Economic Recession and First Births in Europe: recession-induced postponement and subsequent recuperation of fertility in 14 European countries, 1970-2005.

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Abstract

The economic recession that emerged in 2008 has raised further interest in the effects of economic recession on tempo and quantum of fertility. A review of the literature suggests that unemployment and consumer sentiment reflect the impact of recession more closely than general indicators as GDP, that unemployment is strongly related to postponement of first births and that the effects of recession vary in terms of gender, age and socio-economic position. The decline of period fertility levels following recession is routinely interpreted as a short-lived effect on the tempo of fertility that has little or no implications for fertility quantum in the long run. However, research actually distinguishing the effects of recession on tempo and quantum of fertility is currently lacking. Using data from the European Social Survey, this paper analyses the impact of variations in macro-level unemployment rates on first births hazards in 14 European countries between 1970 and 2005. The results provide empirical support for recession-induced postponement of first births at short lags, but also of recuperation of fertility at older ages and considerably longer time-lags. The paper further explores variation of these effects between countries and by socio-economic position of individuals.

1. Introduction

The economic crises that emerged in 2008 and that developed into a recession by 2009 gave rise to speculations about the possibility of a recession-induced baby bust in countries affected by the economic downturn, thus raising interest in the short-term and long-term effects of economic recession on fertility levels in developed countries. In a recent review of the literature on this subject, Sobotka et al. (2010) identify different so-called pathways through which variation in economic context is likely to delay family formation and fertility. These pathways include rising unemployment and falling employment stability, rising uncertainty about the future, changing housing markets, but also prolonged enrollment in education and delayed union formation. Although the empirical literature thus provides evidence of economic recession affecting individuals at different stages in the life-course, it is often unclear whether adverse economic conditions merely affect the timing of fertility as a result of temporary postponement in family formation with postponed births being effectively recuperated at a later stage in the life-course or whether economic recession negatively affects completed fertility of the generations considered. This paper addresses the latter issue and adds to the literature on the effects of recession on family formation by distinguishing short-term and long-term effects of variation in economic context on first birth hazards in Europe between 1970 and 2005. The paper further uses time-varying individual-level information on entry into the labor market and entry into first cohabitation to control for intermediate variables that link macro-level variation in economic context to individual-level fertility outcomes. Finally, consistent with the differentiated effects of economic context on fertility documented in the literature, the analysis explores variation in the effect of economic recession on both postponement and recuperation of first births in terms of individual-level characteristics and macro-level context.

The paper is structured as follows. Section 2 summarizes the results on the effects of economic recession on events in the life-course. Particular attention is paid to the variation of such effects in terms of age, gender, educational level and societal context. Section 3 translates the main conclusions of the literature review into a set of research questions on recession-induced postponement and recuperation of first births that will guide the analysis and model specifications in subsequent sections. Section 4 discusses the data, provides a review of individual-level and macro-level indicators used in the models and comments on the random effects-models used for the analysis. Section 5 presents the results of the study and distinguishes two sets of analyses. The postponement models consider the

effect of variation in economic context on first birth hazards a short very short time-lags (typically 1 year), whereas the recuperation models test the effect of variation of economic context on first birth hazards at much longer time-intervals using time-lags up to 10 years. Both sets of analyses explore variation of the macro-level effects by age, gender, educational attainment as well as variation of these effects between countries. Finally, section 6 discusses the results of this study in view of the existing literature and summarizes the main conclusions.

2. Economic context and fertility outcomes

Stable employment, relatively high income and reasonable housing are often considered to be the key prerequisites for family formation and fertility in contemporary Europe (Lappegard & Ronsen, 2005; Sobotka, Skirbekk, & Philipov, 2010). Given the rising educational attainment and labor force participation of women over the last few decades, high fertility has also become increasingly associated with social policies that affect the opportunity costs of childbearing by providing access to provisions that improve the work-life balance and reduce the incompatibility between women's roles in the family system and individually-oriented institutions such as the educational system and particularly the labor market (McDonald, 2000). Economic recession – being typically associated with increasing unemployment and employment instability, increased uncertainty and reduced or even reversed income growth – touches directly on both income and the opportunity costs associated with childbearing and is therefore expected to cause temporal variation in fertility outcomes. In a review of the relevant literature, we focus specifically on the relation between income, opportunity costs and childbearing as it provides the key to understanding not only the impact of the varying economic context on fertility outcomes, but also variations in the sign and strength of this effect in terms of age, gender, educational level and societal context. We also draw attention to the intermediate factors in the relation between economic context and fertility behavior, such as union formation and possibility to establish and independent household. Before turning to opportunity costs, however, we briefly consider enrollment in education as this constitutes one of the pathways through which the economic context is likely to have a long-term impact on the tempo and quantum of fertility.

- *Enrollment in education, recession and fertility*

Education is considered to have a multifaceted impact on fertility outcomes where a distinction can be made between the effect of educational enrollment on the one hand, and the long-term effects related to level and field of education on the other (Lappegard & Ronsen, 2005). The

'enrollment'-effect refers to the fact that being in education significantly reduces the rates of entering a union, getting married or entering parenthood compared with non-students (J. M. Hoem, 1986). Apart from the effect of educational activity, both the level and field of education are assumed to be correlated with a variety of factors likely to have longer-term effects on fertility outcomes such as value orientations and choice of household type (Lesthaeghe & Van De Kaa, 1986), fertility preferences (Van De Kaa, 2001; Van Peer, 2008), career tracks and labor market opportunities, as well as income trajectories (Becker, 1981; Liefbroer & Corijn, 1999).

Sobotka et al. find that economic downturn is likely to prolong time in education and thus delay childbearing (Sobotka, et al., 2010). Lacking employment opportunities, adolescents may continue education as the value of human capital increases in a competitive labor market and education reduces both the risk of unemployment and employment instability. Particularly the expansion of tertiary education is likely to have both short-term and long-term effects on the timing of births. On the short-term perspective the cultural incompatibility between the roles of student and parent will reduce births hazards for the duration of enrollment in education. In the long run, however, particularly the orientation of adolescents to career-paths typical of the higher educated is likely to entail more sizeable delays in family formation as higher educated generally postpone family formation until a stable position in the labor market been established (cfr. infra). With the higher educated typically postponing the transition to parenthood well into their late twenties and early thirties (see Neels & De Wachter, 2010 for an illustration of educational differentials in the timing of fertility for Belgium), it is evident that the effect of recession-induced enrollment in higher education on fertility may have a significant effect on births hazards for a time-lag that exceeds the actual duration of enrollment in education by several years.

- *Education, opportunity costs and fertility*

Theory on the impact of income and opportunity costs on fertility behavior over the last few decades has revolved to a considerable extent around Becker's new home economics. At the core of Becker's argument is the household production model where household members purchase goods from the market subject to a budget constraint and combine these with time of household members to produce commodities such as children from which household members derive utility. An increase in the price of goods provides an incentive to produce less of those commodities for which these goods constitute an important input. According to Becker, the rising educational attainment of women has increased their earning potential,

leading in turn to higher participation in the labour force. As the cost of time spent on nonmarket activities increases, the relative cost of children increases as well, thus reducing the demand for children (Neels, 2006). Because these opportunity costs are considered to be more sizeable among the higher educated, the effect of education on fertility is assumed to be negative. On the other hand, the income effect associated with higher wages may well outweigh substitution effects and increase fertility, leading to a positive effect of education on fertility. The effect of education thus depends on the compatibility of labour force participation and family formation the compatibility of these roles affects the balance of income effects and opportunity costs.

The explanation of macro-level fertility trends in Western countries offered by Becker's economic reading has not remained uncontested and a number of restrictive assumptions have been challenged as a result. Liefbroer and Corijn (1999) consider the static view on the incompatibility of family life and labour force participation to be the main factor limiting the validity of the argument from being a more general explanation of the relation between educational attainment and family formation. Based on a review of the literature they suggest that the relation between labour force participation, opportunity costs and family formation is not only contingent on human capital or educational attainment, but also on age, gender, the event in the life-course considered and the societal context in which family formation takes place. In our view, these contingencies also prove particularly useful to map the effects of economic recession on fertility outcomes.

- *Income effects, opportunity costs and gender*

Variation of the relationship between income, opportunity costs and demographic outcomes in terms of gender is related to gender roles and particularly the gendered division of labour in the family. As family formation is more likely to reduce the time spent on paid labour by women than men, an income effect is assumed to prevail in case of men, whereas opportunity costs are assumed to outweigh income effects in the case of women. Hence, the effect of human capital on fertility is assumed to be negative for women, whereas a positive effect is likely to emerge for men. Because entry into cohabitation or marriage is less likely to raise compatibility issues with labour force participation than entry into parenthood, the negative effect of human capital is further assumed to be more pronounced in relation to fertility decisions compared to other events.

The gendered impact of income and opportunity costs thus suggests that increasing unemployment and employment instability associated with economic recession may also translate into a gendered response to

variation in economic context. Recession adversely affects the income position of men in their role of breadwinners, thus negatively affecting family formation in times of economic downturn and giving rise to a procyclical relation between economic context and fertility levels. For women, on the other hand, reduced employment opportunities may well reduce opportunity costs and thus increase fertility, giving rise to weaker procyclical or even a counter-cyclical relation between economic context and fertility levels.

Although literature provides some evidence of high unemployment benefits enhancing birth hazards (Vikat, 2004) and unemployment giving rise to higher second and third birth hazards in Norway (Kravdal, 2004), empirical evidence has granted little support for theories suggesting a counter-cyclical relationship between economic trends and fertility (Sobotka, et al., 2010). Most research typically suggests a procyclical relationship with economic recession entailing a decline of period fertility levels in the years immediately following the economic downturn. Although the procyclical character of the relationship between economic trends and fertility may point in the direction of preponderance of the income effect on fertility among men, the definition of opportunity costs in terms of (limited) forgone earnings during the economic downturn is probably too limited as the uncertainty associated with economic recession regarding long-term career prospects and income trajectories is ignored. Put differently, the loss earnings as a result of having children may be reduced during recession (i.e. reduced opportunity costs), but this effect is unlikely to prevail if having children too early may hamper future career development and long-term income and career development.

- *Opportunity costs, career paths and the timing of fertility*

Becker's view of changing fertility patterns focuses predominantly on the level of fertility and has remained somewhat agnostic of timing issues (Lappegard & Ronsen, 2005). In addressing the problem of causal ambiguity between female employment and delayed childbearing, Blake and Ní Brolcháin already stated that, given the known compatibility issues in this area, decisions concerning each of these activities are almost certainly undertaken in the context of a decision about the other (Blake, 1965; Ní Brolcháin, 1993). As a result, women may well adopt specific strategies aimed at combining labour force participation and family formation throughout the life cycle. Rather than taking decisions sequentially, women may attempt to accommodate work participation and family formation to each other by choosing different modes of combining them: by accelerating childbearing, foregoing the labour force in the interim, but returning soon after completion, or, maintaining a greater

attachment to the labour force by working between births rather than having a longer spell out of the labour force for childbearing (Neels, 2006). Liefbroer and Corijn (1999) suggest that higher educated people are more likely to enter long-term career tracks where the increase in earnings is gradual, because age and experience are important determinants of the wage rate. This combination of factors makes it in turn unlikely that highly educated women will have children early in their careers as this would presumably hamper their prospects of entering career tracks typical for higher educated people (Liefbroer & Corijn, 1999). Hence, higher educated women are assumed to postpone childbearing up to a point where they consider themselves to be sufficiently established in a career track so that taking a temporary break from the labour market is also considered less damaging for future career development (Kreyenfeld, 2000). Similarly, Lappegard and Ronsen (2005) state that for women in Norway, who usually return to work when their youngest child is quite small, it has become increasingly important to get established in the labour market before becoming a mother. Given these considerations, we thus expect higher educated women to delay parenthood after graduation until some foothold on the labour market has been gained. As such job opportunities are determined by economic conditions, particularly for younger people entering the labour market, we expect higher educated women to further delay childbearing in periods of adverse economic conditions (Neels, 2010; Sobotka, et al., 2010).

Studies relying on aggregate-level measures of economic recession and fertility as well as results of micro-level research seem to grant support for the idea that reduced employment opportunities and uncertainty about longer-term prospects constitutes an important pathway through which the economic contexts affects timing of fertility. At the macro-level, measures of unemployment and consumer confidence have been found to reflect the impact of recession on fertility outcomes more closely than more general indicators as GDP decline (Sobotka, et al., 2010). Similarly, micro-level studies show that variation in aggregate-level unemployment rates negatively affect birth hazards (Adsera, 2005; B. Hoem, 2000; Kravdal, 2002). Research combining the effects of unemployment at the individual-level and aggregate-level further indicates that the effects of the latter persist after controlling for unemployment spells at the individual-level, suggesting that more general perception of economic uncertainty (employment instability, potential downward income mobility,…) play an important role in establishing the relationship between economic conditions at the aggregate-level and fertility outcomes at the individual-level.

- *Opportunity costs, income and societal context*

The effect of economic context on fertility outcomes through its impact on income and opportunity costs is in several ways contingent in terms of societal context. This societal context encompasses a broad range of potentially relevant policies and institutional arrangements including family benefits, availability of childcare and parental leave arrangements, housing policy, unemployment and means-tested benefits as well as policies and institutional arrangements regulating access to the labour market for young adults. In a recent literature review, Gauthier considers the effect on fertility behaviour of policies directly targeted at families with children such as direct and indirect cash transfers for families with children, means-tested child welfare benefits, maternity and parental leave benefits, as well as childcare facilities and related subsidies programs. Drawing from macro-level as well as micro-level studies, Gauthier concludes that these policies may have an effect on families but that effects tend to be small of magnitude and they may possibly have an effect merely on the timing of fertility rather than on completed family size (Gauthier, 2007). Gauthier draws attention, however, to severe limitations of the studies considered as they usually rely on global measures of family policies while failing to consider individual variations in access to, and receipt of benefits (Gauthier, 2007). As a result, Gauthier concludes that systematic knowledge on the impact of policies on fertility behaviour is still limited and calls for complex modelling of the causal relationship between policies, female labour force participation and fertility. Neyer and Andersson (2008) similarly stress the need to consider the (differential) uptake of policy measures under consideration. Although social class differences in policy response have thus received less attention in the study of policy effects on fertility, results for Belgium suggest that the uptake of arrangements such as child care and parental leave is not neutral in terms of socioeconomic background. Use of formal childcare arrangements is reported to be much lower in families at the lower end of the income distribution and higher educated women are also overrepresented in the population taking up (parental) leaves (Desmet, Glorieux, & Vandeweyer, 2007; Ghysels & Van Lancker, 2009).

Although the literature thus provides mixed results on the overall impact of policies on actual fertility behaviour, available empirical evidence suggests that policies may reinforce or even reverse the impact of economic recession on fertility outcomes. In general, the impact of education and female labour force participation is assumed to be weaker in societies where gender equity has become a dominant cultural value and in societies that provide better structural opportunities to combine work and family (Liefbroer & Corijn, 1999). In similar vein, Esping-Andersen

points out that the Nordic countries, but also France and Belgium, where social policies since the early 1970s have actively pursued the de-familialisation of care burdens (e.g. through availability of child care) have been characterised by higher fertility levels, at least from a comparative European perspective (Esping-Andersen, 1999). A comparison of patterns of fertility and labour force participation in Denmark and Germany similarly suggests that the degree to which social policy supports dual-earners in their combination of work and family, is likely to mediate the relationship between educational attainment and childbearing (Andersson, Kreyenfeld, & Tatjana, 2009). Although social democratic welfare regimes are generally considered to ease the worker-mother conflict – and thus stimulate recuperation of fertility at older ages – Neyer and Andersson suggest that the income-centred parental leave system in Sweden has put additional emphasis on establishing a secure labour market position prior to family formation, thus (unintentionally) reinforcing the procyclical character of Swedish fertility in the 1990s. In contrast to the parental leave system that reinforced the procyclical character of Swedish fertility, the introduction in the mid-1980s of a home-care child care allowance to parents who stay at home with their child under age 3 in Finland provided an attractive alternative to unemployment and shrinking employment opportunities for many women, actually giving rise to a slight increase of period fertility at the time of the economic recession in the mid-1990s. Although policies that reduce unemployment growth and make labour markets more open and flexible for young adults can be assumed to limit the adverse effects of recession on fertility, the contrasting examples from Sweden and Finland clearly illustrate that specific policies may affect the actual impact of unemployment on fertility by increasing income or opportunity costs.

3. Research questions & hypotheses

Based on the results of the literature review, the following hypotheses can formulated concerning the effect of economic recession on postponement of first births in Europe:

a) The increase of unemployment, employment instability and economic uncertainty have been identified in the literature as important pathways through which economic recession adversely affects fertility levels. With empirical evidence granting little support for theories suggesting a countercyclical relationship between economic context and fertility, we expect a negative relationship to emerge between variation in aggregate-level unemployment rates and first births hazards. As a more general indicator of economic uncertainty we furthermore expect the negative affect of macro-level unemployment rates on birth hazards to

persist after controlling for variation of unemployment spells at the individual level;

b) As the effect of unemployment on fertility has been associated with delayed entry into the labor market during periods of economic downturn, we expect the negative effect of aggregate-level unemployment rates on first birth hazards to be more pronounced among younger age-groups.

c) Economic recession is likely to differentially affect fertility outcomes of men and women as a result of the gendered division of labor within households. To the extent that men provide an important source of income to the household the income effect is expected to prevail, resulting in a negative effect of recession on fertility outcomes. As women who are more likely to (partially) retreat from the labor market as a result of family formation, recession may further reduce these opportunity costs, resulting in a weaker negative relationship between recession and fertility outcomes in case of women;

d) The negative effect of recession is further expected to vary in terms of human capital and educational level. As the highly educated are more inclined to postpone family formation until a stable labor market position has been secured, we expect recession to reinforce postponement of fertility particularly for this group as they will avoid jeopardizing entry into long-tern career tracks typical of the higher educated.

e) Although the societal context can be expected to mediate the relationship between recession and fertility outcomes, the expected outcomes are less clear. In general, we expect the effect of recession to be more pronounced in welfare states characterized by a more difficult entry into employment for younger generations and limited income protection in case of unemployment. However, even in countries that heavily support the combination of work and family such as the Nordic welfare states, the earnings-related character of family benefits may put additional emphasis on having stable employment thus reinforcing the procyclical relationship between economic context and fertility levels;

The review of the literature indicates that research distinguishing short-term and long-term effects of recession on fertility is scarce. The negative effect of economic recession on birth rates is often interpreted to reflect a shift in the timing or postponement of births whereas recuperation is implicitly assumed to take place in subsequent years when economic conditions improve. This assumption and the more general results of the literature review concerning the relationship between economic recession

and fertility allow us to formulate the following assumptions concerning the recuperation of fertility:

f) The assumption that fertility is recuperated as economic conditions improve suggests that the relationship between fertility at older ages and economic context continues to be procyclical. In this case we expect the negative relationship between aggregate-level unemployment rates and birth hazards to persist in the older age groups.
g) A rivaling hypothesis regarding the recuperation of fertility is derived from the literature on economic context and fertility. As unemployment and particularly delayed entry into the labor market have been found to constitute important pathways through which recession negatively affects fertility, we expect young adults to become gradually less sensitive for economic setbacks context as they move into more secure positions in the labor market, allowing the recuperation of fertility forgone earlier in the life-course. In this case we expect the procyclical relationship between fertility and economic conditions to weaken among the older age groups and a positive or compensatory relationship to emerge between birth hazards at older ages and the aggregate-level unemployment rate experienced at earlier ages. We further expect the weakening of the procyclical relationship and recuperation to be stronger in societal contexts favoring stable employment and characterized by stronger worker protection.
h) Whether fertility recuperation at older ages predominantly follows a procyclical pattern in response to current economic conditions or a countercyclical pattern in response to economic conditions experienced at younger ages, is again likely to vary in terms of social group. As the highly educated have been considered more likely to postpone fertility under adverse economic conditions because of reduced access to stable employment, we expect stronger recuperation effects to emerge for these groups at older ages.
i) Assuming young adults are able to secure a stable position in the labor market, policies and societal contexts supporting the combination of work and family are subsequently considered to further support recuperation of fertility. In such contexts we expect differentials in recuperation by social group to increase as middle- and higher classes generally benefit disproportionately from social benefits (i.e. so-called 'Matthew-effects in social policy). Although differential uptake has been relatively well documented in social policy research, the issue has received less attention so far in the demographic research on fertility (Gauthier, 2007; Neyer & Andersson, 2008). Empirical evidence does suggest however that higher educated women make more use of parental leave and formal childcare arrangements (Desmet, et al., 2007;

Ghysels & Van Lancker, 2009), whereas lower educated women combine childbearing with a more precarious relation to the labor market, partially as a result of an unmet need for childcare provisions. In contexts favoring the combined worker-parent role we thus expect stronger recuperation of fertility postponed under adverse economic conditions. As a result of differential use of such provisions in terms of gender and socio-economic position, we expect recuperation effects to be stronger among women as well as the higher educated.

j) Increased enrollment in education has been identified as one of the pathways through which economic recession induces postponement of fertility. The delay in family formation induces in this way is likely to exceed the duration of actual enrollment in education as human capital accumulation is further associated with an orientation toward career-paths typical of the higher educated. Considering the average time-lag between enrollment in tertiary education and entry into parenthood, the time-lag between recession induced enrollment and subsequent recuperation of first birth may range up to 10 years, assuming enrollment in tertiary education around age 18 and entry into parenthood roughly between ages 28 and 33.

4. Data & Methods

The analyses use data from the European Social Survey (ESS). The ESS is a general purpose, repeated cross-sectional survey that is currently organized in over 30 countries across Europe. The survey covers a broad array of subjects with the aim to chart and explain the interaction between Europe's changing institutions and the attitudes, beliefs and behavior of its diverse populations. The analysis uses data from the third round of the ESS collected in 2006 which contained a rotating demographic module providing detailed information on the life course, the timing of key life-events, attitudes concerning ideal ages to experience such events, as well as youngest and oldest ages considered appropriate to experience given events. The analysis uses data on the first birth interval – i.e. the time from entry into the risk set at age 15 until first birth or censoring at age 49 - for 14 countries in Europe: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The individual-level data drawn from the ESS are complemented with aggregate-level time-series data on unemployment rates drawn from the Organization for Economic Cooperation and Development (OECD, 2010)

- *Individual-level covariates*

Consistent with the research questions specified in section 3, following individual-level covariates are included in models of the first birth hazard: i) age, ii) gender, iii) educational level, iv) duration since entry into the labor market and v) duration since entry into first cohabitation.

The *educational variable* used in the analysis is based on the number of years of full-time education completed. Although the ESS reports the highest level of education actually obtained, international comparison of educational attainment is not straightforward as classifications of educational levels vary substantially between countries in Europe. As a result, the number of years in full-time education was used to construct an indicator of educational attainment consisting of four categories that represent the quartiles of the distribution: i) 0-10 years of full-time education *(lowest quartile)*, ii) 11-12 years of full time education *(middle-lower quartile)*, iii) 13-15 years of full-time education *(middle higher quartile)* and iv) 16 years of full-time education or longer *(highest quartile)*. The first quartile has been used as the reference category throughout the analysis.

The variable measuring *duration since first cohabitation* measures the duration in period difference since the first cohabitation with a partner or spouse for a period of 3 months or more. Since first births are more frequent during the first years of cohabitation – resulting in a skewed distribution of first birth hazards in terms of the duration of cohabitation – the variable is included in the models as a time-varying categorical covariate distinguishing five categories: i) never cohabited or year of first cohabitation, ii) 1-5 years since first cohabitation, iii) 6-10 years since first cohabitation, iv) 11-15 years since first cohabitation and v) 16 years or more since first cohabitation. The first category is used as the reference category throughout the analysis.

Duration since *entry into the labor market* measures the number of years in period difference since the first entry in paid employment or paid apprenticeship of 20 hours or more per week for a period of at least three months. Based on the curvilinear relationship between birth hazards duration since first employment, a time-varying categorical variable was included into the models that distinguishes six categories: i) never had paid employment or employed for less than three years, ii) 5-9 years since first employment, iii) 10-14 years since first employment, iv) 15-19 years since first employment, v) 20-24 years since first employment and vi) 25 years or more since first employment. The first category is used as the reference category throughout the analysis.

- *Macro-level variables*

The literature on the effects of economic recession on fertility has identified variation in aggregate-level unemployment rate as a relevant indicator of the impact of economic context on birth hazard (Adsera, 2005; Adsera & Menendez, 2009; Van Giersbergen & De Beer, 1997). Hence, the individual level data from the ESS have been complemented by contextual information on unemployment drawn from the OECD (OECD, 2010). For the countries considered, the OECD-database provides time-series of the unemployment rate, calculated as a percentage of the civilian labor force, between 1956 and 2005. Given the length of the time-series available, the effect of macro-level unemployment rates on first birth hazards was estimated with lags varying from 1 to 10 years, given that the temporal scope of the hazard models has been restricted to the 1970-2005 period.

- *Model specifications*

The analysis uses random-effects complementary log-log models of the first birth hazard of men and women between ages 15 and 49 in the 14 EU-countries considered. All models specify a cubic baseline hazard function in terms of age as a fixed effect. To allow different age schedules of fertility by age for men and women, an interaction between gender and the baseline hazard function has been included throughout.

Throughout the period considered, fertility schedules by age have been subject to considerable variation over the time-period considered (Frejka & Sardon, 2006). Postponement of parenthood has resulted in a substantial decline of fertility rates at younger ages, later followed by an increase of fertility in the older age-groups. Moreover, the onset of fertility postponement itself is subject to substantial variation among countries in Europe (Council of Europe, 2005; Sobotka, 2004). Generally speaking, the trend of fertility postponement was initiated in the Nordic countries and subsequently emerged in Western-European countries, Southern European countries, and more recently Eastern-Europe (Council of Europe, 2005). To allow sufficient flexibility to the models of first birth hazards to accommodate such trends, a random-effect was included allowing deviations from the fixed-effects baseline hazard function by i) five-year age-group, ii) five-year time period between 1970 and 2005, and iii) country.

Given the fixed-effects baseline hazard function and the random deviations from this pattern by age, year and country, two types of models have been estimated, focusing on short-term and long-term effects of economic context on first births hazards respectively. The first set of models focuses on the *short-term* effect of variation in aggregate-level

unemployment rates on first births hazards between ages 15 and 49. In these models the macro-level unemployment rate is included with a lag of one-year. The age variable has been centered at age 15. Consistent with the hypothesis formulated in section 3, separate models are estimated to allow variation in the macro-level unemployment effect by age, gender, level of education and societal context. Subsequent models estimate the effect of macro-level unemployment on first birth hazards controlling for level of education, duration since entry into first cohabitation and duration since entry into first job.

The second set of models focuses on *long-term* effects of variation in macro-level unemployment rates on first birth hazards, allowing time-lags from 2 years up to 10 years. For these models, the analysis is restricted to the 30-49 age-group and age has been centered at age 30 as a result. Similar to the first set, separate models are estimated to allow variation in long-term effect by age, gender, level of education and societal context. Subsequently, additional controls are added for level of education, duration since entry in first cohabitation, duration since entry into first job and also current economic conditions.

5. Results

Table 1 summarizes the results of the models estimating the effect of variation in the macro-level unemployment rate on first birth hazard in the subsequent year (i.e. aggregate-level unemployment rate has been lagged by one year).

Model 1 presents the model with the fixed-effects baseline hazard function allowing separate cubic functions by age and a random-effect allowing deviations from this pattern by five-year age-group, five-year time-interval and country. The results indicate that baseline hazard functions differ significantly by gender. Also the random-effect is significant, indicating that deviations from the fixed-effects baseline function by age-groups, time-period and country account for approximately 7 per cent of the variation in first births hazards.

The aggregate-level unemployment rate is included in model 2. The effect of the aggregate-level unemployment rate on first birth hazards is allowed to vary by five-year age group. A significant procyclical relationship between economic context and first birth hazards emerges between age 15 and 34. The relationship is more articulated, however, at younger ages, with a percentage point increase in the unemployment rate generally reducing first birth hazards by 5.5 per cent ((1-0.945)*100). Although the effect seems modest, a 10 percentage point increase in unemployment rates - as witnessed in a number of European countries between the mid-1970s and mid-1980s - reduces birth hazards in these age

groups by 43 per cent. The procyclical relationship between the unemployment rate and first birth hazards is somewhat attenuated after age 25: a 1 percentage point increase in the unemployment rate now significantly reduces first birth hazards by 4.5 per cent in the 25-29 age-group and by approximately 2.5 per cent in the 30-34 age-group. After age 35 there is no longer a significant association between first birth hazards and the aggregate-level unemployment rate. Although the random effect in model 2 is still significant, the amount of variation in first birth hazards accounted for by deviations from the fixed effects by five-year age groups-time-periods and countries has decreased to 2.7 per cent indicating that a substantial part of the variation in birth hazards at this level during the period considered has been associated with variations in economic context.

Models 3a and 3b provide the age-structure of the aggregate-level unemployment level on first birth hazards for men and women separately. For women, a significant procyclical relationship emerges between ages 15 and 29, whereas a negative association is found over a larger age-interval in the case of men, with the aggregate-level unemployment rate adversely affecting birth hazards between ages 15 and 34. Comparing the magnitude of the effect by gender in the 15-24 age bracket indicates that the negative association between economic context and birth hazards is more pronounced among men: a 1 percentage point increase in the aggregate-level unemployment level decreases birth hazards 5.2 per cent among men between ages 15 and 19, compared to 4.4 per cent among women in the same age-group. The gender differential in the unemployment effect is also somewhat more articulated in the 25-29 age-group, with a one percentage point increase in the aggregate-level unemployment rate being associated with a reduction of first birth hazards by 5.2 per cent, compared to 4.3 per cent for women. Also after age 30, the effect of variation in aggregate-level unemployment levels continues to affect birth hazards of men, but is no longer significant among women.

Models 4a-d reflect the results for educational groups taken separately. Consistent with previous models, a significant procyclical relationship emerges between aggregate-level unemployment rates and first birth hazards between ages 15 and 34, regardless of the educational level considered. The magnitude of the effect is, however, subject to variation in terms of educational level. Particularly among the younger age-groups, a 1 percentage point increase in the aggregate unemployment rate is associated with a larger negative effect as the level of education increases. In the 20-24 age-group, the effect of increasing unemployment is associated with a reduction of approximately 4 per cent in the two lowest educational groups (models 4a and 4b), whereas the reduction in birth

hazards increases to 6.3 and 10.3 per cent among the higher educational groups (models 4c and 4d respectively).

The variation of the aggregate-level unemployment effect in terms of societal context is documented in models 5a-e. Five groups of countries have been considered in the analysis respectively: i) the northern-European countries (Denmark, Finland, Norway and Sweden), ii) a small set of countries from southern Europe (Spain and Portugal), iii) Western-European countries (France, Belgium and the Netherlands), iv) Anglo-Saxon countries (United Kingdom and Ireland) and finally v) a set of German-speaking countries (Austria, Germany and Switzerland). The results indicate that a significant procyclical relationship between aggregate-level unemployment rates and first birth hazards emerges in all the regions considered. Further comparison of the size of the effect indicates that the negative effect of aggregate-level unemployment on birth hazards in the 15-19 age category is most pronounced in the set of Western European countries, followed by the Nordic countries, Southern Europe, the English-speaking countries and finally the set of German-speaking countries. A similar ranking is found for the 20-24 age category, with more articulated negative effects emerging in Western and Northern Europe. In the 25-29 age category, differences between regions are smaller and the regional ranking of effects somewhat different as a result. After age 30, negative effects of the aggregate unemployment level are only significant in the set of Western European countries, the United Kingdom and Ireland.

Models 6, 7 and 8 introduce additional controls into the model for level of education, duration since first cohabitation and duration since first job respectively. Although each of these controls somewhat attenuate the effect, none of these variables is capable of explaining the negative effect of the aggregate unemployment rate on first births hazards. The negative effect of the aggregate-level unemployment rate also persists when joint controls for these factors are added to the model simultaneously (model 9). The effects of the additional covariates all run in the expected directions. Higher levels of education are associated with decreasing first birth hazard (model 6): compared to men and women with 0-10 years of full-time education, birth hazards are 4 per cent lower for men and women with 11-12 years of full-time education (difference not significant), 17 per cent lower for men and women with 13 to 15 years of full-time education and 37 per cent for men and women with 16 years of full-time education or more. Duration since first cohabitation clearly has a significant impact on first birth hazards (model 7). Compared to people who never cohabited or still in their first year of cohabitation, birth hazards are 9.5 times higher people in their first year of cohabitation with a partner, 6.8 times higher

for people who first cohabited with a partner 6-10 years earlier and 4.8 to 3.5 times higher for people who first cohabited with a partner 11-15 years earlier or more than 16 years earlier respectively. Duration since first entry into the labor market also has a significant impact (model 8), but the effect is clearly less articulated than the effect of union formation. Compared to individuals who never had a job or had their first job less than 5 years ago, first birth hazards are 45 per cent higher among individuals who first entered the labor market 5 to 9 years earlier and 49 per cent higher for individuals who had their first job 10 to 14 years before. First birth hazards decline for durations exceeding 15 years. The hazard ratio decreases to 28 per cent for individuals who first entered the labor market 15 to 19 years earlier and differentials are no longer significant for durations exceeding 20 years.

The long-term effects of variation in aggregate-level unemployment rates have been tested by using lags for the unemployment effect that range from 2 years up to 10 years in period difference among individuals aged 30 to 49. No significant relationship was found between first birth hazards after age 30 and unemployment rates 2 to 5 years earlier. Significant positive associations do emerge, however, between first birth hazards after age 30 and the aggregate-level unemployment rate 6 to 10 years earlier. The results thus support compensatory fertility behavior at older ages in response to economic conditions faced earlier in the life-course. Moreover, in contrast to the short-term effects which typically affect birth hazards in the subsequent year, the countercyclical effects in response to earlier economic conditions emerge over a longer period of time spanning several years. Table 2 explores variation of this relationship by age, gender, educational attainment and societal context for models considering a time-lag of 10 years in the effect of the aggregate unemployment level on first birth rates.

Model 11 explores the relationship between birth hazards at ages 30-49 and economic context experienced earlier in the life-course: a 1 percentage point increase in the aggregate unemployment level earlier in the life-course results in a 1 per cent increase of first birth hazards between ages 30-34 and a 3 per cent increase between ages 35-49. The model including lagged effects constitutes a significant improvement over the model excluding such effects (model 10). Moreover, the lagged effect of the unemployment rate experienced 10 years earlier in the life-course on first birth hazards between ages 30-39 remains significant when additional controls are introduced for the current economic context faced at older ages.

Models 13a and 13b document the variation by gender of the countercyclical relationship between first births hazards after age 30 and economic conditions faced earlier in life. For men a significant effect emerges only between ages 35-39, whereas for women more sizeable effects are found, affecting a larger age interval between ages 30 and 39.

Models 14a-d in turn document the variation of the effect of aggregate-level unemployment on first birth hazards by level of education. In general, a positive effect of previously experienced unemployment levels is found on birth hazards after age 30, but the effect is only significant in the age group from 35 to 39 years among lower educated individuals having completed 0-10 years of full-time education as well as individuals having completed 16 years of full-time education or more.

Regional variation is explored in models 15a-e. The results provide evidence of a countercyclical relationship between first birth hazards after age 30 and the aggregate unemployment rate lagged by 10 years for the set of Northern European countries (age-group 30-35), the set Western European countries (age-group 30-34 as well as age-group 35-39) as well as the United Kingdom and Ireland (age-group 35-39). No compensatory relationship between first birth hazards after age 30 and previously experienced labor market conditions was found in Southern European countries (Spain and Portugal) or the set of German-speaking countries.

Finally, models 16, 17 and 18 introduce additional controls for educational level, duration since first cohabitation and duration since first entry into the labor market respectively. Although each of these additional control variables somewhat reduce the magnitude of the effect, a significant positive relationship remains between ages 35-39 between first birth hazards and the aggregate-level unemployment rate experienced 10 years earlier. The positive association in the age category 35-39 also persists when joint controls for these factors are added to the model simultaneously (model 19).

6. Discussion and Conclusion

Although the economic crisis that emerged in 2008 gave rise to speculations about a recession-induced baby-bust in the countries affected by the economic downturn, it is unclear whether adverse economic conditions merely affect the timing of births or whether economic recession negatively affects completed fertility of the generations considered. Relying on micro-economic theories of fertility behavior and a number of contingencies of these relationships in terms of age, gender, educational level and societal context, we have formulated a number of research questions concerning recession-induced postponement and recuperation of fertility.

Because increased unemployment and job uncertainty as well as increasing uncertainty were identified as important pathways through which economic recession adversely affects fertility levels, we expect the negative of aggregate-level unemployment rates on first birth hazards to be more articulated among younger age-groups, men, the higher educated as well as in societal contexts that increase the short-term and long-term costs associated with unemployment, either by offering limited income protection against unemployment or by putting additional emphasis on gaining secure employment prior to family formation in view of earnings-related family benefits later in the life-course. Consistent with these hypotheses, we found a significant negative effect of the aggregate-level unemployment rate on first birth hazards between ages 15 and 34. The results thus provide evidence in favor of a procyclical relationship between first birth hazard and economic context that affects a considerable part of the reproductive life-span. The results further indicate that the procyclical relationship between first birth hazards and economic context is more articulated in the case of men, suggesting that the negative effect of recession on income or income growth prevails for this group. For women is procyclical relation between economic context and fertility is equally found, despite theoretical arguments suggesting that economic recession may reduce opportunity costs and raise fertility. Also for women, the negative impact of recession on income (growth) seems to prevail in tandem with the potential long-term opportunity cost of having children early that could reduce the probability of entering typical long-term career tracks (Kreyenfeld, 2000). In terms of societal context, a more articulated procyclical relationship was found in the set of Northern European countries as well as the set of Western European countries compared to other regions in Europe, suggesting that the additional emphasis that is put on gaining stable employment prior to family formation may well outweigh the negative effect of poor income protection against unemployment and thus reinforce the procyclical relationship between fertility and economic context (Neyer & Andersson, 2008). Finally, the negative impact of aggregate-level unemployment rates on first birth hazard was found to be resistant to additional controls for educational level, duration since entry into first cohabitation and particularly duration since first entry into the labor market. Although this result was found to be consistent with the literature, some cautionary remarks are required at this point. The two time varying control variables in the analysis merely consider first cohabitation with a partner of spouse for a period of 3 months or longer as well as first entry into a job or apprenticeship of 20 hours or more per week for a period of at least three months. In several respects, these variables lack important information that may be relevant in

accounting for the effect of the aggregate-level unemployment rate on individual-level first birth hazards: the variable on cohabitation does not consider subsequent changes in relationship status, nor does it incorporate the effect of more qualitative aspects of the relationship on first birth hazards. Similarly, the variable on first entry into the labor market does not take into account the relevant characteristics of this employment (type and duration of contract, private versus public sector, wage, benefits,…) or information on subsequent spells of unemployment. Although the effect of the aggregate-level unemployment rate is still significant controlling for these variables, it should be kept in mind that several potentially relevant aspects have not yet been measured that may be important intermediate variables in the relationships between macro-economic context and individual-level birth rates

In summary, the results provide clear empirical support to negative short-term effects of economic recession on entry into parenthood that is likely to affect period fertility levels. In line with the conclusion drawn by Sobotka et al. (2010), reducing unemployment growth and making the labor market flexible and open to young age-groups may present important pathways for policy to reduce the negative effect of recession on fertility (Sobotka, et al., 2010).

Apart from recession-induced postponement of fertility, a second set of models was estimated to explore long-term effects of economic recession on fertility. Routinely, recuperation of postponed births is assumed to take place later in the life-course under more favorable economic conditions, suggesting a procyclical relationship between economic context and fertility levels also at older ages. The results for models 1-9 for the 15-49 age interval already suggest that the procyclical relationship between economic context and birth hazards is much weaker after age 30 and generally no longer significant after age 35. The results for the models considering birth hazards between ages 30 and 49 show a positive relationships between first birth hazards and the aggregate-level unemployment rate that is lagged by an interval of 10 years, suggesting that some compensation takes place between birth hazards after age 30 and economic conditions experienced earlier in the life-course. These compensatory effects are found to be resistant to variation in economic conditions experienced after age 30 as well as a larger set of control variables. Compensatory effects were further found to be more articulated among women. Considering regional variation, a significant compensatory relationship between birth hazards and economic conditions experienced earlier in the life-course was found in Western European countries, Northern European countries as well as the United Kingdom and Ireland,

whereas these effects were absent in Southern Europe and the set of German-speaking countries, suggesting that policies supporting the combined role of worker and parent facilitate recuperation of previously postponed fertility. Finally, a cautionary remark is also required concerning the models of long-term effects of economic recession on first birth hazards. Depending on the number of individuals having their first child early in the life-course, the proportion of men and women being childless at age 30 is likely to vary substantially in terms of willingness and ability to have children. To the extent that many individuals had their first child at younger ages, the risk set after age 30 is likely to become an increasingly selective subset, resulting in lower birth hazards. Conversely, to the extent that the number having their first child early in the life-course is smaller, childless men and women at age 30 are likely to be less selective, resulting in higher birth rates. Although the results presented here provide some empirical support for compensatory fertility behavior at older ages in response to economic conditions experienced earlier in the life-course, additional controls for selectivity and unobserved heterogeneity may thus be required.

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TABLES

Table 1. Short-term effects models, EU-14, 1970-2005, Ages 15-49.

	Model 1		Model 2		Model 3a		Model 3b		Model 4a		Model 4b	
					Individual-level covariates							
Age (centered at age 15)												
. Linear	2.431	***	2.56	***	2.396	***	-		2.447	***	2.649	***
. Quadratic	.959	***	.954	***	.959	***	-		.951	***	.949	***
. Cubic	1.001	***	1.001	***	1.001	***	-		1.001	***	1.001	***
Female	9.432	***	10.08	***	-		-		12.138	***	9.317	***
Female*Age (centered at age 15)												
*. Linear*female*	.753	***	.746	***	-		2.011	***	.746	***	.776	***
*. Quadratic*female*	1.013	***	1.014	***	-		.961	***	1.011	**	1.010	-
*. Cubic*female*	.999	***	.999	***	-		1.001	***	.999	-	.999	-
Country *(Detailed country differentials omitted)*												
Education *(lower quartile is reference)*												
. Medium low												
. Medium high												
. High												
Duration since first cohabitation												
. never cohabited												
. 1-5 years												
. 6-10 years												
. 11-15 years												
. ≥16 years												
Duration since first job												
. never or <5 years												
. 5-9 years												
. 10-14 years												
. 15-19 years												
. 20-24 years												
. ≥25 years												
					Macro-level covariates							
Unemployment												
. urlag1*age1519			.946	***	.929	***	.948	***	.956	**	.978	-
. urlag1*age2024			.942	***	.944	***	.937	***	.958	***	.961	***
. urlag1*age2529			.954	***	.948	***	.957	***	.956	***	.967	***
. urlag1*age3034			.977	***	.963	***	.993	-	.974	**	.977	*
. urlag1*age3539			.997	-	.986	-	1.006	-	.994	-	1.014	-
. urlag1*age4044			1.001	-	1.007	-	.953	-	1.001	-	.985	-
. urlag1*age4549			.950	-	.999	-	.646	**	.891	-	.922	-
Unemployment												
. urlag10*age3034												
. urlag10*age3539												
. urlag10*age4044												
. urlag10*age4549												
					Model parameters							
Rho	.0686	***	.0272	***	.0418	***	.0504	***	.0196	***	.0194	***
N Person-periods	272038		188224		141342		130696		51030		60183	
Df	22		29		25		25		29		29	
Deviance (-2LL)	91075.24		90948.88				48633.36		20048.31		21420.24	
AIC	91119.24		91006.89				48683.36		20106.31		21478.25	
BIC	91350.54		91311.89				48927.88		20362.67		21739.40	

Source: European Social Survey (2006, Round 3) & OECD , calculations by author
Significance levels: NS (-), p < .050 (*), p < .010 (**), p < .001 (***)

Table 1. Short-term effects models, EU-14, 1970-2005, Ages 15-49 (continued).

	Model 4c		Model 4d		Model 5a		Model 5b		Model 5c		Model 5d	
					Individual-level covariates							
Age (centered at age 15)												
. Linear	2.746	***	2.604	***	2.489	***	2.342	***	3.257	***	2.107	***
. Quadratic	.951	***	.959	***	.957	***	.957	***	.940	***	.963	***
. Cubic	1.001	***	1.000	***	1.001	***	1.001	***	1.001	***	1.001	***
Female	7.164	***	7.014	***	8.084	***	10.24	***	24.45	***	7.583	***
Female*Age (centered at age 15)												
*. Linear*female*	.784	**	.777	**	.781	**	.744	**	.625	***	.757	**
*. Quadratic*female*	1.012	*	1.013	*	1.017	-	1.014	*	1.025	***	1.016	*
*. Cubic*female*	.999	-	.999	*	.999	-	.999	-	.999	**	.999	*
Country *(Detailed country differentials omitted)*												
Education *(lower quartile is reference)*												
. Medium low												
. Medium high												
. High												
Duration since first cohabitation												
. never cohabited												
. 1-5 years												
. 6-10 years												
. 11-15 years												
. ≥16 years												
Duration since first job												
. never or <5 years												
. 5-9 years												
. 10-14 years												
. 15-19 years												
. 20-24 years												
. ≥25 years												
					Macro-level covariates							
Unemployment												
. urlag1*age1519	.937	**	.917	**	.916	**	.935	***	.904	***	.972	-
. urlag1*age2024	.947	***	.897	***	.923	***	.950	***	.917	***	.969	**
. urlag1*age2529	.954	***	.937	***	.959	***	.937	***	.942	***	.965	**
. urlag1*age3034	.975	**	.972	**	.990	-	.981	-	.967	**	.976	*
. urlag1*age3539	.994	-	.992	-	1.021	-	1.012	-	.971	-	.972	-
. urlag1*age4044	1.016	-	.998	-	1.055	-	1.011	-	.952	-	.912	**
. urlag1*age4549	.980	-	.973	-	1.021	-	.961	-	.790	*	.844	*
Unemployment												
. urlag10*age3034												
. urlag10*age3539												
. urlag10*age4044												
. urlag10*age4549												
					Model parameters							
Rho	.0506	***	.0420	***	.0263	***	.0606	***	.0404	***	.0162	**
N Person-periods	77301		80624		66385		35828		56770		40662	
Df	29		29		19		17		18		17	
Deviance (-2LL)	24650.50		22664.16		22991.08		12583.74		18747.27		13560.97	
AIC	24663.50		22722.15		23029.08		12617.74		18783.27		13594.97	
BIC	24931.90		22991.78		23202.04		12762.01		18944.32		13741.38	

Source: European Social Survey (2006, Round 3) & OECD , calculations by author
Significance levels: NS (-), p < .050 (*), p < .010 (**), p < .001 (***)

Table 1. Short-term effects models, EU-14, 1970-2005, Ages 15-49 (continued).

	Model 5e		Model 6		Model 7		Model 8		Model 9	
					Individual-level covariates					
Age (centered at age 15)										
. Linear	2.442	***	2.544	***	1.732	***	2.344	***	1.691	***
. Quadratic	.956	***	.954	***	.972	***	.958	***	.973	***
. Cubic	1.001	***	1.001	***	1.000	***	1.001	***	1.000	***
Female	7.431	***	10.02	***	6.135	***	9.179	***	6.120	***
Female*Age (centered at age 15)										
*. Linear*female*	.794	**	.743	***	.763	***	.765	***	.771	***
*. Quadratic*female*	1.009	-	1.014	***	1.015	***	1.012	***	1.014	***
*. Cubic*female*	.999	-	.999	***	.999	***	.999	***	.999	***
Country *(Detailed country differentials omitted)*										
Education *(lower quartile is reference)*										
. Medium low			.957	-	.899	***	.941	*	.894	***
. Medium high			.829	***	.774	***	.829	***	.771	***
. High			.627	***	.615	***	.656	***	.617	***
Duration since first cohabitation										
. never cohabited					ref.				ref.	
. 1-5 years					9.482	***			9.258	***
. 6-10 years					6.827	***			6.651	***
. 11-15 years					4.810	***			4.790	***
. ≥16 years					3.155	***			3.302	***
Duration since first job										
. never or <5 years							ref.		ref.	
. 5-9 years							1.451	***	1.119	***
. 10-14 years							1.492	***	1.150	***
. 15-19 years							1.282	***	1.011	-
. 20-24 years							1.041	-	.841	*
. ≥25 years							.826	-	.646	**
					Macro-level covariates					
Unemployment										
. urlag1*age1519	.935	*	.953	***	.948	***	.952	***	.948	***
. urlag1*age2024	.939	**	.949	***	.949	***	.951	***	.949	***
. urlag1*age2529	.940	**	.960	***	.954	***	.960	***	.953	***
. urlag1*age3034	.973	-	.983	**	.980	**	.981	**	.978	**
. urlag1*age3539	1.002	-	1.001	-	.997	-	1.002	-	.997	-
. urlag1*age4044	1.029	-	1.002	-	.989	-	1.000	-	.990	-
. urlag1*age4549	.939	-	.949	-	.926	*	.924	*	.907	**
Unemployment										
. urlag10*age3034										
. urlag10*age3539										
. urlag10*age4044										
. urlag10*age4549										
					Model parameters					
Rho	.0492	***	.0460	***	.0556	***	.0424	***	.0539	***
N Person-years (df)	72433		269138		265027		263479		260189	
Df	18		32		36		37		41	
Deviance (-2LL)	22936.24		89741.20		79735.52		87761.70		78489.20	
AIC	22972.23		89805.21		79808.51		87835.69		78571.20	
BIC	23137.66		90141.30		80186.07		88223.52		79000.44	

Source: European Social Survey (2006, Round 3) & OECD , calculations by author
Significance levels: NS (-), p < .050 (*), p < .010 (**), p < .001 (***)

Table 2. Long-term effects models, EU-14, 1970-2005, Ages 30-49.

	Model 10		Model 11		Model 12		Model 13a		Model 13b		Model 14a	
					Individual-level covariates							
Age (centered at age 30)												
. Linear	1.048	-	1.047	-	1.055	-	1.063	-	-		.962	-
. Quadratic	.977	***	.974	***	.974	***	.971	***	-		.989	-
. Cubic	1.001	**	1.001	**	1.001	**	1.001	**	-		1.000	-
Female	1.320	***	1.312	***	1.318	***	-		-		1.361	*
Female*Age (centered at age 30)												
*. Linear*female*	.845	**	.851	**	.846	**	-		.894	**	.832	-
*. Quadratic*female*	1.023	*	1.022	*	1.023	*	-		.996	-	1.019	-
*. Cubic*female*	.999	*	.999	*	.999	*	-		.999	-	.999	-
Country *(Detailed country differentials omitted)*												
Education *(lower quartile is reference)*												
. Medium low												
. Medium high												
. High												
Duration since first cohabitation												
. never cohabited												
. 1-5 years												
. 6-10 years												
. 11-15 years												
. ≥16 years												
Duration since first job												
. never or <5 years												
. 5-9 years												
. 10-14 years												
. 15-19 years												
. 20-24 years												
. ≥25 years												
					Macro-level covariates							
Unemployment												
. urlag1*age1519					-		-		-		-	
. urlag1*age2024					-		-		-		-	
. urlag1*age2529					-		-		-		-	
. urlag1*age3034					.992	-	.983	-	1.007	-	.992	-
. urlag1*age3539					.972	**	.969	*	.975	-	.953	*
. urlag1*age4044					1.010	-	1.023	-	.951	-	.965	-
. urlag1*age4549					1.011	-	1.017	-	.980	-	1.078	-
Unemployment												
. urlag10*age3034			1.012	*	1.013	*	.995	-	1.039	***	.997	-
. urlag10*age3539			1.032	***	1.049	**	1.034	**	1.076	***	1.045	*
. urlag10*age4044			1.034	**	1.019	-	1.005	-	1.064	-	1.031	-
. urlag10*age4549			1.001	-	.994	-	1.003	-	.794	-	.801	-
					Model parameters							
Rho	.015	***	.011	**	.001	**	.001	-	.017	*	.000	-
N Person-periods	66495		66495		66495		37359		29136		17002	
Df	22		26		30		26		26		30	
Deviance (-2LL)	26159.46		26138.82		26130.40		15380.47		10702.83		4978.83	
AIC	26203.46		26190.82		26190.40		15432.47		10754.83		5038.84	
BIC	26403.77		26427.55		26463.55		15654.21		10970.10		5271.07	

Source: European Social Survey (2006, Round 3) & OECD , calculations by author
Significance levels: NS (-), p < .050 (*), p < .010 (**), p < .001 (***)

Table 2. Long-term effects models, EU-14, 1970-2005, Ages 30-49 (continued).

	Model 14b		Model 14c		Model 14d		Model 15a		Model 15b		Model 15c	
					Individual-level covariates							
Age (centered at age 30)												
. Linear	1.018	-	1.063	-	1.138	*	1.164	*	1.106	-	.971	-
. Quadratic	.971	*	.971	*	.971	**	.955	***	.976	-	.983	-
. Cubic	1.001	-	1.001	-	1.001	-	1.002	**	1.001	-	1.001	-
Female	1.156	-	1.317	*	1.431	**	1.318	*	1.464	*	1.319	*
Female*Age (centered at age 30)												
*. Linear*female*	.970	-	.807	*	.763	**	.802	*	.809	-	.922	-
*. Quadratic*female*	.999	-	1.039	-	1.046	*	1.025	-	1.023	-	1.003	-
*. Cubic*female*	.999	-	.998	-	.998	*	.999	-	.999	-	.999	-
Country *(Detailed country differentials omitted)*												
Education *(lower quartile is reference)*												
. Medium low												
. Medium high												
. High												
Duration since first cohabitation												
. never cohabited												
. 1-5 years												
. 6-10 years												
. 11-15 years												
. ≥16 years												
Duration since first job												
. never or <5 years												
. 5-9 years												
. 10-14 years												
. 15-19 years												
. 20-24 years												
. ≥25 years												
					Macro-level covariates							
Unemployment												
. urlag1*age1519	-		-		-		-		-			
. urlag1*age2024	-		-		-		-		-			
. urlag1*age2529	-		-		-		-		-			
. urlag1*age3034	.963	*	.996	-	.999	-	1.002	-	.988	-	.969	*
. urlag1*age3539	.976	-	.967	-	.983	-	1.027	-	.989	-	.933	**
. urlag1*age4044	1.049	-	1.023	-	1.031	-	1.053	-	.999	-	.977	-
. urlag1*age4549	.936	-	1.024	-	.998	-	1.104	-	1.017	-	.703	*
Unemployment												
. urlag10*age3034	1.022	-	1.009	-	1.008	-	1.029	*	1.006	-	1.041	**
. urlag10*age3539	1.044	-	1.048	**	1.031	*	1.018	-	1.019	-	1.087	***
. urlag10*age4044	.974	-	1.032	-	.984	-	1.065	-	1.006	-	1.014	-
. urlag10*age4549	1.100	-	1.048	-	1.020	-	.935	-	.964	-	1.209	-
					Model parameters							
Rho	.000	-	.000	-	.000	-	.000	-	.000	-	.000	-
N Person-periods	13921		16296		18365		14762		7758		13433	
Df	30		30		30		20		18		19	
Deviance (-2LL)	5003.16		6785.31		8967.99		6549.19		3415.65		5428.46	
AIC	5063.16		6845.31		9027.93		6589.19		3451.65		5466.46	
BIC	5289.40		7076.27		9262.48		6741.18		3576.87		5609.06	

Source: European Social Survey (2006, Round 3) & OECD , calculations by author
Significance levels: NS (-), p < .050 (*), p < .010 (**), p < .001 (***)

Table 2. Long-term effects models, EU-14, 1970-2005, Ages 30-49 (continued).

	Model 15d		Model 15e		Model 16		Model 17		Model 18		Model 19	
Individual-level covariates												
Age (centered at age 30)												
. Linear	.962	-	1.052	-	1.054	-	1.084	*	1.057	-	1.079	*
. Quadratic	.991	-	.977	-	.975	***	.978	***	.976	***	.980	**
. Cubic	1.000	-	1.000	-	1.001	**	1.001	*	1.001	*	1.001	-
Female	1.204	-	1.390	*	1.300	***	1.301	***	1.327	***	1.305	***
Female*Age (centered at age 30)												
*. Linear*female*	.799	-	.816	-	.847	**	.853	**	.837	**	.848	**
*. Quadratic*female*	1.078	*	1.026	-	1.023	*	1.022	*	1.025	*	1.023	*
*. Cubic*female*	.994	*	.999	-	.999	*	.999	*	.999	**	.999	*
Country *(Detailed country differentials omitted)*												
Education *(lower quartile is reference)*												
. Medium low					1.192	**					1.072	-
. Medium high					1.355	***					1.124	*
. High					1.471	***					1.164	**
Duration since first cohabitation												
. never cohabited							ref.				ref.	
. 1-5 years							12.60	***			12.02	***
. 6-10 years							7.992	***			7.658	***
. 11-15 years							5.626	***			5.446	***
. ≥16 years							3.823	***			3.795	***
Duration since first job												
. never or <5 years									ref.		ref.	
. 5-9 years									1.374	***	1.006	-
. 10-14 years									1.373	***	1.072	-
. 15-19 years									1.252	**	1.035	-
. 20-24 years									1.097	-	.951	-
. ≥25 years									1.036	-	.913	-
Macro-level covariates												
Unemployment												
. urlag1*age1519	-		-		-		-		-		-	
. urlag1*age2024	-		-		-		-		-		-	
. urlag1*age2529	-		-		-		-		-		-	
. urlag1*age3034	.998	-	1.087	*	.989	-	.997	-	.993	-	.995	-
. urlag1*age3539	.915	*	1.038	-	.969	**	.976	*	.973	*	.974	*
. urlag1*age4044	.933	-	1.214	*	1.009	-	1.001	-	1.016	-	1.006	-
. urlag1*age4549	.971	-	.897	-	1.014	-	1.010	-	.992	-	.993	-
Unemployment												
. urlag10*age3034	1.008	-	.926	*	1.006	-	.997	-	1.010	-	.993	-
. urlag10*age3539	1.077	***	.992	-	1.040	***	1.034	**	1.046	***	1.028	**
. urlag10*age4044	1.013	-	.853	-	1.006	-	1.019	-	1.009	-	1.004	-
. urlag10*age4549		-	1.362	-	.987	-	.987	-	1.011	-	1.003	-
Model parameters												
Rho	.000	-	.007	-	.009	**	.012	**	.009	**	.012	**
N Person-years (df)	11149		19393		65584		65036		64576		62767	
Df	18		19		33		34		35		42	
Deviance (-2LL)	4100.07		6533.08		25840.84		23574.99		25557.36		23051.02	
AIC	4136.07		6571.08		25906.84		23642.99		25627.35		23135.03	
BIC	4267.81		6720.66		26206.84		23951.80		25945.00		23515.01	

Source: European Social Survey (2006, Round 3) & OECD , calculations by author
Significance levels: NS (-), p < .050 (*), p < .010 (**), p < .001 (***)