

# **On the critique of association, aggregation and paradoxes in the age-specific and country-heterogeneous association between fertility and female employment**

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In his response to our article on the age-specific and country-heterogeneous association between fertility and female employment, Rense Nieuwenhuis (2015) rightly elaborates on some critical points of analyzing time-series cross-sectional macro-level data in pooled models. Specifically, he first highlights the potential ambivalence between country-specific trajectories and cross-country correlations that are based on pooled estimators. Second, he describes different kinds of aggregation paradoxes which he rightly points out to be detrimental to pooled macro-level assertions. In a third point of critique, he derives that analyses on the matter should rather be based on micro-level studies in order to pay due regard to the “great variety in trends across countries”.

Though we can unconditionally agree with most of Rense Nieuwenhuis’ depictions, we do not agree that any of them are of relevance to our study.

More precisely, as pointed out before as well as in Brehm and Engelhardt (2015), the points of critique apply to findings yielded from pooled macro-level models which assume unit homogeneity across time and partly even across countries’ general level. It is for these exact reasons Nieuwenhuis states that we chose a method – Random Coefficient Modeling – which pays due regard to countries’ varying intercepts and slopes, i.e. to both the variance between countries as well as the developments within countries. In fact, Nieuwenhuis’

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argument and Figure 1 can already be found in discussions on the issue, e.g., in Engelhardt (2009, p.253) and elsewhere; the study in question reflects on the associated assertion around Figures 3 to 5. Similarly, it is our study's declared aim and achievement to explore the issue of fertility and female employment beneath the forms of aggregation paradoxes listed in Nieuwenhuis' second argument. Equally, we explicitly and even numerically address the question of varying trends across countries, e.g., in Figure 7 and Appendix 3.

It is true that, beneath these individual trajectories, the model as well as our study assume a common pattern across countries – but, as Beck and Katz (2007) put it, “[o]bviously, we must assume enough homogeneity to allow for estimation; if every observation is unique, we can do no science” (p.183).

In line with that, it is one of demographic research's major foci and strengths to do science on macro-level associations without ever claiming full validity on the micro-level. It is of course worthwhile to complement macro-level research with micro-level studies. However, we consider this more fruitful if (a) the research questions and premises address the same issue and (b) the data allows for micro-level nesting of individuals within countries.

### ***Conclusion***

The authors thank Rense Nieuwenhuis for his critique and his elaboration on relevant issues when conducting studies with pooled macro-level models. However, since we explicitly did not rely on pooled estimators, we do not see the critique's relevance for the study in question.

## **Literature**

Beck, N. and Katz, J.N. (2007). Random Coefficient Models for Time-Series Cross-Section Data. Monte Carlo Experiments. *Political Analysis* 15(2): 182–195.

Brehm, U. and Engelhardt, H. (2015). On the Age-specific Correlation between Fertility and Female Employment. Heterogeneity over Space and Time in OECD Countries. *Demographic Research* 32: 691–722.

Engelhardt, H. (2009). Zum Wandel der Korrelation von Fertilität und Frauenerwerbstätigkeit in Raum und Zeit. Eine empirische Analyse unter Berücksichtigung der Effekte ausgewählter sozialer Indikatoren. *Zeitschrift für Familienforschung* 21(3): 245–263.

Nieuwenhuis, Rense (2015): Association, Aggregation, and Paradoxes: On the Positive Correlation Between Fertility and Women's Employment. Response to 'On the Age-specific Correlation between Fertility and Female Employment. Heterogeneity over Space and Time in OECD Countries.' *Demographic Research*.