A pooled time-series analysis on the relation between fertility and key fertility-related demographic behavior across space and time

Alexia Prskawetz
Henriette Engelhardt
Marija Mamolo

Vienna Institute of Demography
Austrian Academy of Sciences

1. INTRODUCTION

In a world where socio-economic and cultural patterns are usually slow to change, there has been a radical reversal in traditional factors that influence levels of fertility.

(Castles 2002)

Cross national lessons for the current debate:

Fertility now tends to be lowest in countries "still commonly labelled as traditional, Catholic, and family oriented".

(Chesnais 1996)

Fertility is highest in countries with the highest divorce rates, the highest rates of cohabitation, and the greatest level of extra-marital fertility.

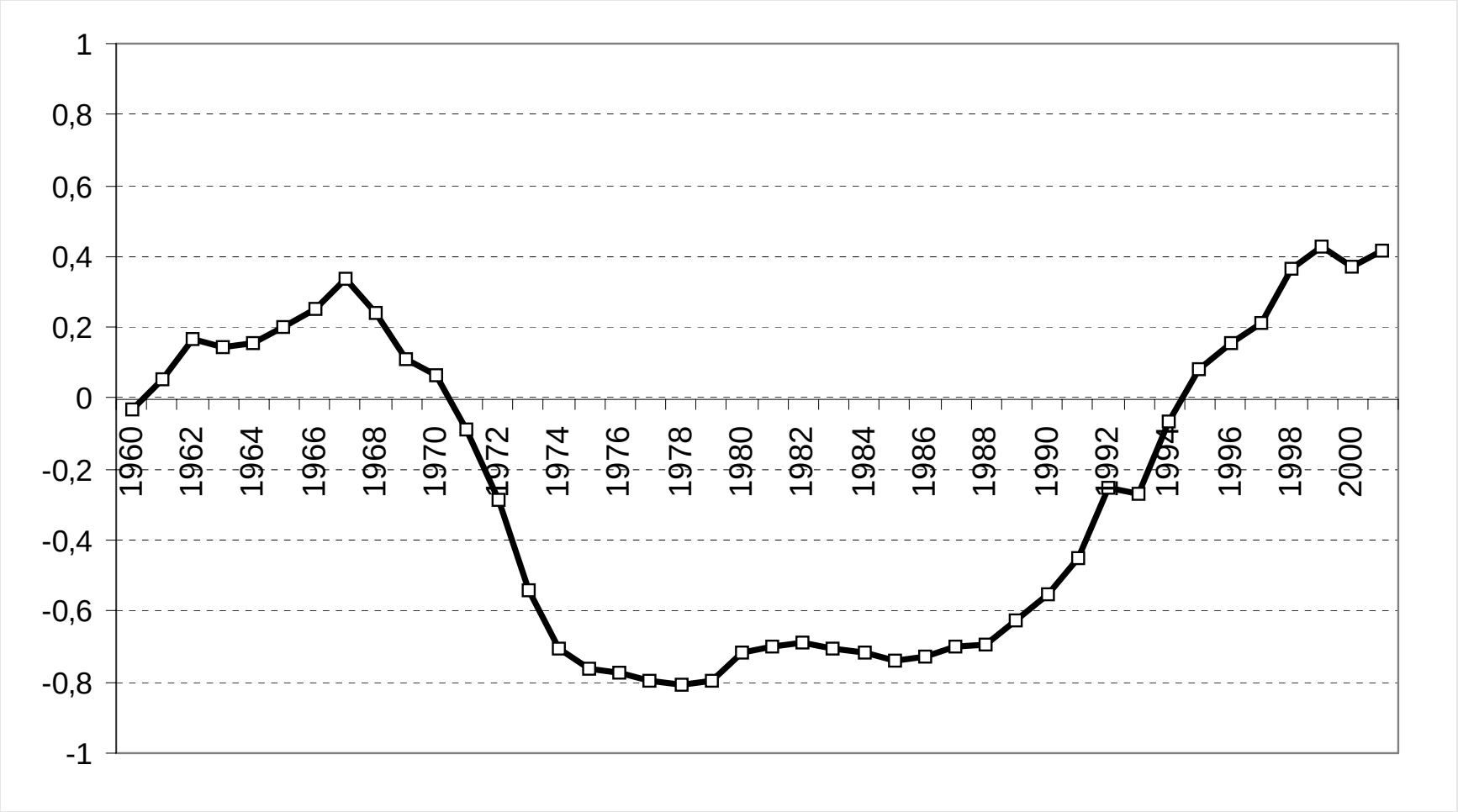
(Monnier and de Guibert-Lantoine 1996)

2. DATA

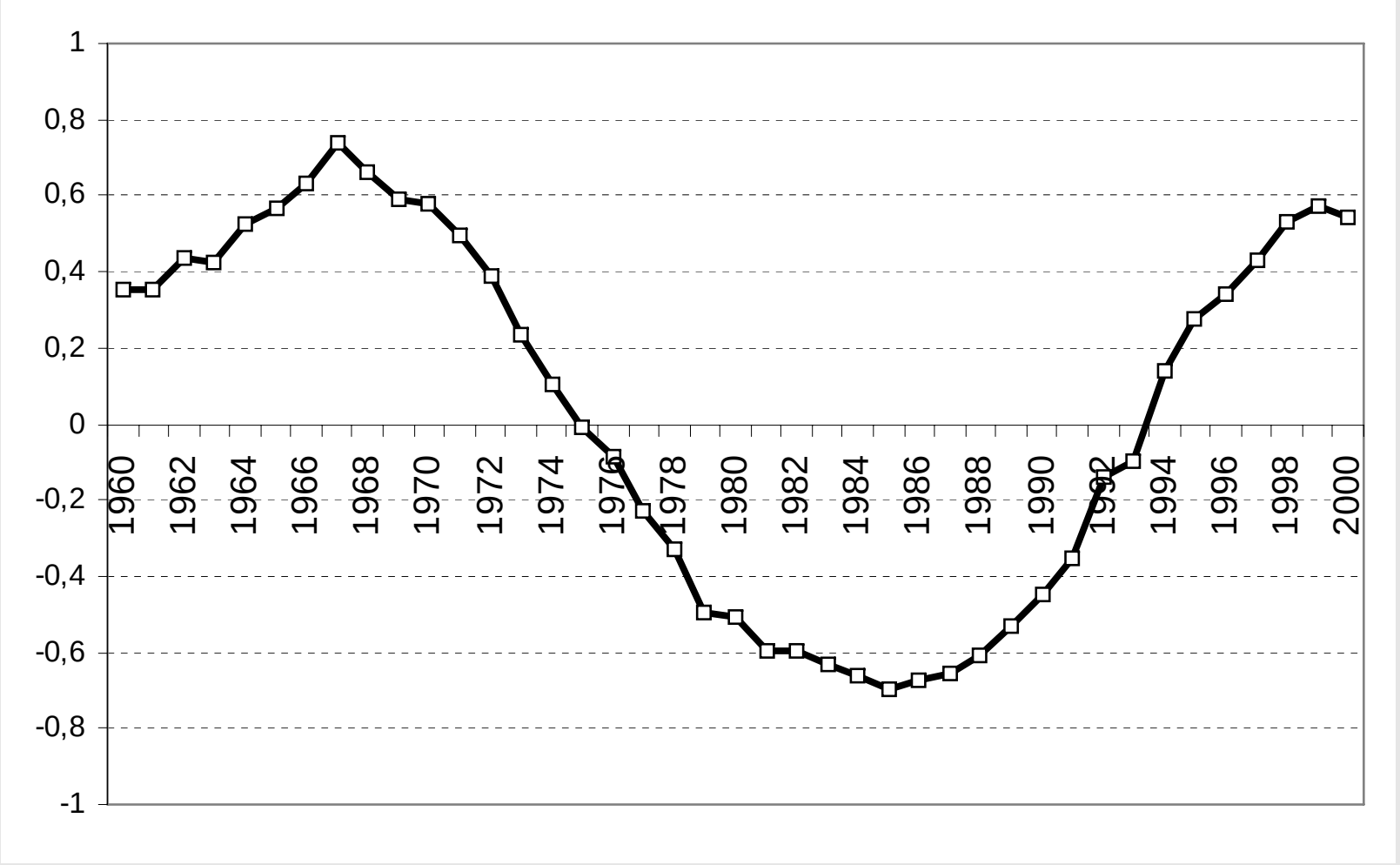
- **Countries of the Council of Europe** (38 countries)
- Time series from **1960-2003**
- **TFR**

  key fertility-related demographic behavior
- **MAFB** (mean age at first birth)
- **MAFM** (mean age at first marriage)
- **TDR** (total divorce rate)
- **EXMB** (% of extramarital births)

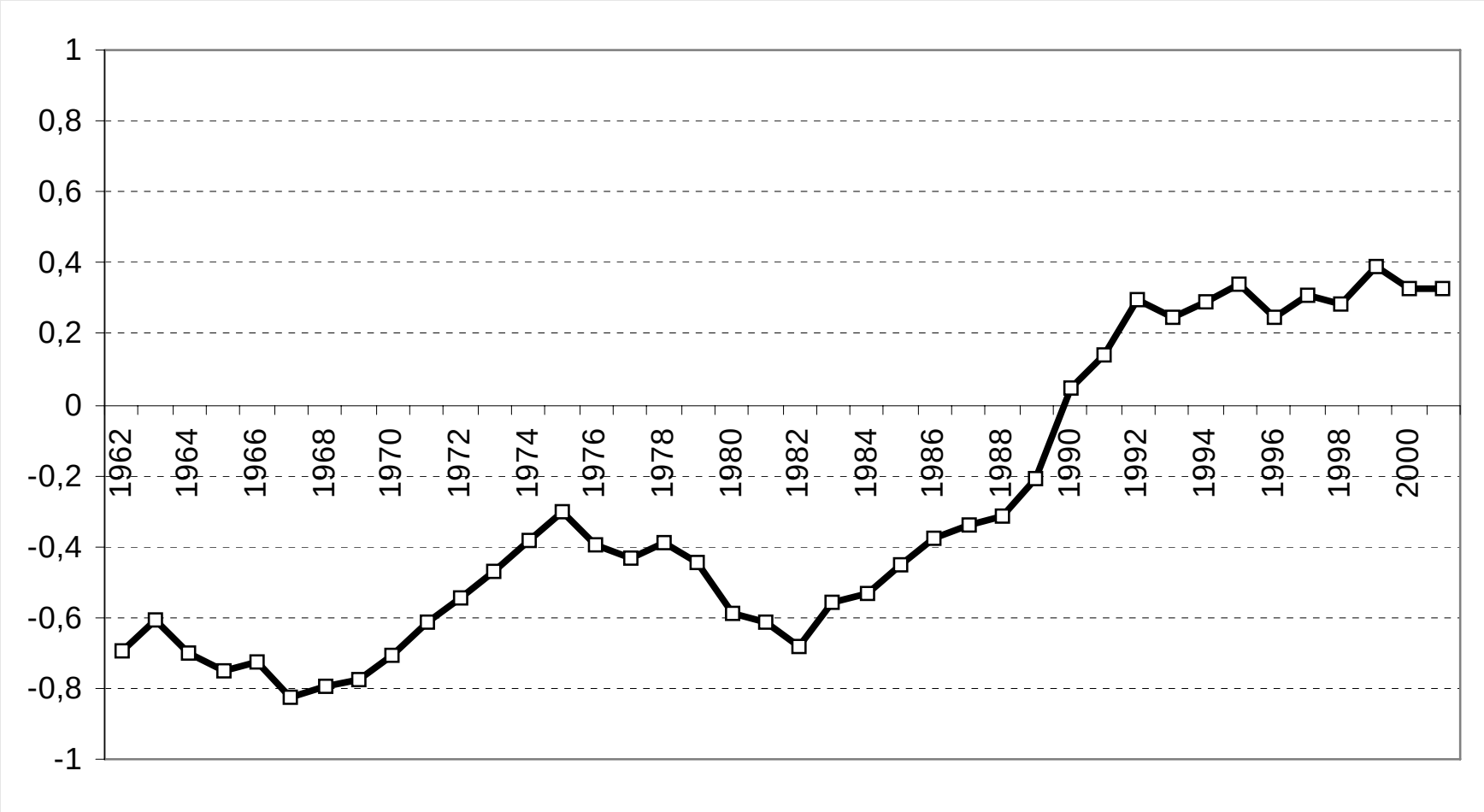
Cross-country correlation between TFR and MAFB
15 countries (CoE), 1960-2001



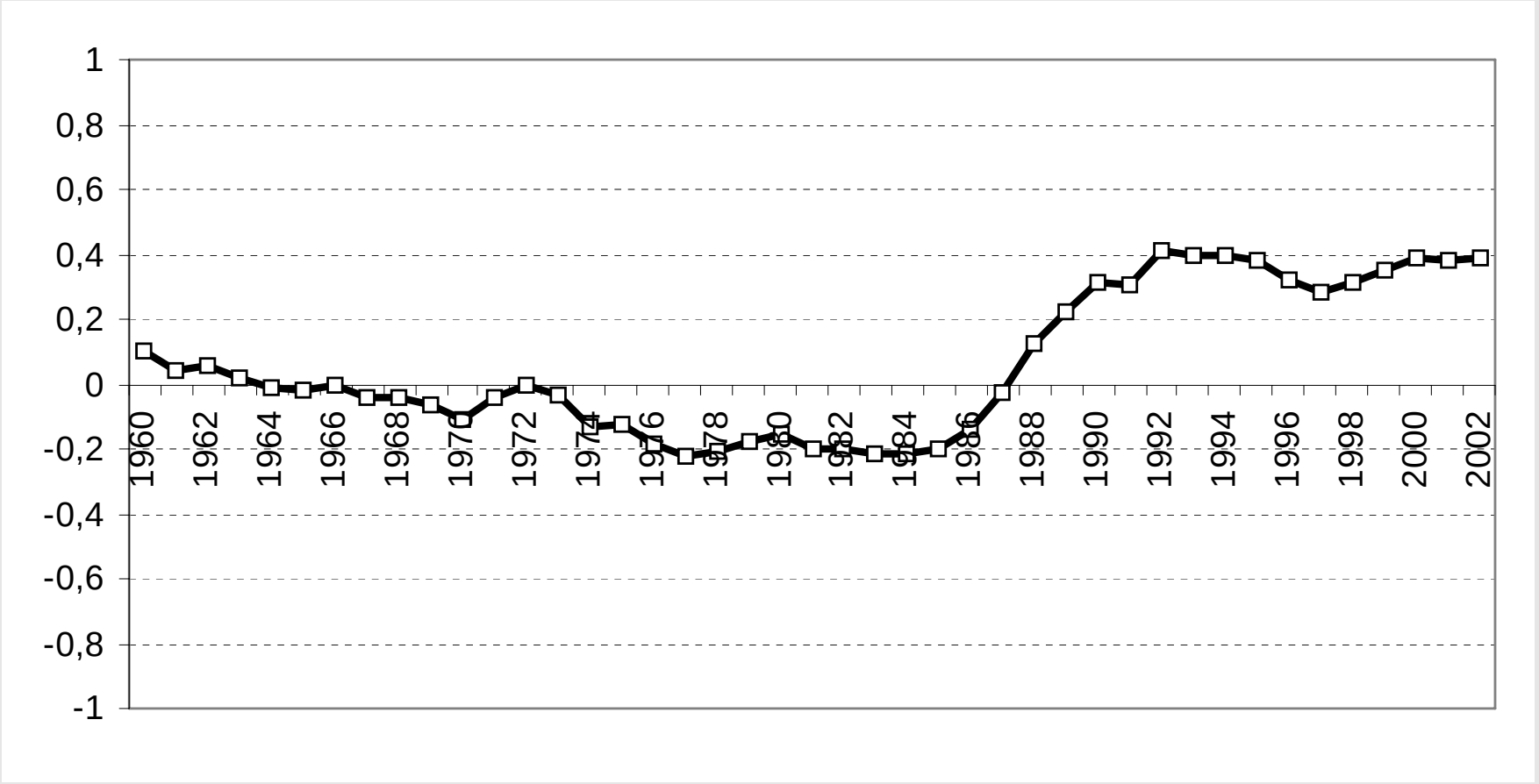
Cross-country correlation between TFR and MAFM
20 countries (CoE), 1960-2000



Cross-country correlation between TFR and TDR
21 countries (CoE), 1962-2001



Cross-country correlation between TFR and EXMB
30 countries (CoE), 1960-2002



Elements that may explain change in cross-country correlation

- Unmeasured **country-specific factors**
- **Country** and **time heterogeneity** in the magnitude of the negative time-series association between TFR and key fertility-related demographic behavior

3. METHODOLOGY

Methods

- Pooled cross sectional time series
- Critical assumption using OLS: "**pooling**"

$$Y_{it} = X_{it}^{'}\beta + \varepsilon_{it}, \qquad i = 1,\ldots,N;\ t = 1,\ldots,T$$

Temporal and spatial heterogeneity

- Fixed country effects

$$Y_{it} = X'_{it}\beta + \nu_i + \varepsilon_{it}$$

→ Focus on within country variation
→ Coefficients represent a cross-country average of the longitudinal effect

- Fixed country and time effects

$$Y_{it} = X'_{it}\beta + \nu_i + \gamma_t + \varepsilon_{it}$$

4. RESULTS

comparison of **alternative estimation methods**, TFR & MAFB

	BE	FE	RE
MAFB	-0.049	-0.237***	-0.220***
Const.	3.174 ***	7.768***	7.352***
R-sq.	0.177	0.177	0.1773
F(df,n)	1.35	316.14***	
Wald			291.60***
Chow		26.50***	
Breusch Pagan			971.14 ***
Hausman	18.05***	24.72 ***	
Rho		0.978	0.978
Baltagi-Wu LBI		0.149	0.149
Wooldridge		299.835***	

comparison of **alternative estimation methods**, TFR & MAFB

	FE Prais-Winsten
MAFB	-0.180***
Constant	6.908***
R-sq.	0.717
Wald	143.53***

Range of MAFB: min = 21.89 max = 29.00 diff = 7.11 * beta = -1.28

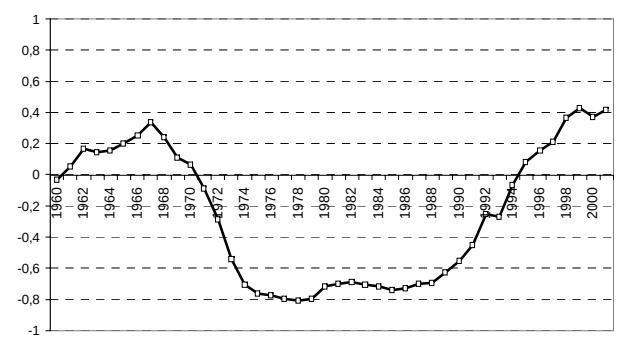
Range of TFR: min = 1.09 max = 4.11 diff = 3.02

Effect of **MAFB and its time interaction on fertility**

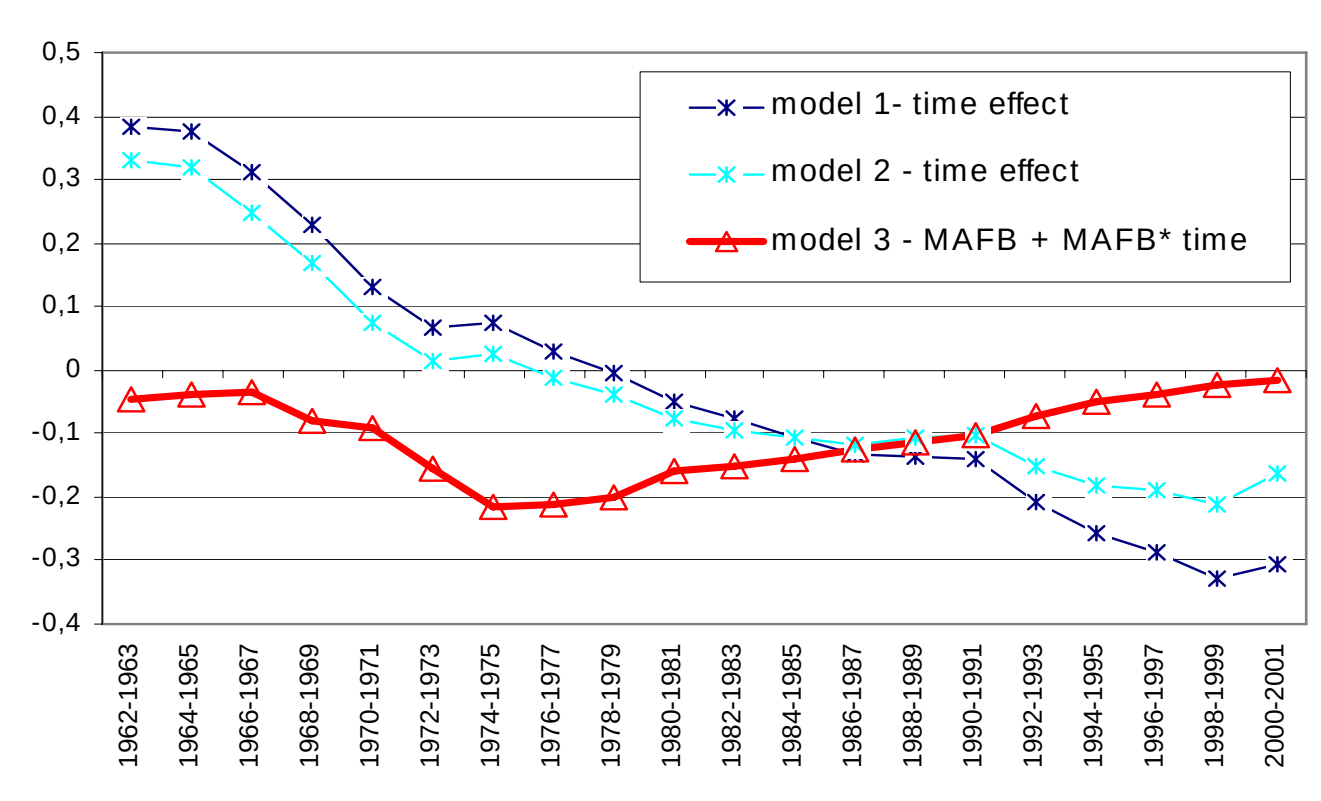
	model 1	model 2	model 3	
			main effect	MAFB*time
MAFB		-0.099 ***	-0.102 ***	
1960-61	+	+	-	+
1962-63	+	+	-	+
...	...			
1978-79	-	-	+	-
...	...			
2000-01	-	-	-	+
constant	1.968	4.407	4.455	

independent time effect that changed sign around late 70s

the negative effect of MAFB on TFR became smaller over time



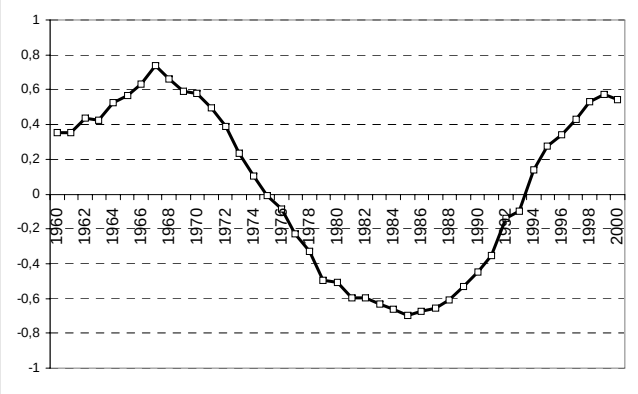
Effect of MAFB over time



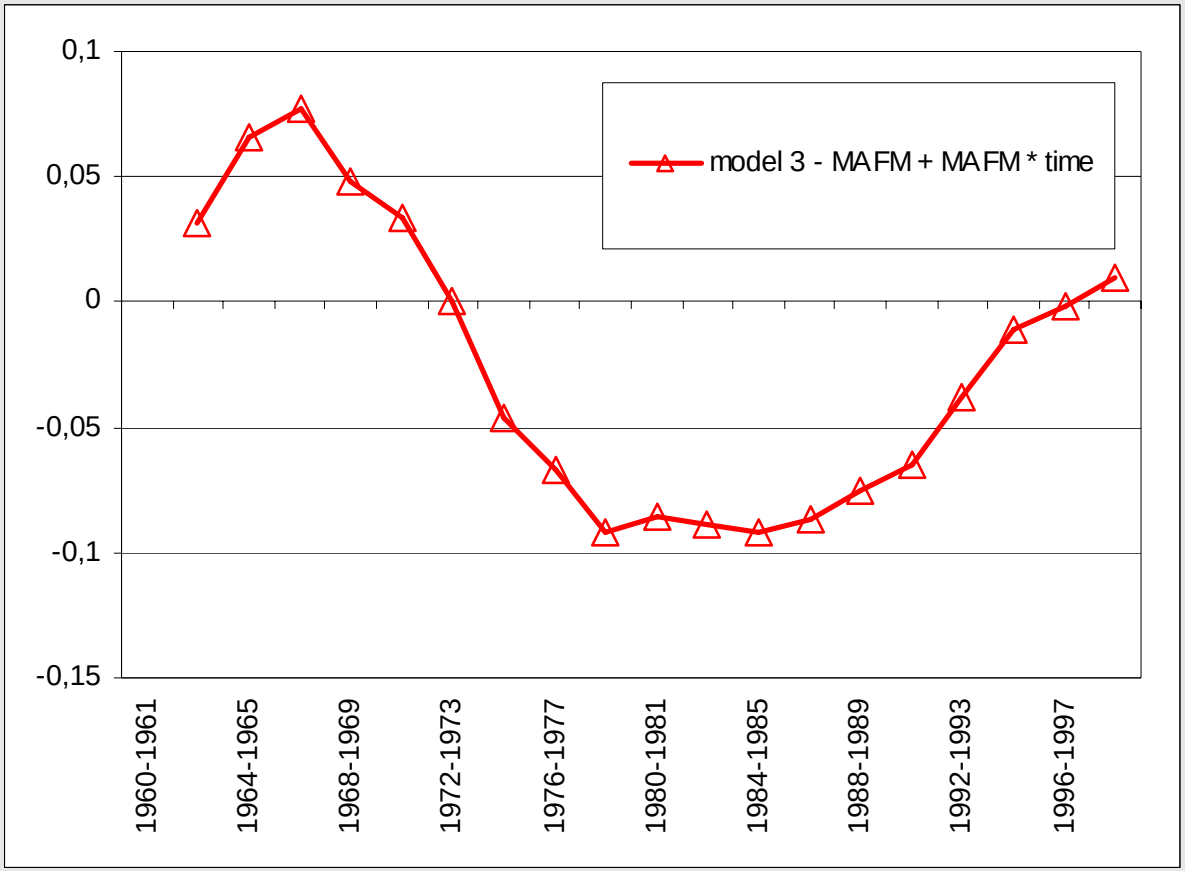
FE Prais-Winsten for **MAFM, TDR** and **EXMB**

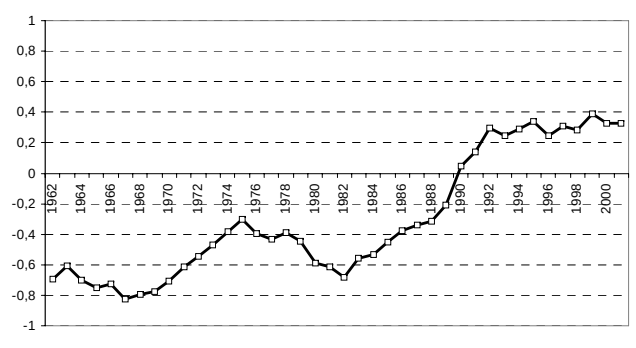
	MAFM	TDR	EXMB
Beta	-0.097***	-1.402***	-0.025***
Constant	4.357***	2.279***	2.483***
R-sq.	0.679	0.548	0.6815
Wald	180.20***	242.31***	337.87***
Min	21.1	0.0003	0.99
Max	29.7	0.5494	65.21
Diff * beta	- 0.837	-0.771	-1.606
TFR min	1.09	1.09	1.09
TFR max	3.23	3.67	4.17
TFR diff	2.14	2.58	3.08

.... adding time interactions (model 3)

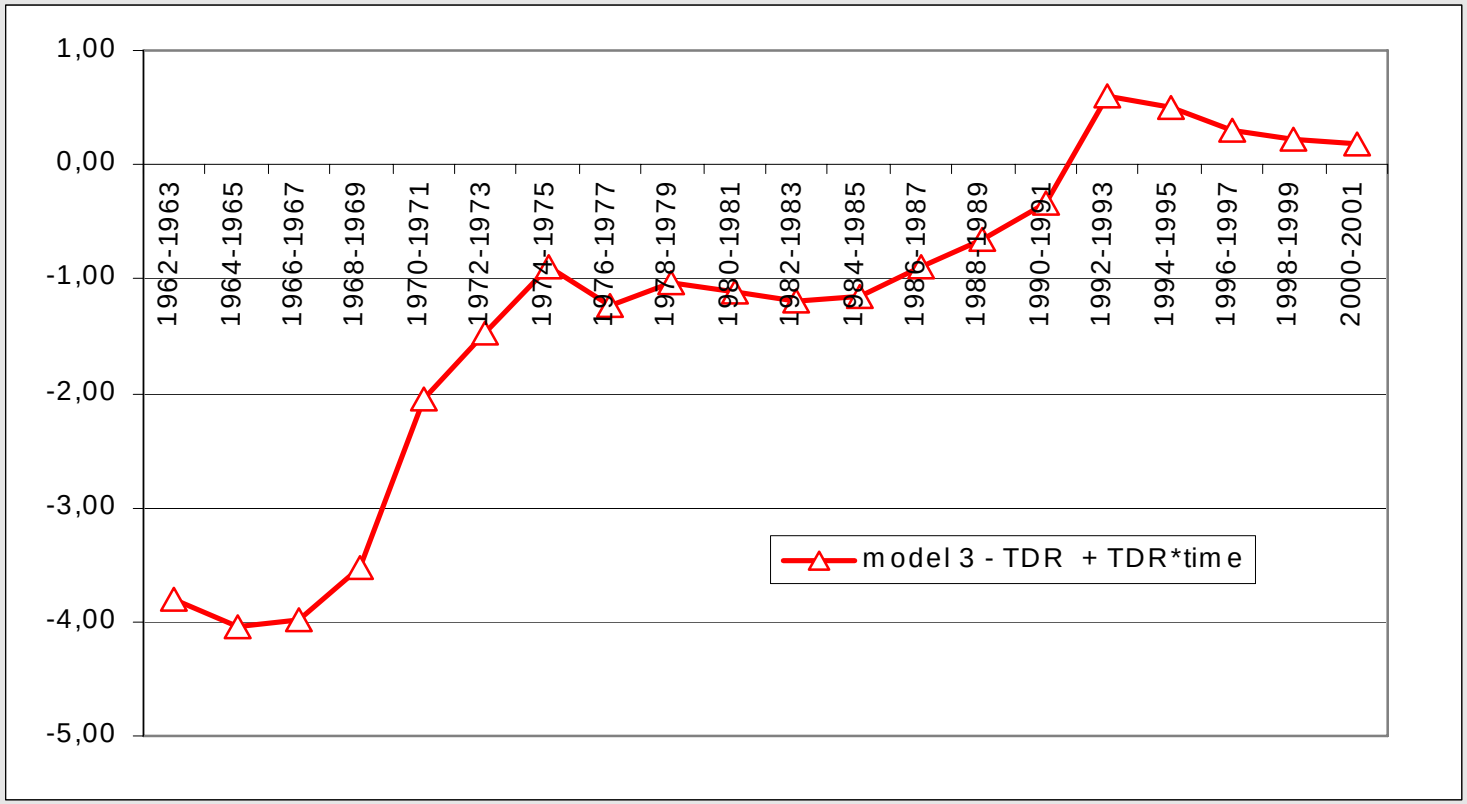


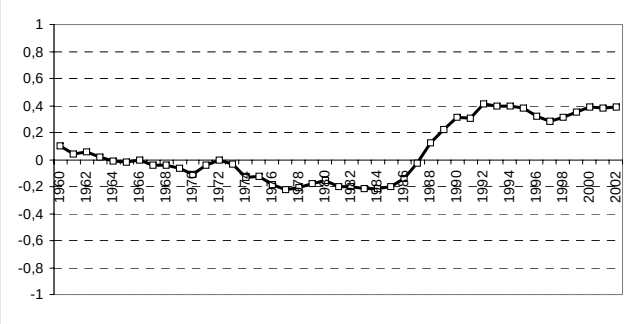
Effect of MAFM over time



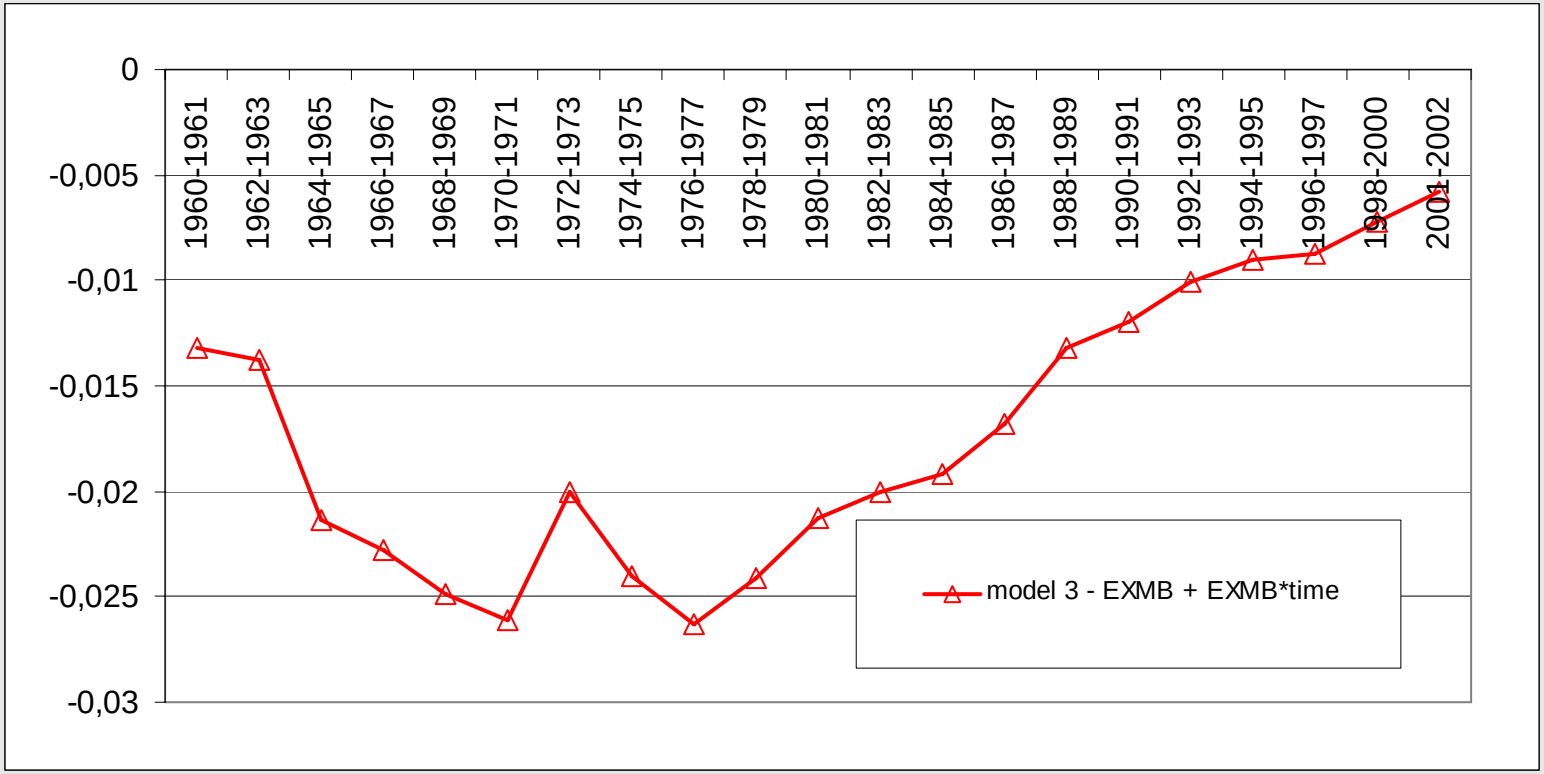


Effect of TDR over time





Effect of EXMB over time



5. SUMMARY

- There is no positive correlation between MAFB, MAFM, TDR, and EXMB and TFR when controlling for country and time heterogeneity

  Remark: We found similar results for FLP.

- Empirical findings reveal substantial differences in the effects of MAFB, MAFM, TDR, and EXMB on TFR across time.
- Initial increases in MAFB, MAFM, TDR, and EXMB lower TFR, but continued increases have a progressively less negative effect.
- Effect of TDR even gets positive.

At least at the macro-level the postponement of key fertility related demographic events will have a declining negative or insignificant impact on fertility; this holds particular in countries that have adjusted their social, family and labour market policies accordingly.

- → Policies aimed at increasing TFR should take other demographic developments into consideration.
- → Our research indicates that policies supporting traditional family model are misplaced.
- → Methodological note: the puzzle of why the micro and macro evidence run in opposite directions could be explained by the interaction of individual attitudes and social externality effects (cf. Joost de Laat and Almudena Sevilla Sanz 2005)!

Further research:

- Age-specific effects of X on TFR
- Consideration of effects of indicators from the labour market, educational indicators, and social policies on TFR and other key fertility-related factors over space and time.

END