Poster Title
Sub-replacement Fertility: Why Pure Postponement Models are Inadequate

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Extended Abstract (2-4 pages)

Introduction and Theoretical Position

From 1960 to 2003, Period Total Fertility Rates (PTFRs) in Western Europe have fallen to below replacement level. Previous literature has shown that period measures of fertility can be substantially deflated by a shift in fertility to the older ages, which is known as the "postponement effect" (Bongaarts & Feeney: 1998; Frejka & Sardon: 2006). Prior scholarship has sought to determine the magnitude of a PTFR without the distortion of the postponement effect. Two of the most well known models in this area of study are the Bongaarts-Feeney model (1998) and the Kohler-Philipov adjustment (2001). Both of these models assume full recuperation of delayed births and do not account for situations where postponed fertility is not being made up, or for the disparity in "catching up" that exists among countries. Figures 1 and 2 below illustrate the difference in fertility schedules for Western European countries that are recuperating the delayed births and those that are not.

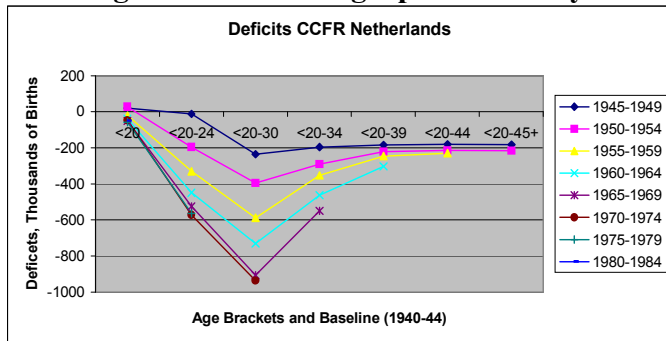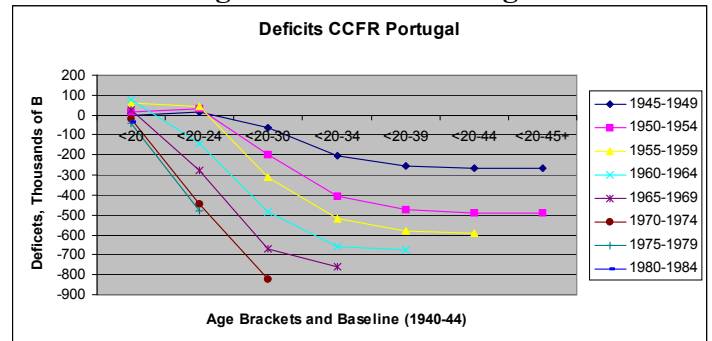**Figure 1: "Catching Up" of Fertility[1]**   **Figure 2: Not "Catching**

[1] Using Council of Europe Data, these graphs show the fertility deficits that succeeding birth cohorts (1945-1964) achieved when compared to the baseline cohort (1940-1944). The Netherlands (Figure 1) depicts one pattern found in Western Europe, where the fertility of later cohorts approaches that of the baseline by the end of the fertility schedule. Portugal (Figure 2) illustrates the opposite pattern, where postponed fertility is not being recuperated.

Data and Methods

This poster presents the results of a two-step analysis of Council of Europe fertility data. The first stage was a cohort analysis based on the comparison of cumulated age-specific fertility schedules for each cohort compared to that of the benchmark cohort (born 1940-1944). This portion of the analysis indicated which countries were "catching up" their delayed fertility and which were not. These graphs indicated that postponement was occurring nearly in all situations, but also that some countries exhibited evidence of "catching up" of the delayed fertility by age 40, while others did not.

Several parameters for the regression analysis that comprised the second stage of this analysis were calculated from the cohort fertility graphs. First, the Completed Cohort Fertility Rate for the baseline cohort (born 1940-1944) was recorded. Next, the fertility deficit at age 30 for each cohort was recorded. This comprises the "trough" parameter, or the amount of fertility that later cohorts are postponing relative to the baseline. Finally, the difference between the fertility deficits at age 40 and age 30 were calculated for each cohort. This represents the amount of the fertility gap that has been reduced by the end of the fertility schedule for each cohort (age 40).

The regression analysis presented in this poster used the Completed Cohort Fertility Rates, the trough parameter, and the gap reduction parameter to predict the PTFRs 30 years after the birth of a cohort, as given in the Council of Europe data[2].

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[2] Only countries and cohorts that exhibited a deficit in fertility at age 30 were included in this analysis. There were 49 data points, representing fertility information from various cohorts from 14 countries in the Council of Europe dataset.

Results

The results of this analysis are depicted in Figure 3 below.

Figure 3: Regression Results

Regression Models			
	Model 1	Model 2	Model 3
Gap Reduction	--	--	-.917***
Trough Parameter	--	.851***	1.414***
Baseline CTFR	0.651***	.752***	1.107***
Constant	318.361	371.068	-286.525
R Square	0.505	0.673	0.793

As these results indicate, 50.5% in the variance of the PTFRs from 1970-1990 can be explained if the PTFRs are regressed on the CTFRs of the baseline cohort (model 1). Adding the level of the trough parameter accounts for the postponement effect (model 2), which explains 67.3% of the variance. Model 3, which includes the recuperation factor, explains 79.3% of the variance in the PTFRs for the countries in this sample. The results of this regression analysis suggest that postponement is indeed important to discussions of contemporary fertility, but so is differential "catching up."

Conclusion

Fertility modeling based on pure postponement is inadequate, and this analysis has shown that the factor of differential "catching up" is essential to explain the difference in Period Total Fertility Rates. The postponement effect of fertility is not the only determinant of PTFRs, and models based on postponement alone clearly miss the impact of disparate recuperated fertility.

References

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Frejka, T. and J.P. Sardon (2006). "Cohort Birth Order, Parity Progression Ratio and Parity Distribution Trends in Developed Countries." *Max Plank Institute for Demographic Research Working Paper*. MPIDR WP 2006-45. November 2006.

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