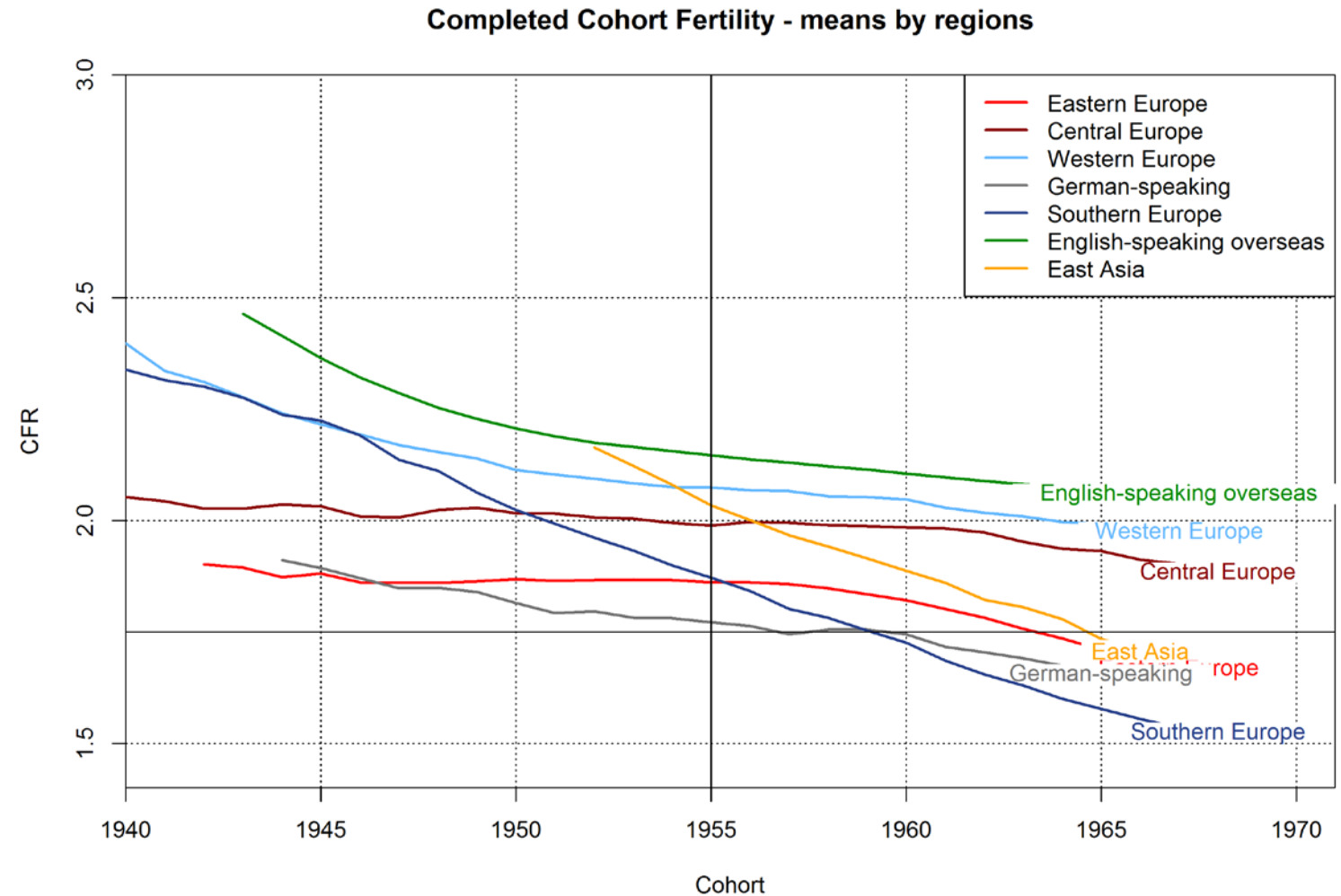


- Decline in cohort fertility since WWII cohorts
- Differences between the two stages of the fertility decline
- From birth cohorts closing the baby boom (1940) to the youngest birth cohorts who have finished their reproductive careers (1970)
- Clear regional patterns
- Mechanisms of decline?



## RESEARCH QUESTION

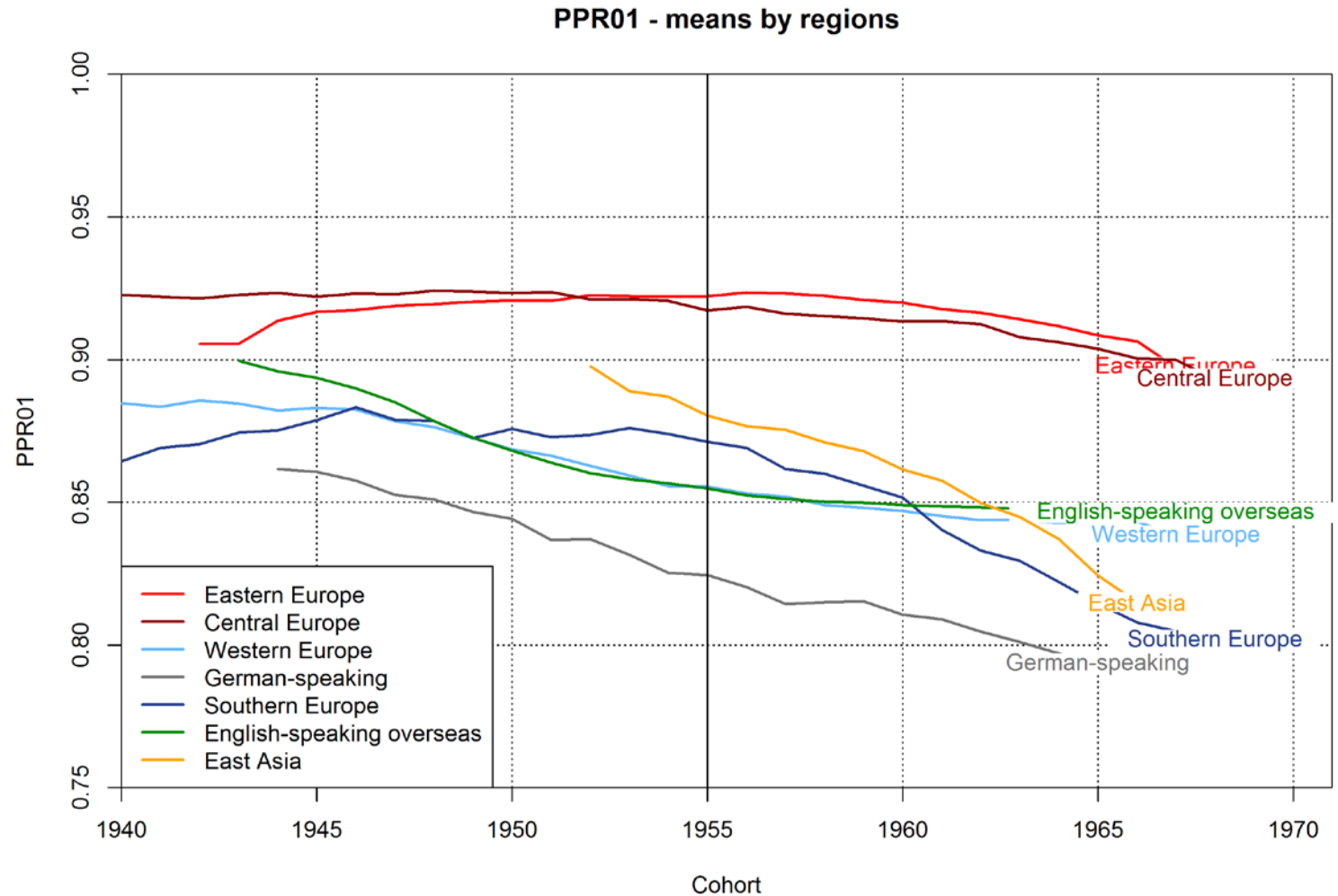
- 1) What was the role of declining transitions to first, second and third birth, in driving the cohort fertility decline?
- 2) Are there systematic regional differences in parity-specific patterns of cohort fertility decline?
- 3) We pay particular attention to countries which experienced a fall of completed fertility below 1.75 children per woman.



Using data from the Human Fertility Database (HFD) and the Cohort Fertility and Education (CFE) database

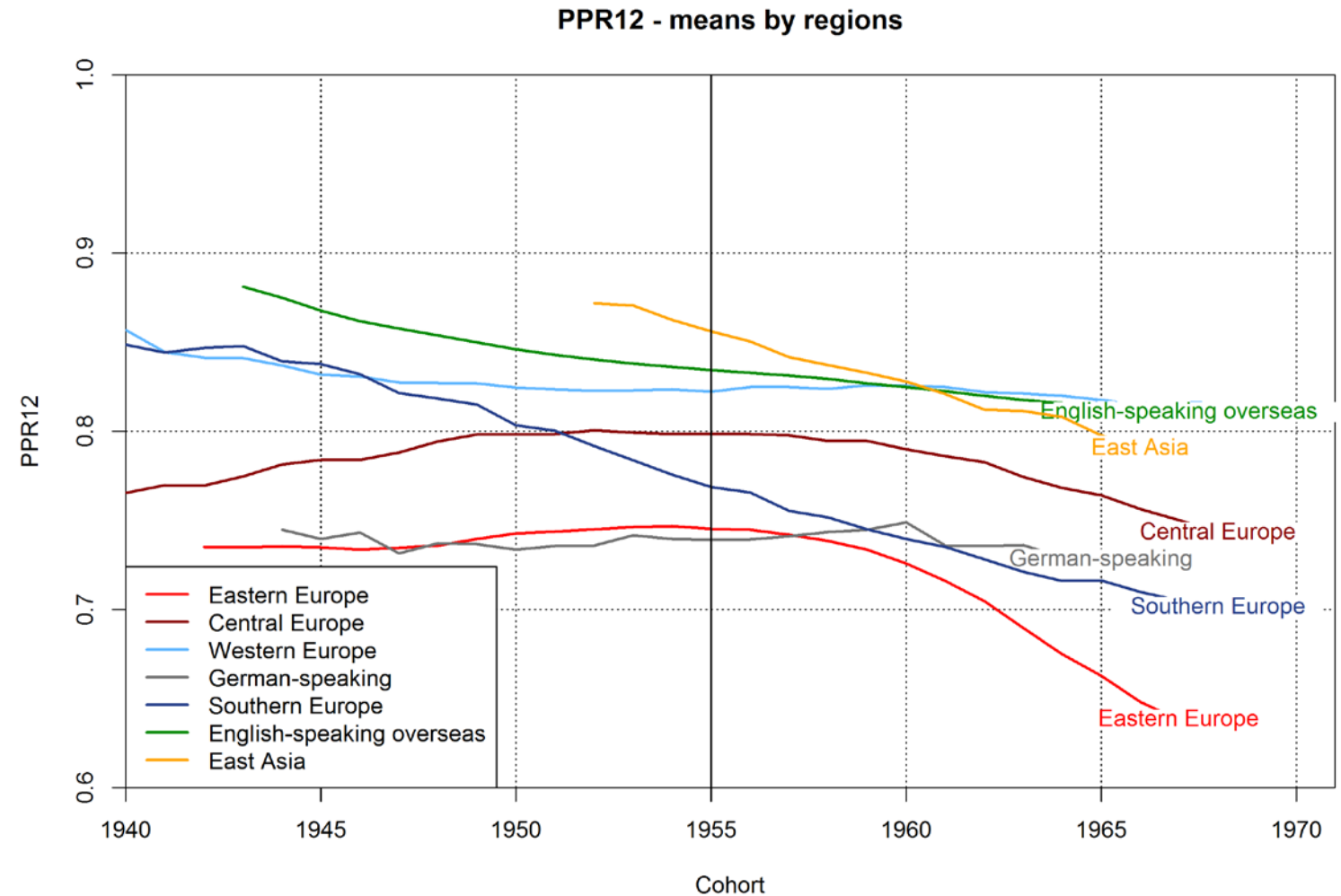
## PARITY PROGRESSION RATIO 0→1

- Low  $PPR_{01}$  i.e. high childlessness in German speaking countries, Southern Europe, East Asia
- High  $PPR_{01}$  i.e. Low childlessness in Central and Eastern Europe
- Later stage:  $PPR_{01}$  and  $PPR_{12}$  did not move or decline in tandem – huge differences through regions



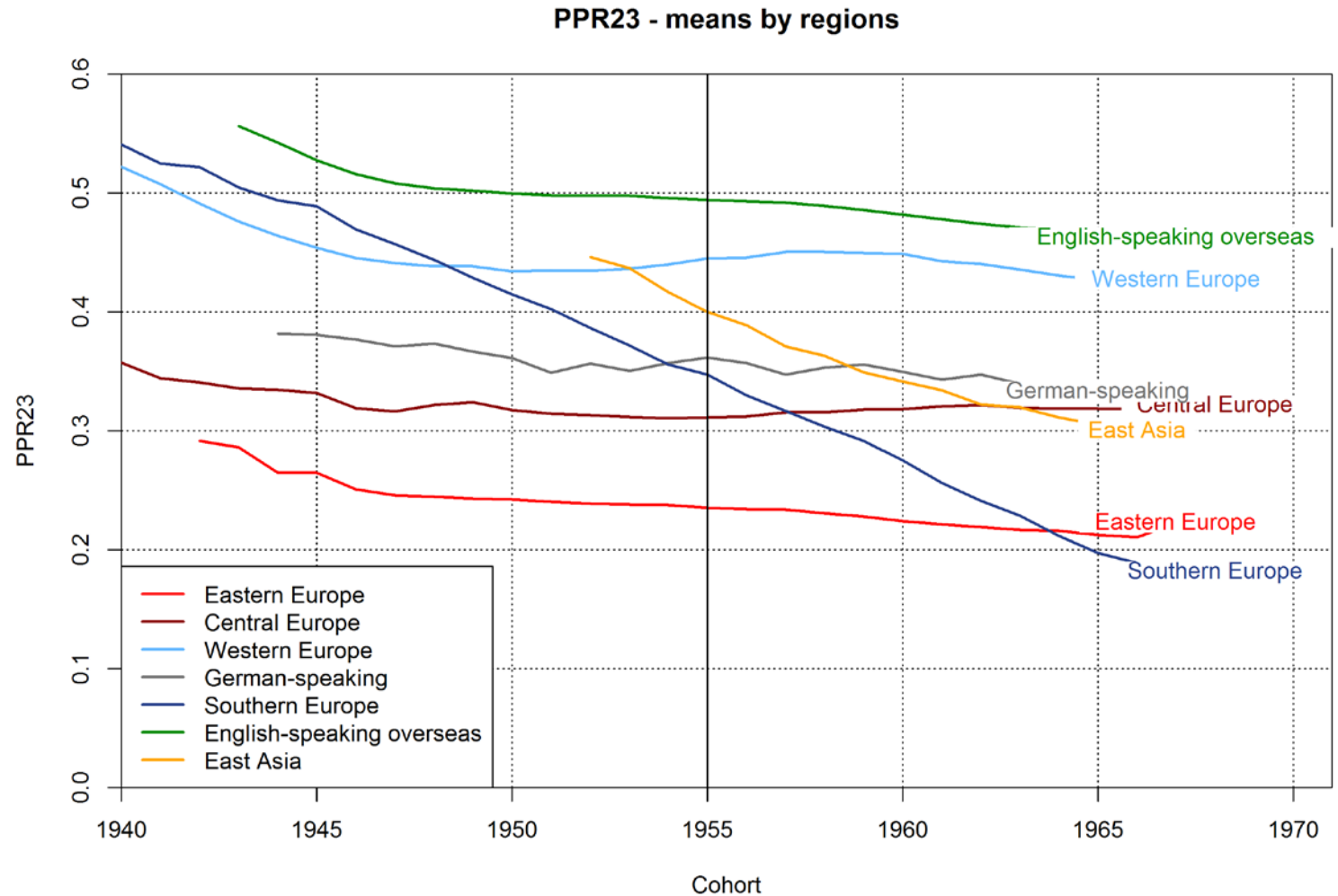
## PARITY PROGRESSION RATIO 1→2

- Low  $PPR_{12}$  in Eastern Europe, Southern Europe
- Increasing proportion of 1-child families

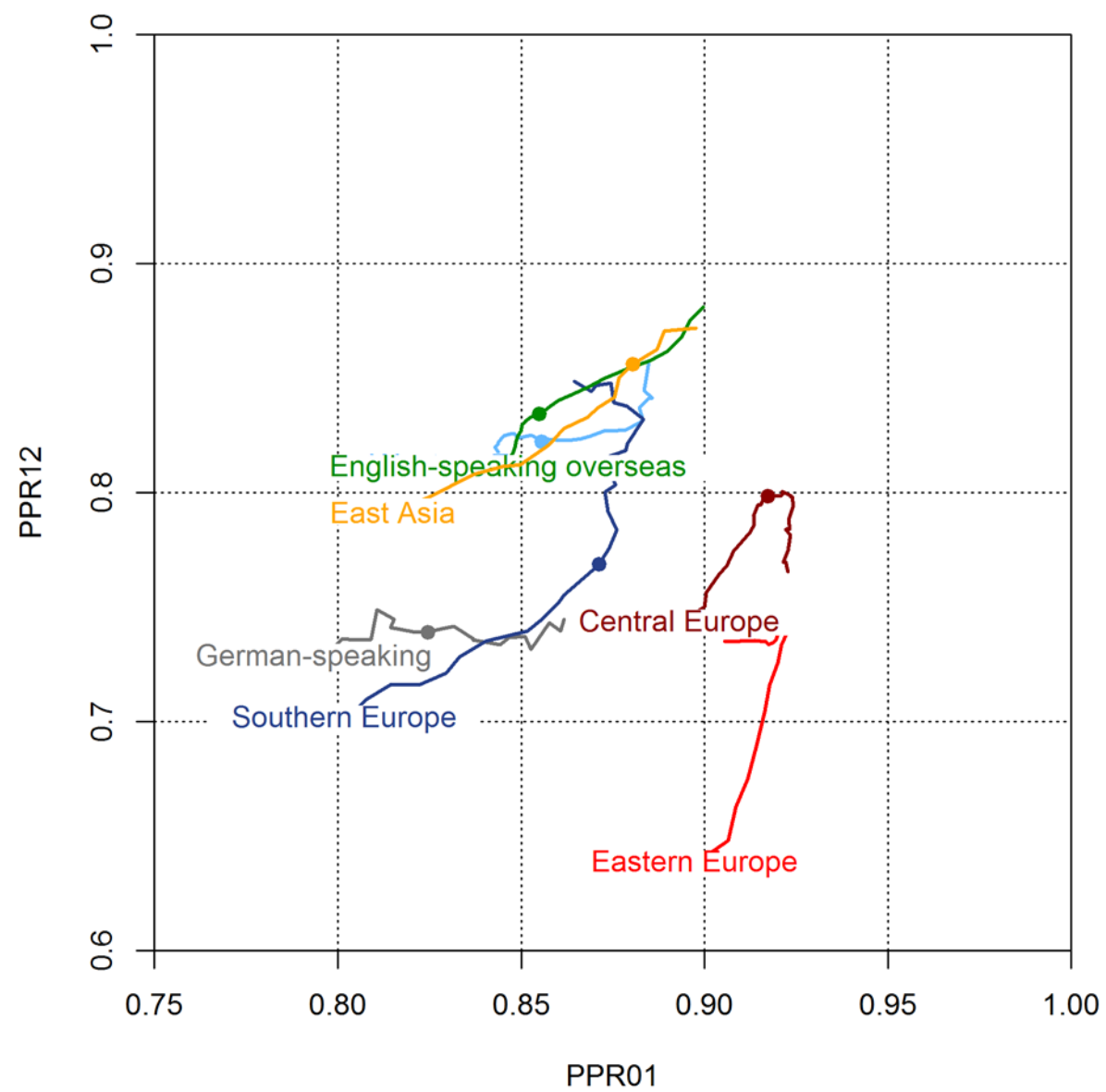


## PARITY PROGRESSION RATIO 2→3

- Most of the fall before C 1955 was driven by  $PPR_{23}$  and higher; and by increasing childlessness
- Continuing decline in East Asia and South Europe
- Stabilisation at different levels
- Big families more frequent in West



PPR01 vs PPR12; REGIONS



## METHOD OF DECOMPOSITION OF CFR DECLINE INTO *PPRs*

- We interpret all changes in cohort fertility (*CFR*) in the terms of parity progression ratios ( $PPR_{i-1,i}$ )
- The sequential nature of childbearing as a chain of transitions across parities
- Method developed by Ní Bhrolcháin (1987) and Pullum et al. (1989) and further utilised by **Barkalov (1999)** and extended by Andreev, Shkolnikov and Begun (2002)
- The parity progression ratios are stepwise fixed at the value of initial cohort (1940 or 1955 resp.), to estimate the effect of change in  $PPR_{01}$ ,  $PPR_{12}$ , and  $PPR_{2+}$  on the overall change in *CFR* between cohorts 1940-1955 and 1955-1970

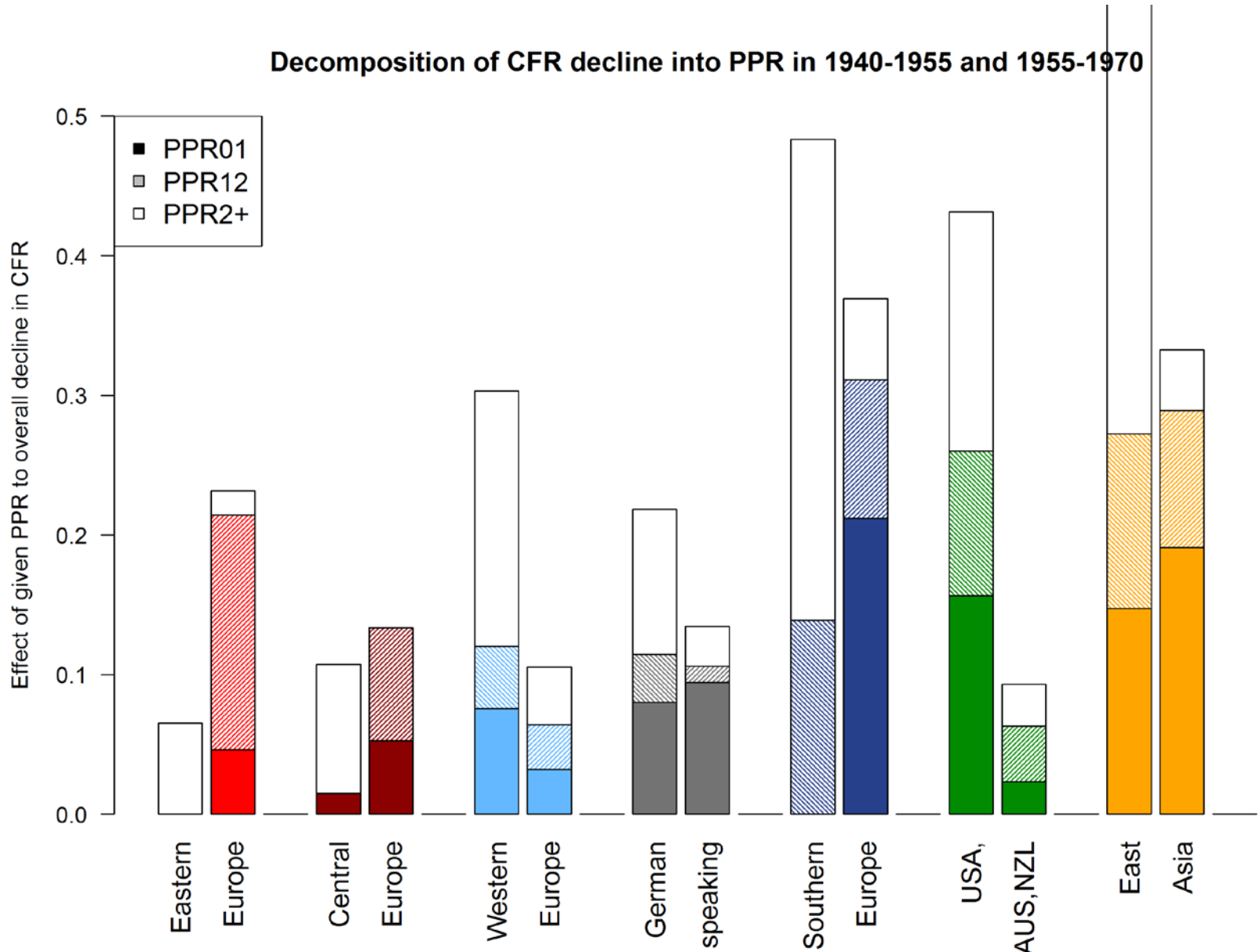
$$CFR^{c2} - CFR^{c1} = \sum_i (PPR_{i-1,i}^{c2} - PPR_{i-1,i}^{c1}) \frac{\partial CFR}{\partial PPR_{i-1,i}} = \sum_i \left[ \left( \frac{CFR_i^{c2}}{CFR_i^{c1}} - \frac{CFR_{i+1}^{c2}}{CFR_{i+1}^{c1}} \right) \sum_{j=i} CFR_j \right]$$

	PPR01	PPR12	PPR23+
<b>C1</b>	0.90	0.85	0.45
<b>dPPR01</b>	<b>0.80</b>	0.85	0.45
<b>dPPR12</b>	<b>0.80</b>	<b>0.60</b>	0.45
<b>dPPR23+</b>	<b>0.80</b>	<b>0.60</b>	<b>0.20</b>
<b>C2</b>	0.80	0.60	0.20

CTFR1	CTFR2	CTFR3+	CTFR	contribution
0.90	0.77	0.54	<b>2.21</b>	
0.80	0.68	0.48	<b>1.96</b>	<b>-0.25</b>
0.80	0.48	0.34	<b>1.62</b>	<b>-0.34</b>
0.80	0.48	0.12	<b>1.40</b>	<b>-0.22</b>
<b>-0.10</b>	<b>-0.29</b>	<b>-0.42</b>	<b>-0.81</b>	

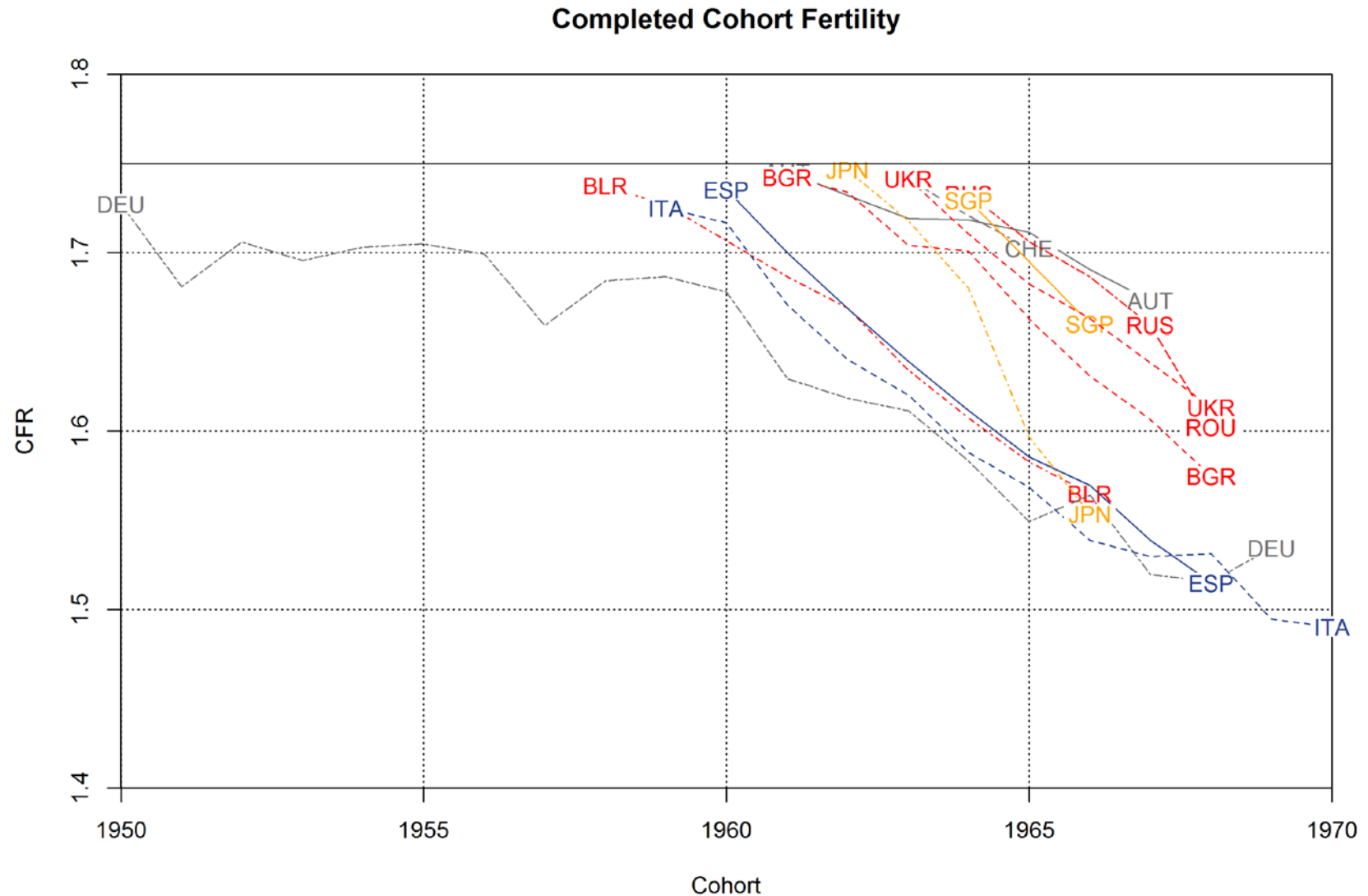


# DECOMPOSITION OF COHORT FERTILITY DECLINE INTO PARITY PROGRESSION RATIOS



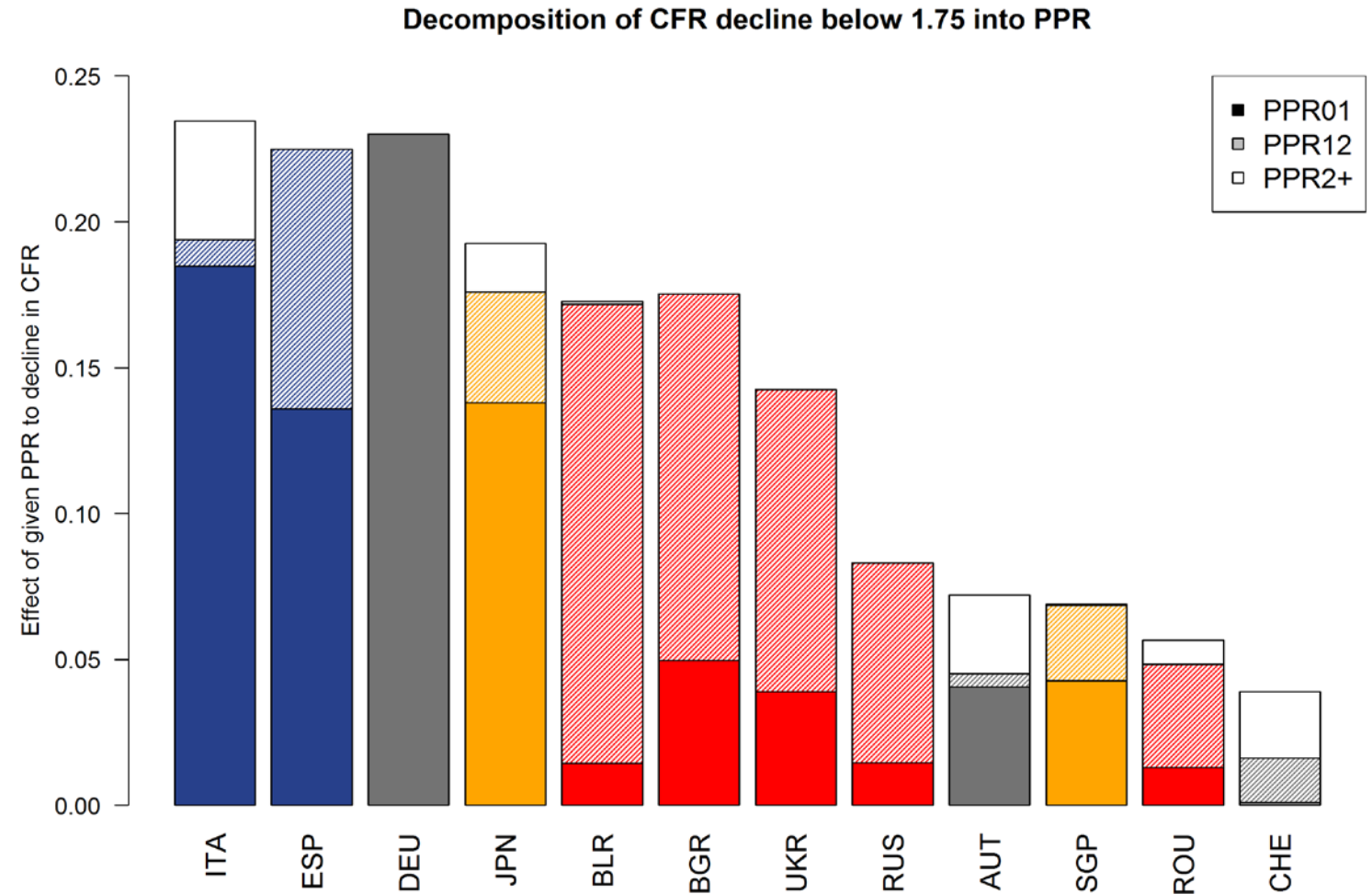
## DECLINE OF COHORT FERTILITY TO VERY LOW LEVELS

- Below 1.75 : 12 countries
- No sign of CFR stabilisation
- The decline have continuing trend of ~ 0.1 children in 5-year-cohorts
- Germany longest track and recent slowdown



## DECLINE OF COHORT FERTILITY TO VERY LOW LEVELS

- Very differing patterns of PPR effect:
- In Southern Europe, Germany and Japan childlessness is claiming 0.15-0.25 of recent drop below 1.75
- In Eastern Europe it is  $PPR_{12}$  with numerical effect of 0.15 child decline; the childlessness here was not increasing
- Progression ratios to higher parities are responsible for significant *CFR* decline just in Italy



## CONCLUSIONS AND DISCUSSION

Identification of two patterns of cohort fertility decline:

- FIRST pattern that is driven by weakening progression to first child, i.e. increasing childlessness, mainly in German speaking countries and East Asia
- SECOND pattern of fertility decline driven by decreasing progression towards second child, prevalent in Eastern Europe, and to lesser extent in Central Europe
- The special case of Southern Europe combines both these declines and even further decline of transition towards higher parities, resulting in the lowest cohort fertility levels in the world
- Parity progression ratios and the overall level of fertility are stabilised in Western Europe and English-speaking overseas, and to some extent in Central Europe.

*Discussion on social, economic and institutional contexts behind these differing patterns ->VID WP*

*Likely future trends of cohort fertility?*



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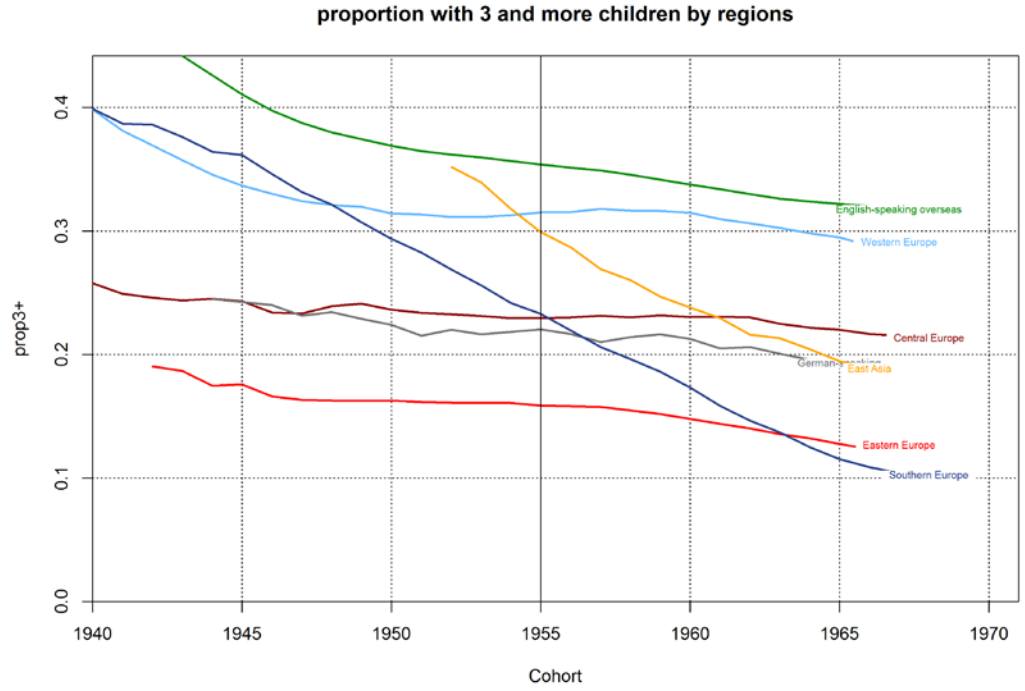
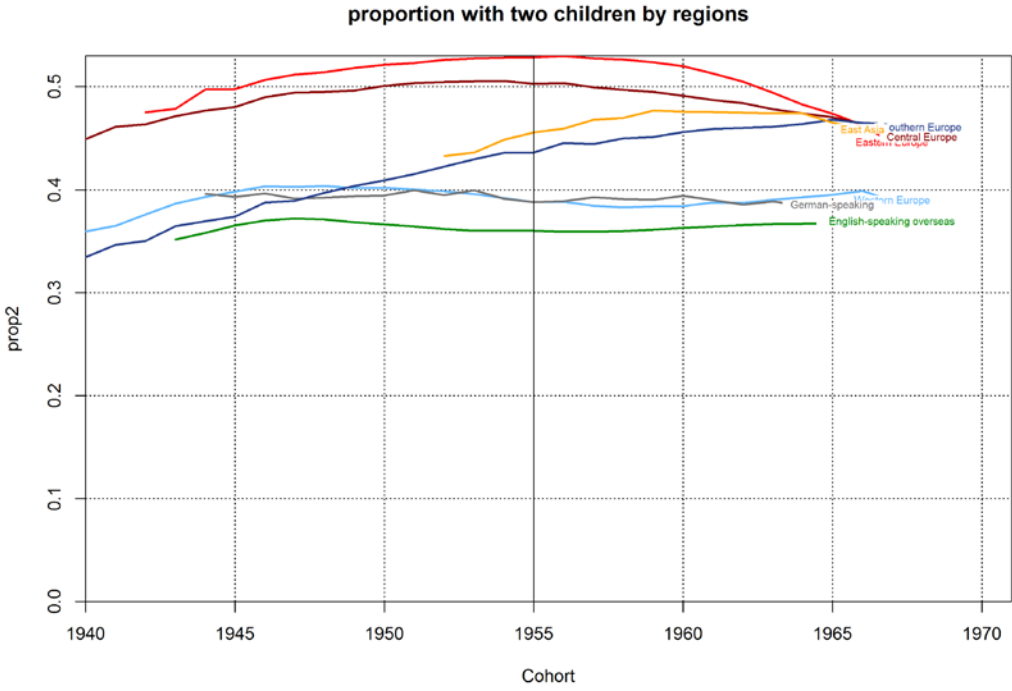
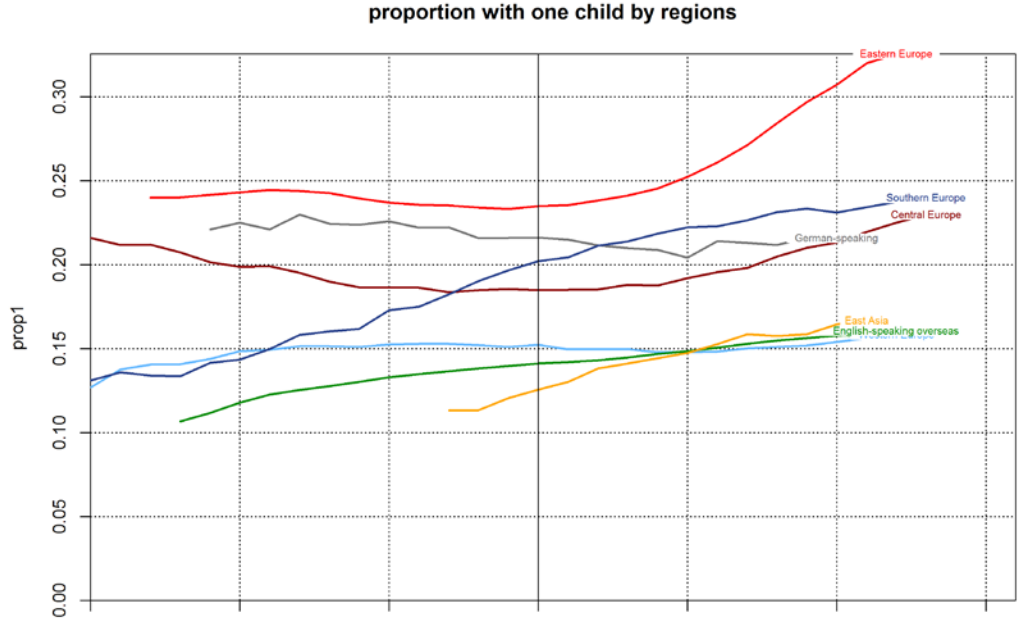
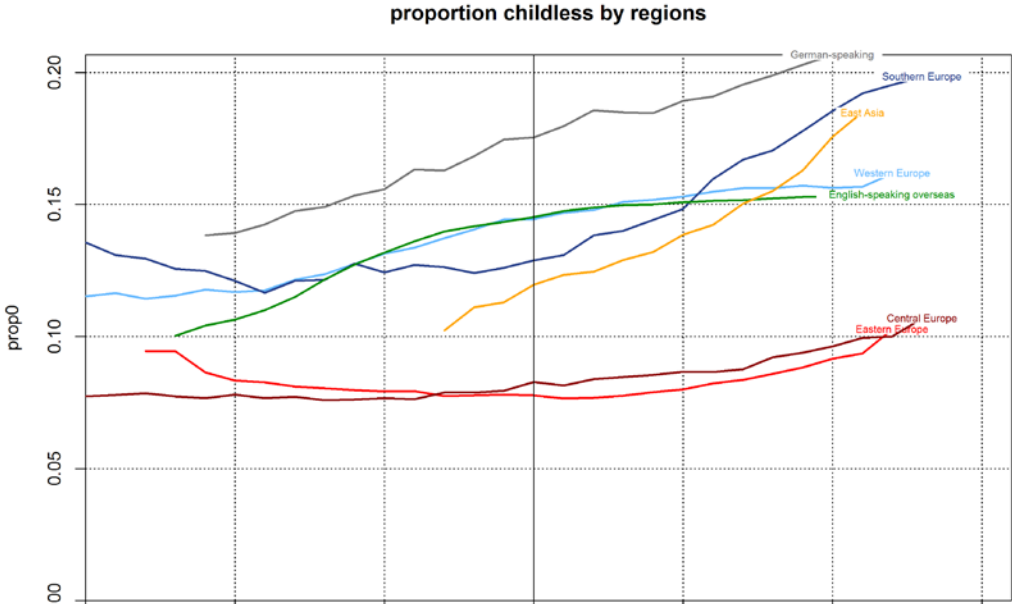


**EURREP**  
FERTILITY AND REPRODUCTION  
IN 21<sup>ST</sup> CENTURY EUROPE

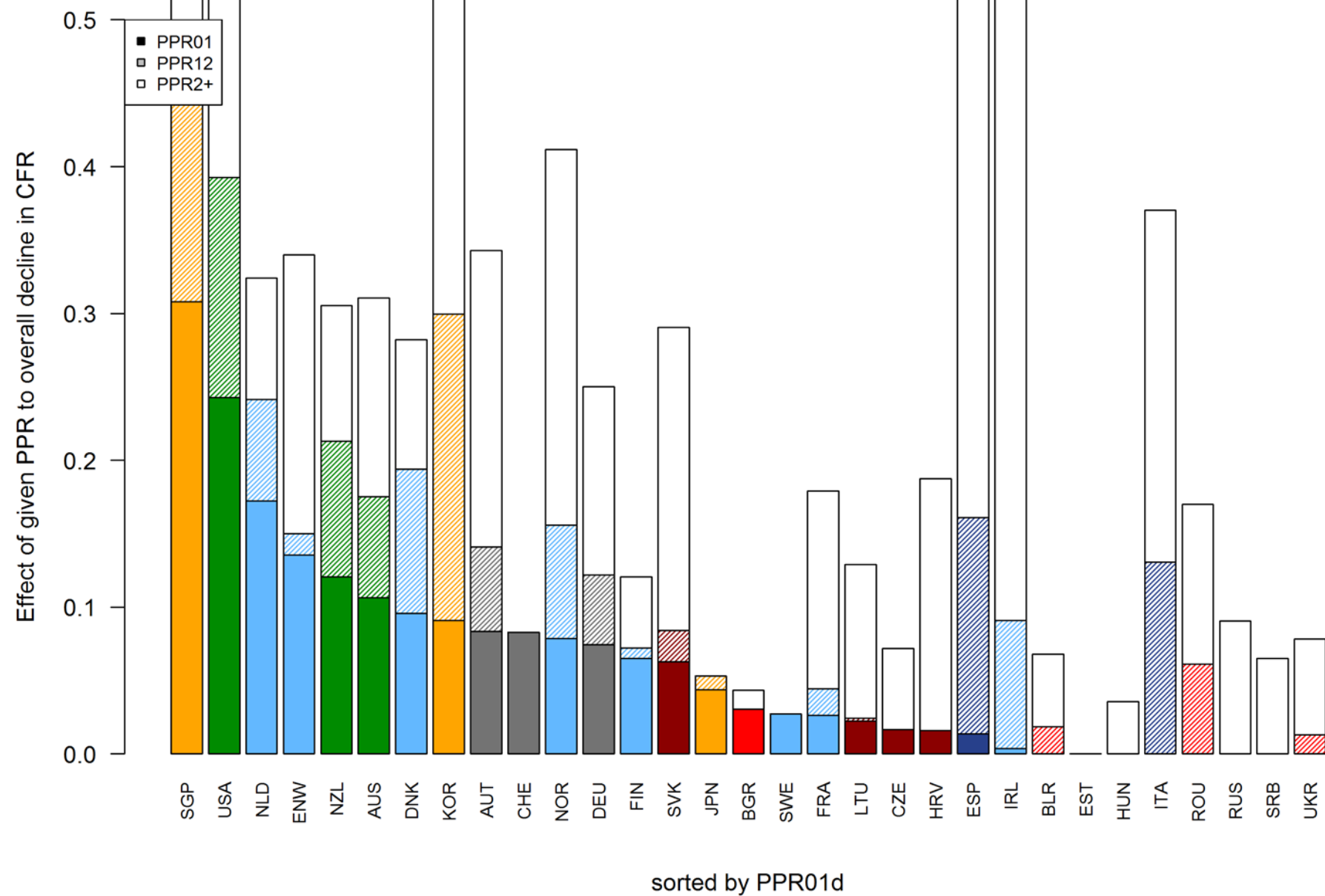


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# CONSEQUENCES FOR PROPORTION OF WOMEN / FAMILIES BY PARITY



Decomposition of CFR decline into PPR; C1940 to C1955



Decomposition of CFR decline into PPR; C1955 to C1970

