Why Portugal is not replacing generations?

A period and cohort perspective in a comparative analysis with selected European Countries.

Lídia Patrícia Tomé

Tese apresentada à Universidade de Évora
para obtenção do Grau de Doutor em Sociologia

ORIENTADORA : *Professora Doutora Maria Filomena Mendes*

ÉVORA, NOVEMBRO 2015
INSTITUTO DE INVESTIGAÇÃO E FORMAÇÃO AVANÇADA

Acknowledgement

First and foremost I want to thank my advisor Professor Maria Filomena Mendes. It has been an honour to be her PhD student. She has taught me, both consciously and unconsciously how good social science is done. I appreciate all her contributions of time, ideas and changes to go further. The joy and enthusiasm she has for her research has been contagious and motivational for me, even during though times in the PhD pursuit. I am also thankful for the excellent example she has provide as a successful Woman, Demographer and Professor.

To Évora Demographic Research team my thankfulness, especially to Filipe, Andreia and Filipa for all discussions and presentations. I also would like to express my special gratitude to Maria da Graça Morais for all the comments over my research in the past years and for made me an in love person on historical demography. To Graça Magalhães for all the support and all the encouraging words. And to Isabel Tiago de Oliveira, José Dias, Tomas Sobotka and Frans Willekens for their important role to accomplish this thesis successfully.

I am also thankful to FCT (Fundação para a Ciência e Tecnlogia) for the grant - project number SFRH/BD/70494/2010 - that allowed me to proceed until the end with my work plans, developed at Évora University as a research member from CIDEHUS. As well as to Netherland Institute (NIDI), the institution that allowed me the to be at European Doctoral School of demography (EDSD) in the period from September 2010 to July 2011. Also I want to acknowledge Max Planck Institute for demographic Research (MPIDR), where from September 2011 to October 2013 I was a guest researcher in the Laboratory of Economic and Social Demography, under the supervision of Joshua Goldstein.

During the time in Rostock, there have been some hard days, however Robert and Julia you made me fall in love to the region and I know that I go visit Rostock throughout my life. Rostock was a home thanks to you. And you and little Ella will always be a second family to us. Outside Portugal and before Rostock, my time in Lund, at the EDSD was made enjoyable in large part due to the many friends that became part of my life. I am grateful for the times spend around the table with Andy, Joana, Elena, Angelo, Bartoz and Jordi. It was always a pleasure to have you in Akarp for a Portuguese lunch.

From the bachelor cohort of 2002, I'm grateful to Lucia, Pedro, Joana, M. João and Bruno for all the support, and mainly for the ability to understand that a friend within a PhD is many times an absence friend. Thank you! Thanks João Pedro for being the younger brother that I don't have, and also Telma for being the older sister that I would like to have. Telma, Mahamud and Priscila I know that I promised a visit to Mozambique and I will do it one day. Ana, Ivo, Teresa, Ricardo, Rafael and Mariana thank you for keeping my mental sanity the past few months. Thanks for all the hours with a smile in my face. Thank you for the contribution to the bottle's corks.

I would not be here without my parent influence to be an independent woman. Thank you to our support as well as the one from my parents in law and from my little brother in law. And Miguel you know, Demographer is the best job in the world!

Last, but not the least, I would like to thank you Filipe. My partner in life, with whom I shared the last 13 years, the demography love, and all the insane adventures, and the love of your four legs friends – Strauss and Sushi the EDSD cats that moved from Portugal to Lund and later to Rostock, and Jack and Gloria Lexis the dogs that gave us the insanity needed to finish our thesis. Thank you for your support my Love, and for even in the worst moments make me laugh, thank you for all incentive when I want to give up and thank you for being just you, being here all the time.

Abstract

Historical low and lowest-low fertility patterns have been discussed in the context of the individualization theory and the second demographic transition to provide empirical discussion on the implications in the real number of births, and as well about the cause-effect association between fertility, education, economic and employment stability. The fertility levels observed across Europe over the past century are not only the direct result from changes in the period fertility trends, but also the result from each individual choice conditioned by their birth cohort. Therefore, once that fertility rates are accounting for fertility from different real cohorts, disturbed by different period, it is implausible to disregard the inter-dependency between synthetic and real cohorts.

With the aim to understand why Portugal is not replacing generations, based on a cross-country comparative analysis, we explore, in this thesis, the relationship between cohort and period fertility postponement and the effect of this double postponement on the final period *quantum*.

The observed transformations in the transition to parenthood can be seen as a result of the modernization process, in which individuals behaviours are no longer conditioned only by the personal background but in which variables that correspond to personal choice have more predictive capability. This changes renewed the input decisions in the transition to parenthood and how and when that would occur in the individual life history. Such transformation adjusted also the own individual *tempo* and *quantum* fertility dynamics to the new socioeconomic dynamics and to the increase female participation at the educational system and at the labour market.

The increasing mean age at childbearing results from higher levels of education, later transitions to the labour market and consequently due to the lack of economic stability later family formation, and decreased the total fertility rate and changed the fertility dynamics. All these individual, socio-economic and demographic changes are pushing Europe towards accelerated aging and even that major changes in fertility occur in the short-run, possible fertility increases may not be enough to avoid or counterbalance this tendency.

Thereby, this thesis addresses the most prominent features of current European fertility trends: permanent low fertility rates and what determines later transitions to motherhood; the impact of education evolution in the cohort fertility; and in the implications from the last economic crisis in the postponing and *recuperating* countries.

Key words: Cohort; Fertility; Period; Postponement; Portugal.

Porque não está Portugal a recuperar as suas gerações?
Uma perspectiva de calendário e geração numa análise comparativa entre países europeus

Resumo

Os níveis históricos de baixa fecundidade têm sido analisados no contexto das teorias da individualização e da segunda transição demográfica, proporcionando uma discussão empírica sobre as suas implicações no número real de nascimentos, bem como na relação de causa-efeito entre fecundidade, educação e estabilidade laboral. Os níveis de fecundidade observados em toda a Europa durante o século passado não foram apenas resultado direto de mudanças da fecundidade do momento mas também condicionada pelo comportamento de fecundidade das coortes de origem. Em consequência torna-se necessário analisar os padrões de fecundidade do momento considerando a interdependência entre coortes sintéticas (do momento) e reais.

Tendo como objetivo central compreender porque não está Portugal a substituir as gerações, apoiando-nos numa análise comparativa entre cinco países europeus, investigámos a relação entre coortes reais e sintéticas e os seus comportamentos quanto ao adiamento da fecundidade, bem como os efeitos desse(s) adiamento(s).

As alterações observadas na transição para a parentalidade, parecem ser o resultado do processo de modernização da sociedade, no qual os indivíduos deixaram de estar principalmente condicionados pelo seu contexto familiar de origem, em que as características adquiridas ao longo da vida, preferências pessoais têm hoje um maior impacto nas decisões de formação e constituição da família. Tais alterações transformaram as decisões individuais ajustando não apenas o *quantum* mas também o *tempo* da fecundidade às novas dinâmicas socioeconómicas e ao aumento da participação feminina no sistema educativo e no mercado de trabalho. O aumento da idade média à fecundidade sendo igualmente o reflexo do aumento dos níveis de educação, da entrada tardia no mercado de trabalho e do consequente adiar de estabilidade económica que permita a formação de uma família, agrava a redução dos níveis de fecundidade.

Este adiamento característico de cada geração é influenciado por conjunturas críticas que afetam em simultâneo os comportamentos dos indivíduos pertencentes a diferentes coortes gerando formas de ajustamento com consequências imprevisíveis que conduzem a alterações significativas a nível demográfico na Europa.

Em resumo, esta tese aborda questões fundamentais relacionadas com as atuais tendências da fecundidade europeia: os determinantes para uma transição tardia para a parentalidade, os continuados baixos níveis de fecundidade; o impacto da educação na evolução da fecundidade das coortes; as implicações da recente crise económica não só nos países em adiamento como também nos países em recuperação de fecundidade.

Palavras-chave: Adiamento; Coorte; Fecundidade; Período; Portugal.

Table of Contents

List of Figures

List of Tables

CHAPTER 1
INTRODUCTION

1.1. The context of Southern European countries

In 2005 the fundamental argument to Kohler and colleagues was that the emergence of low fertility in Europe was due to a combination of four distinct behavioural and demographic factors. The first factor identified was the *economic and social changes* that made the postponement of fertility an individual and rational response. The second, the *social interactions processes* that affect the timing of fertility have changed the population response to these new socioeconomic circumstances substantially larger than the direct individual responses. The third factor, the *demographic distortion of period fertility measures,* caused by the fertility postponement and changes in parity-composition of populations have shrink the level of period indicators below the related level of cohort fertility. Finally the fourth factor is the *institutional settings* which in Central, Eastern and Southern European countries that have favoured an overall low fertility *quantum*. Moreover the institutional settings caused, due to the delay of childbearing, large reductions in the completed fertility in lowest-low fertility countries.

The structural and high unemployment in the south European countries have discouraged the young adults from entering in the labour market and as consequence the family formation and childbearing have been postponed. It is widespread in the literature that countries with lowest-low fertility share institutional settings characterized by an almost nil contribution of the welfare state relatively to low *quantum* of fertility, e.g., the Southern European countries provide highly insufficient child-care support (Esping-Adersen, 1999).

In comparison with Western European countries, the South have the lowest levels of state support for families with children in terms of tax allowances or direct transfers, but this lack of state support is compensated in the South by the family support.

However, the family support until later ages have a perverse effect once the young adults have a high integration in the family home, thereby the union formation and fertility are discouraged.

Countries with low compatibility between childbearing and female labour force participation are subject to large postponement effects (Rydell, 2002). These countries experience considerable decrease in completed fertility that is causally related to delays in childbearing. The low fertility and total fertility rate from the last decades in Europe, and particularity in Southern European countries, are an important challenge for the European economies due to its consequences, in terms of the population equilibrium level, welfare state (social security, education and health), and the sustainable growth and economic development in the long term.

From all the four Southern European countries Portugal and Spain are the more similar in terms of recent trajectories in the political, social and economic fronts. Both countries exited from a dictatorial regime in the mid-1970; entered the European Union in 1986; have fragile welfare states and the social organization is characterized by relatively strong family-ties and low investment in family policies (Dominguez-Folgueras and Castro-Martin, 2008). However Portugal, when compared to Spain had already in the 1960s a higher female participation at the labour market combined with highest fertility levels, and only in 2012 Portugal achieve the lowest-low fertility levels that Spain registered already in the 1990s.

Even that Portugal does not fit totally to the Southern European model, the lowest values from the late 2000s have been reported. When the *State of World Population 2011* report was released by the United Nations, in Portugal the results were widely spread. This report summarized the Portuguese fertility and family context and it was then point out that *for over a generation of family's Portuguese fertility rates have been decreasing*. Besides that together with Malta and Austria, in the period 2010-2015, would be the country with the lowest fertility levels. 1.3 children per woman was the value expected for these three European countries. In that same year, also OECD points out the Portuguese problem of sustainable fertility, in the report, *Doing better for families*. The report is explicit: *Portuguese problem is not that families have no children, but rather* *families not having more than one child*. And also *to improve fertility rates, Portuguese families need more support when caring for young children*.

1.2. Aim of the study and research questions

The fundamental purpose of this research is the analysis of the **relationship between cohort fertility postponement and period fertility postponement and to evaluate the joint and separated effects of this double postponement on the final period *quantum*** in Portugal. In the context of the individualization and of the second demographic transition theories, we provide empirical discussion on the implications of both postponements effects in the real number of births as long as understand the cause-effect association between fertility, education, labour force participation and employment stability.

The study of period and cohort fertility is fundamental to describe and discuss the fertility trends over the last decades. Often studied independent one from another, real and synthetic cohorts are deeply related. The synthetic cohort it is a cohort where the patterns, of a given year, are assumed to be constant though time. Reflecting fertility, mortality, migrations and social behaviour from different real cohorts.

The most used indicator on fertility analysis is directly influenced by all the period changes. And to that fertility rate are counting for the fertility from different real cohorts, it is no plausible to disregard the inter-dependency between synthetic and real cohorts. Therefore this work seeks to explore the relationship between cohort and period fertility postponement and the impact of this double effect on the final period *quantum*.

For that we hypothesized as the core for the empirical analyses on real and synthetic cohorts that,

Period and cohort fertility levels strongly affected by the double postponement.

We expect that the observed postponement to both period and cohort parenthood transition can be understood into the light of individualization theory: as a process of modernization in which individuals behaviour is no longer so deeply constrained by the so called background variables, given by birth (such as age, sex, household composition, social condition) and in which variables that correspond to personal choice (e.g., personal effort, education, labour market participation) start to have more predictive capability.

Nowadays, with such low fertility levels and later transitions to parenthood we can expect that the parenthood determinants are coincident with fertility ones. In order to verity that relationship we arise the following hypothesis:

Familiar background, social norms and individual values, influences the parenthood postponement, i.e., explain the late period fertility transition.

The fertility postponement and *quantum* decline can be not only explained by the social transformations as a consequence of socioeconomic improvements, but also by the high increase in the female educational level. Thus we expect that the educational change and the deep relationship between period fertility and educational level, arise the following hypothesis:

Individual's education is a central key factor for the period and cohort fertility postponement.

The increasing childbearing mean age as result from higher levels of education, later transitions to the labour market and consequently later family formation, decreased the total fertility rate and changed the fertility dynamics. Still the relationship between education, family formation and employment stability differs from country to country and depending on the familiar ties (Neels, 2010). Nevertheless even that employment has different relationships with the fertility trends, in the case of unemployment uncertainty its expected homogenous reactions in all countries.

In that context, if we consider the association between education, fertility postponement, employment stability and improvements in the labour market participation we arise the following hypothesis:

The traditional influence of education level and fertility postponement changed from negative to positive in terms of fertility quantum, mainly at later ages.

All these individual, socio-economic and demographic changes are pushing Europe towards aging and even that major changes in fertility occur in a short-term, that fertility increases it might not be enough to avoid or counterbalance this tendency.

Considering that all the circumstances that led fertility to the current low values will maintain for the next ten years, and specially that fertility transition postponement will continue to concentrates into to latter reproductive ages, on average around age 30, we arise the following hypothesis:

The recent observed changes in the relationship between fertility level, education and employment, will compress childbearing around age 30.

To provide empirical discussion about our research questions we use a cross-country analysis. Our cross-country analysis included five other European countries. Austria for the similar cohort and period fertility trends in the *quantum* decline and postponement effect. Hungary due to its approximation to the Portuguese trends in the most calendar years as well as for younger cohorts. France and Sweden as countries were the transition to low fertility has been exceeded or not even reached. Finally we included Spain for the social, economic and cultural resemblances, as well as the strong and continuous postponement behaviour.

1.3. Outline of the study

This study consists of seven chapters, including the present introduction. **Chapter 2** reviews the period and cohort fertility measures, promoting a comparative analysis of fertility trends in Europe. We will identify that not only in the period but also in the cohort firstly a *quantum* decline, followed by strong and persistent postponement behaviour. Later we not only analyse the period fertility patterns but also discuss on the possible fertility recuperation. Such discussion and decomposition of the total fertility rate allow identify when the significant period changes occurred and to determine that for more than one decade that fertility haven't substantially changed in the cross-country comparison. Finally we will elaborate about fertility patterns controlling for the *tempo* and *quantum* effects since 1990.

Identified the patterns of fertility over the last decades in selected European countries and contextualized the Portuguese situation, we will identify in **Chapter 3** parenthood determinants in Portugal. The risk of becoming a parent will be analysed into the light of both individualization theory and the second demographic transition one.

The previous analysis will provide the consistence to the empirical findings that individuals education as well as their mother education (grandmother or potential ones) is one, if not the major factor for the period and cohort fertility postponement, and allow elaborating the following chapter in the perspective of fertility postponement and educational improvements. **Chapter 4** provide us an extensive literature review were findings for the multidimensional relation between education and period fertility will be the first main focus. Later in this chapter and for a group of selected countries we proceed to a cohort analysis of educational impact on fertility postponement.

The traditional negative relationship between education and fertility postponement can, however, become positive in terms of fertility *quantum*, mainly at later ages, if we consider it in association with the employment stability and improvements in the labour market female participation. In **Chapter 5** we further argue on the positive and negative relationship between low fertility and high employment and unemployment rates. Also empirical direct evidences on the relationship between the 2008 economic shock and fertility decline will be reviewed.

Assuming that fertility determinants will not change substantially in the next years, as well as the education will keeping the same impact at fertility tempo and the economic impact shock will constrain fertility, in **Chapter 6** fertility forecasting is presented, giving new insights on the fertility compression at age 30. The concluding **Chapter 7** summarises the major findings and outlines major insights correlating them to the possible implications in the social and economical structures.

1.4. Relevance and limitations of the study

The work on this thesis was undertaken and founded by the Portuguese Science and Technology Foundation (Fundação para a Ciência e a Tecnologia – FCT), project number SFRH/BD/70494/2010. The goal of this project is to improve the understanding of a particular demographic process (fertility) in order to formulate theoretically and empirically informed scenarios of future developments in European countries fertility patterns and particularly in Portugal.

We do not claim to be the first researcher who considered the period fertility *quantum* decline as a consequence from the cohort and period double postponement in a direct relationship with the social, educational and economical transformations. However, to our knowledge, no other study has looked into the micro and macro causalities and explanations to the women's childbearing behaviour, including Portugal in a European comparative study.

Thereby this study address the most prominent features of current European fertility trends – permanent low fertility rates and what determine later transitions to motherhood; the impact of education evolution in the cohort fertility; the implications from the 2008 economic shock in the postponement and recuperating countries. Whenever possible, it gives a detailed country-specific comparison of the trends under analysis. Additionally in Chapter 6, considering the features of current European fertility, it provides insights concerning possible future trends on the fertility evolution.

Overall the broader scope and comparative cross-country perspective are the strong points of this study. Several parts of this research (e.g. Chapter 4) provide a wide-ranging perspective on the studied issues by themselves.

However, this study has also limitations. As in the majority of studies our theoretical insights are provided from the individual point of view in context of the life-course perspective, still the empirical discussion focus mainly the fertility macro-level trend. Both micro and macro-level analysis allow a more complex and completed analysis enriching the traditional demographic analysis and the life-course approach.

The inclusion in our work of micro-data analysis was possible in Chapters 3 and 4, were indeed we identified most of our data limitations. In Chapter 3 we used the Portuguese Fertility Survey (PFS) to identify the determinants into the motherhood transition. Yet it is a major drawback regarding the analysis of demographic events is that does not provide the fertility life-course perspective to those, which are already outside the fertility window. Such information would provide new insights to the micro fertility analysis. Similar constraints have been found also in Chapter 4 due to how data was reconstructed – cohort data was reconstructed in the perspective of the child decreasing the number of variables (or characteristics) exclusive of the mother. We hope that this lack of information can be overcome with more complete data and future research.

CHAPTER 2

A RETROSPECTIVE OVERVIEW OF PERIOD AND COHORT FERTILITY PATTERNS:
Evidence from six European countries

2.1. Introduction

In Western Europe, the fall of fertility has been accompanied by a progressive postponement of childbearing and first marriage, a trend that has also started to proliferate in Eastern Europe after the fall of state socialism (Neyer and Andersson, 2004: 2). As a result of those changes, fertility becomes one of the most complex components in the demographic analysis. In the analysis of it must be taken into account that, in opposition to the risk of death, the risk of generate a live birth is not common to all the females in a population. While mortality strikes all of the population in one moment in their lives, fertility is not biologically "available" to all the females.

Given the complexity of fertility, it must be considered not only as a multidimensional process but also as a cumulative once that, the birth *may be experienced more than once and only temporarily removes a woman from the risk of giving birth* (Preston et al., 2001: 93). The analysis should be carried out in harmony with cohort information in order to allow a complete observation of the life cycle events.

There are, however, some difficulties with cohort measurement either in fertility or in mortality analysis. Firstly, the cohorts do not provide information during specific years or short time periods, which is often what in demography we are mostly interested in. Secondly, the cohort measures can be calculated only for cohorts whose life cycle event experience is complete. And, thirdly, the calculation of cohort measures requires data for all years in which the life cycle events from the cohort occur (Bongaarts and Feeney, 2008). Therefore, result of the lack of completed cohorts, the typical way to measure and analyse fertility is performing by period approaches.

The most widely used fertility measure, the total fertility rate, is a hypothetical indicator, interpreted as the average number of children that a woman would have if the age-specific fertility rates in a given year remain constant over her reproductive life. Although that this measure is not affected by changes in the age structure of the female population, the age-specific fertility rates are influenced by distortion in fertility timing – the postponement or advancement of births – and changes in the fertility schedule. The fact that cohorts – real or synthetic – are subjected to timing distortion is widely recognised among demographers, as we will demonstrate later.

This chapter investigates the fertility evolution on selected European countries, on a comparative analysis where Portugal is the main focus, regarding the period and cohort traditional methods presenting also up-to-date measures and methods. Here, our main goal is to provide innumerable details about the Portuguese fertility patterns in the context of selected European countries. Consequently, six main objectives can be summarized:

1. Elaborate an extensive literature review on period and cohort fertility measures;
2. Evaluate the cohort fertility patterns as a starting point to understand the observed postponement;
3. Use the period fertility patterns not only to characterize the actual fertility levels but also to discuss on the possible fertility recuperation;
4. Decompose TFR into different fertility *momentums* by applying segmented linear regressions identifying when significant period changes occurred;
5. Elaborate about fertility patterns controlling for the *tempo* and *quantum* effects since 1990;
6. And lastly, provide new insights about period and cohort perspectives.

Our analysis is centred on cohort and period fertility (total and by parity) data for six European countries, with different fertility patterns: Austria, France, Hungary, Portugal, Spain, and Sweden. Special attention will be given to the Portuguese fertility evolution. With this chapter we provide a comparative perspective of fertility and motherhood transition transformations in the selected countries. Such comparison is partly stimulated by the different historical and cultural background in the past and their gradual economic and social proximity as well as demographic convergence.

Thus, this chapter is differentiated in 5 main sections. The introduction is followed by a theoretical discussion and review on the period and cohort fertility measures and perspectives (section 2.2). Section 2.3 provides the description of data and methods, with four subsections, firstly regarding the used data (subsection 2.3.1); secondly, in subsection 2.3.2 we present conventional cohort methods, while in subsection 2.3.3 the period fertility indicators are the main focus; and finally, thirdly, subsection 2.3.4 methods to improve the use of total fertility rate are presented. Section 2.4 corresponds to obtained results, also divided in three additional subsections. Subsection 2.4.1 presents the results for cohort fertility; followed by a discussion on the period analysis in subsection 2.4.2; complemented by a total fertility rate segmentation in section 2.4.3; and finally an analysis of fertility postponement and decline in Europe for the recent decades is presented in subsection 2.4.4. The subsequent section (2.5) concludes this chapter.

Summarizing, in this chapter we simply focus our analysis on the demographic dimension, while the socioeconomic dimension will be discussed in the following chapters.

2.2. A review on period and cohort fertility measures and methods

When in the 1970s and 1980s the period total fertility rate dropped bellow the replacement level (i.e., usually taken as 2.1) the demographic terminology adapted to new concepts of *low fertility* or *below-replacement*. In 2005 Kohler and his colleagues went further in the low fertility questions discriminating the different levels of low fertility. The authors introduced in the scientific community a new definition, used in the case of countries with a total fertility rate of 1.3 or below, and then known as *lowest-low fertility* countries. Such overwhelming fertility decline to values close to 1.0 (e.g., Spain) in the 1990s has revealed the need of societies in explaining more than ever the fertility evolution (Sobotka, 2004). Persistent sub-replacement fertility will produce inevitable consequences such as aging populations, declining workforce and smaller overall population size (Morgan and Taylor, 2006).

Furthermore *contemporary demography is greatly interested in family decision process, to assist in explaining why different people marry, cohabit or stay single, and why many couples have no children or only one, compared with the norm of two* (Rowland, 2003: 221). The questions related to the transition to adulthood and to family formation emerged with the purpose to explain not only the fertility decline but also the postponement itself. In such context, fertility can be considered the most complex component of demographic analysis. Given its complexity, must be considered not only as a multidimensional process but also as a cumulative one. Fertility analysis should be always as possible, carried out in harmony with cohort information in order to allow a complete observation of life cycle events. In fact, the cohort approach is crucial for assessing the importance of the period changes on the synthetic cohorts.

As a result of incomplete cohorts, the typical way of measuring fertility is performed by the period methods. Nevertheless measures of period fertility, such as the total fertility rate (TFR), oscillate more than analogous cohort indicators. Such fluctuation materializes the result from the changes in the timing of cohort fertility that distorts the period measures of fertility *quantum*. Thereby, when the *pace of cohort fertility is accelerating, conventional period measures of fertility quantum will be excessively high and when cohort tempo is decelerating, period indicators will be too low, relative to the corresponding measures for the cohorts affected. This is seen repeatedly in time- series of period and cohort fertility indices* (Ní Bhrolchain, 1992: 599). Then the major issue of fertility analysis is to obtain information trends of fertility levels not distorted by the timing effect and the *time series of total cohort fertility rates achieve this goal* (Frejka, 2010: 5). The appropriate description and measurement of fertility constitutes an essential step in the empirical and theoretical analysis of patterns, not only in Europe, but also all over the countries (Kohler and Ortega, 2004).

Ní Bhrolchain (1992) identified that the confusion on the measure of fertility lies at the heart of discussions about cohort and period approaches. However we may appeal to Ryder (1964) when he states that, *the births occurring in any year are the contribute of* *parents who began their lives in many different years, while the births occurring to any group of parents identified by common cohorts are experienced over an extended span of years. In each year (period) the contribute to fertility is the outcome of 35 different cohorts (in ages 15-49 inclusive), thus the complete birth rate of a given year could simply be a weight sum of the complete birth rates of the cohorts represented among the parents years, the weights being the respective age-distributional component of each cohort's fertility.*

Furthermore, the challenge for demographic analysis is not only to include the decomposition of heterogeneous fertility patterns into their behavioural and demographic determinants, but also to proceed to assessment of recent period developments in terms of their implications for cohort fertility (Kohler and Ortega, 2004). Ní Bhrolchain (1996: 239) summarizes eight propositions regarding period and cohort fertility analysis, which seem important to emphasize and discuss: (1) *Period fertility fluctuates more than comparable cohort indices because changes in the timing of cohort fertility distort period measures of the level of fertility;* (2) *Period measures are therefore unsatisfactory. We need especially to remove the tempo component from period indicators;* (3) *Cohort fertility is more "real" and period fertility more "unreal" or "transient";* (4) *The true time-path of change is to be seen in the cohort series;* (5) *Cohort fertility is ultimately what is of interest and period fertility is but an imperfect guide to it;* (6) *Period fertility is of interest largely for pragmatic reasons, because cohort figures are out of date by the time cohorts have completed their childbearing;* (7) *Period measures are a useful way of establishing a population's current reproductive performance;* (8) *Policy issues led to an interested in period fertility.*

Previous research (Myers and Gibson, 1961, Andersson et al., 2009) identify that the period fertility present higher fluctuation due to the timing of cohort fertility, however is also true that cohort behaviour could be severely influenced by an extreme situation (e.g. wars or economic shocks) that happens in a given period (Goldstein and Cassidy, 2014). Nevertheless period measures are indeed unsatisfactory, especially when affected by the postponement. Still we cannot state that such measures are an imperfect guide to measure cohort fertility. Yet the completed fertility can only be measure by complete cohorts, and policy-makers can't wait for a complete cohort to create family measures.

Consequently, following this perspective, the best way to measure and compare fertility patterns is by focusing in the period indicators.

The actual debate about measuring of fertility is particularly concerned with the implications of childbearing postponement, which is frequently associated with the trend towards low and lowest-low fertility, on cohort and period fertility levels (Kohler and Ortega, 2004). However the postponement itself is also associated with some constrains, the term postponement means that what is being postponed now will take plane in the future (Frejka, 2010). Reality is somehow different, when women postpone fertility, later when it is supposed to recuperate, the final number of births may not be the same as it was expected without the postponement. We will not discuss further such questions, however it is important to keep in mind that the fertility decline at young ages is result of childbearing postponement, and the fertility increase at older ages correspond to childbearing recuperation. One may then say that *postponement* and *recuperation* are fundamental definitions of cohort fertility while for period *tempo* and *quantum* are crucial.

Postponement is measured by cumulating absolute or relative fertility decline across all ages when fertility has fallen, and the recuperation is measured by cumulating absolute or relative fertility increases across all ages when fertility has increased relatively to the reference cohort (Sobotka et al., 2012). Therefore is not simple or easy to differentiate in a period perspective between the temporary depressing effect of shifting timing of childbearing (*tempo* effect) and the real decline of fertility (*quantum* effect).

If in the measure of fertility postponement is thus insufficient, Ní Bhrolchain (1992: 599) states that they must be treated in one of two ways: *either they should be deployed with extreme caution, or they should be adjusted or transformed so as to approximate more closely to the true, underlying level of fertility observable in the cohort mode*. Thus period and cohort measures need to be transmuted from one to the other with particular need to remove the tempo component from period indicators.

Fertility trends illustrated by period rates give a misleading description of fertility change throughout time, i.e., by cohort. Once again, recalling that the lack of completed cohorts results in the typical way of measuring fertility, performed by employing period analysis. In results of these methods, the *period* measures were created to overcome the unavailability data issues. Still the period measures present shortcomings. The two most commonly period measures of fertility are, age-specific fertility rates (ASFR) and TFR. When calculating ASFR, the numerator is restricted to births occurring to women of a specified age interval, and the denominator is restricted to the number of person-years lived by women in the age interval.

TFR is the most frequently used indicator of period fertility, corresponding simply to the sum of ASFRs across the childbearing ages. Thus, the TFR is an age-standardized, single-value, i.e., a summary measure of fertility. This measure has a powerful, yet easily understood, interpretation (Morgan and Hagewen, 2005). It is, however, influenced by *tempo* (timing) and *quantum* (level) *effect*. Bongaarts and Feeney (1998: 272) defined the *quantum effect* as *the TFR that would be have been observed in the absence of changes in the timing of childbearing during the period in which the TFR is measured*. While to the *tempo effect* the same authors defined as *the distortion that occurs due to timing changes*.

The demographic concept of *tempo effect* introduced by Ryder (1964) is related to the idea of demographic translation from the same author. Ryder most important finding was that a change in the timing of childbearing results in a divergence between the TFR and the cohort completed fertility rate ($CCFR$). With these finding Ryder proposes the translation formula between period and cohort, providing the exact relationship between cohort and period total fertility rates, as long as the age-specific rates are changing linearly. Since Ryder in 1964, until today many were the authors that expressed interest in the questions related to the timing effect in fertility, as e.g., Bongaarts and Feeney (1998), Kohler and Philipov (2001), Zeng and Land (2002), Rodriguez (2006), and Goldstein and Cassidy (2014). To Bongaarts and Feeney (1998 and 2002), the tempo distortion reflects an inflation or deflation of an indicator of the life cycle, the resulting increase or decrease in the average age for that same event.

Authors as Bongaarts and Feeney (1998) focused their methods in a period fertility perspective that provides the possibility to observe fertility change over time. However, the cohort perspective, which is repeatedly neglected, provides a similar contribution. In contrast to the period approach, *the cohort approach does not need any recourse to statistical constructions such as a synthetic cohort* (Sobotka et al, 2012: 8). Nevertheless the major problem of the cohort approach is the long period of 'waiting time' until the cohort completes the reproductive history. The solution to the different problems presented is the 'combination' of cohort and period perspectives is a method that *follows of childbearing postponement and recuperation and its reflection in total period fertility levels and trends in low fertility populations* (Frejka, 2010: 2). These methods are methods enable a better understanding about the period fertility behaviour.

Fertility, measured by the period total fertility, rose in the large majority of European countries from 2000 onwards. This change in the observed fertility trends resulted in an unexpected reversal on the historical unprecedented low levels reached by most countries in the 1990s and early 2000s (Bongaarts and Sobotka, 2012). Explanations for this phenomenon can be clarified by the demographic or socioeconomic changes across countries.

2.3. Data and Methods

2.3.1. Data

Period and cohort analysed indicators were calculated from the vital statistics data on the total births and parity order, by age of mother and age at parity structure of the female population. The main source of these data was the Human Fertility Database (HFD), combined with data from EUROSTAT.

2.3.2. Measuring cohort fertility

Cohort fertility analysis relates the lifetime experiences with the fertility patterns, following real women over their reproductive lifetimes, but has a major constrain once for data analysis we need completed cohorts. In this chapter the cohort fertility analysis operates as a *starting point* to analyse the performance of many period fertility indicators.

As in the period approach, in the cohort perspective the total fertility rate is one of the most used methods (*CTFR*) obtained by summing up the TFR_i as result from the sum of $ASFR_i$ by age, which is obtained by births occurred in a given age and time over female exposures at the same age and time:

$$CTFR = \sum_i CTFR_i = \sum_{i,a} CASFR_{i,a} = \sum_{i,a} \frac{B_i(a)}{P_F\,(a,t)} \qquad [2.1]$$

where a is age, i the parity order, B number of live births, P_F the female population (15-49 years) from a given cohort and t is time (a given year).

Both, cohort total fertility rate and cohort age-specific fertility rates allow us to analyse the fertility decline while the inclusion of cohort mean age at birth (by parity i) allows to measure the postponement, through the increasing values over the past years. Thus, the mean age at childbearing, is given by:

$$CMAC = \sum_i CMAC_i = \frac{\sum_{i,a} ASFR_{i,a} * x_{i,a}}{\sum_{i,a} ASFR_{i,a}} \qquad [2.2]$$

where a is age, i the parity order and $x_{i,a}$ is the middle age interval by parity.

As mentioned in section 2.2, if in period fertility the keywords are *tempo* and *quantum*, in cohort fertility the keywords are *postponement* and *recuperation*. The postponement is measured by cumulating absolute or relative fertility decline across all ages when fertility has fallen, and recuperation is measured by cumulating absolute or relative fertility increases across all ages when fertility has increased relatively to the reference cohort (Sobotka et al., 2012). A vast number of empirical results and graphs can be combined to analyse different characteristics of cohort fertility change by age and parity.

Lesthaeghe (2001) suggested a cohort benchmark model of cohort fertility postponement and recuperation, from the point of view of the start of postponing process, observing the way that these two factors develop across different and consecutive cohorts. The author proposed a relational model of cumulative cohort fertility deviations relative to the schedule of a benchmark cohort, using two scalars to manipulate a standard deviation schedule before and after the age of 30 (Sobotka et al. 2012).

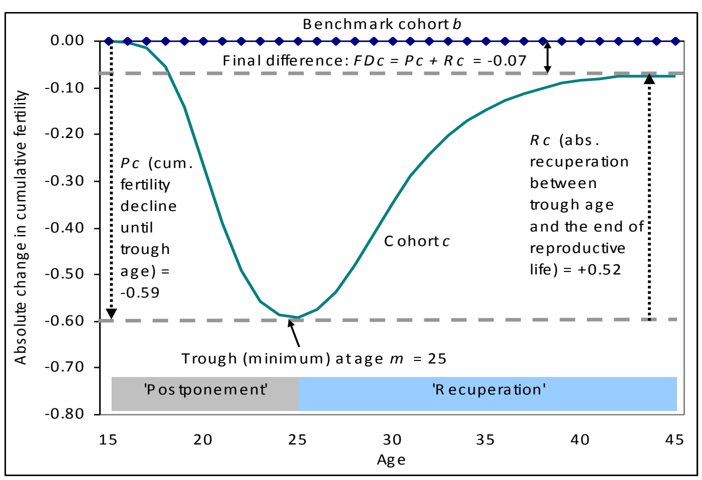
The benchmark cohort is defined as the cohort experiencing the onset of first postponement of births. A simplified scheme of cohort postponement and recuperation

(Figure 2.1) where we can observe the delineation of which part of fertility decline at younger ages (P_c), which part has eventually been recuperated later in life (R_c) and finally which decline turned out to be permanent. The most common procedure involves a careful inspection of age-specific trajectories of cumulative cohort fertility, which are compared with the selected 'benchmark' cohort. These trajectories reveal at what ages childbearing has been postponed (indicated by the increasing fertility 'deficit' among the more recent cohorts), at which ages the postponed fertility has been 'made up' (narrowing absolute differences), and to what extent (Freijka and Zakharov, 2012, Sobotka et al. 2012).

From the indicators presented in the figure 2.1 we should do a brief explanation of them and introduce different indicators. Therefore, and taking into account the previous figure:

- b is the Benchmark cohort. This is the first cohort that experienced an increase in the mean age at first birth that continued for at least five cohorts;
- m is the age at which the gap between the cumulated fertility rate of the benchmark cohort and of the observed cohort reaches a maximum;
- P_c is the decline in cumulated cohort fertility of cohort c compared to that of the benchmark cohort b. Measures the maximal difference in cumulated fertility between the benchmark and the observed cohort;

Figure 2.1: A simplified scheme of cohort "postponement" and "recuperation"



Source: Reproduced from Frejka and Zakharov (2012): Diagram 1, pp 3.

- R_c is the recuperation measure or the absolute increase in cohort fertility, as compared to the benchmark cohort b, at the end of the reproductive period;
- FD_c is the *final difference*. Is the permanent difference, in fertility between the benchmark cohort and the cohort of interest, computed as $FD_c = P_c + R_c = CTFR_c - CTFR_b$. It can also be computed as a non-recuperated portion of the 'postponed' fertility, using the recuperation index;
- RI_c is the *recuperation index* and measure the degree of *recuperation* relative to the *decline* at younger ages: $RIc = R_c/-P_c$. It can also be expressed as a percentage, ranging from 0 (no recuperation) to 100 % (full recuperation) or even above ("over-compensation").

2.3.3. Period fertility indicators

Even though the TFR is by far the most common indicator of period fertility, in a general way to measure the level of fertility we can distinguish four basic approaches. The first indicator is the *crude birth rate* (CBR) that relates the total number of births in a given year to the total population size. However when we relate the total number of births only with the number of women in reproductive age (between 15 and 49) the crude birth rate is known as general fertility rate. The second approach to measure the period fertility is based on the *age-specific fertility rates* ($ASFR$) that relate the number of births among women in a given age group to all women in that age group. The sum of $ASFRs$ in a particular year corresponds to the TFR. The third approach and the one, which constitutes the most accurate indicators, are based in age and parity-specific childbearing *probabilities* and *intensities* (known as hazard rates).

In the case of fertility, the hazard rates (see section 3.3.3 in Chapter 3) reflect the probabilities of giving birth of order i are specified only for women having i-1 children, in other words, the hazard rates are the parity progression ratios (PPR_i). The PPR_j are interpreted as a probability for women who have i-1 children to have another child during their reproductive life. Finally we should also mention a fourth indicator suggested by Sobotka (2004) and related with duration, specially because the duration is an important variable that can influence the number of births, which is time. It is important to measure, e.g, the time from the marriage or time between births and to Feeney (1983: 76) *the* *parity progression schedules, which incorporate parity progression rates and birth-interval distributions, are arguably the most natural approach to the measurement of fertility*.

Then TFR is obtained by summing up the TFR_i as result from the sum of $ASFR_i$ by age, which is obtained by the birth in a given age and time over female population at the same age and time:

$$TFR = \sum_i TFR_i = \sum_{i,a} ASFR_{i,a} = \sum_{i,a} \frac{B_i(a)}{P_F\ (a,T)} \qquad [2.3]$$

where a is age, i the order, B number of live births, P_F the female population (15-49 years) and T is time (a given year).

Even that fertility cannot be measured trough the average age at birth, the evolution of such indicator give the perception about fertility postponement. Thus the mean age at childbearing order i, is given by:

$$MAC = \sum_i MAC_i = \frac{\sum_{i,a} ASFR_{i,a} * x_{i,a}}{\sum_{i,a} ASFR_{i,a}} \qquad [2.4]$$

where a is age, i the parity order and $x_{i,a}$ is the middle age interval.

The changes across time in TFR can be delimited empirically, nevertheless, we do not know how statistically significantly those changes are. Thus, to depict those breaks from TFR patterns, we elaborate a piece-wise linear regression, where independent regression lines correspond to changes in TFR rate of increase, i.e., in the slope. By applying this method, we were able to identify, in all countries independently, more than one break. Assuming that a possible changing point i in a calendar year (y_i) is captured by:

$$TFR_i = \alpha + \beta_1 y_i + \beta_2 (y_i - \psi)_+. \qquad [2.5]$$

Likewise in a simple linear regression model, parameter α corresponds to the intercept, while β_1 is the first segment slope and β_2 the difference-in-slopes for the second segment, parameter ψ represents the calendar year breakpoint and $(y_i - \psi)_+ = (y_i - \psi) * I(y_i > \psi)$ (Muggeo, 2003). When $y_i > \psi$ is satisfied, the indicator function $I(.)$ equals one and if a breakpoint is not detected, final result corresponds to a simple linear regression model, i.e., ψ does not exist and β_2 is a statistical zero.

The measures presented in [2.3] and [2.4] are the most common in the period analysis of fertility, and widely disseminated mainly by the need to few data. The ideal is that we can obtain ASFR, TFR and MAC by parity, however the most common its to calculate each indicator based on the total number of births. The data availability and harmonization provided by HFD, allowed to avoid the search for data in numerous sources. With more available and accurate data, the HFD *re-introduced* in fertility analysis the concept of fertility tables with no accounting for covariates besides parity and women in *risk* by each parity order.

Fertility tables are one way to obtain period indicators with more accuracy, yet so far they have been not extensively used. The fertility tables are analogous to the life tables or mortality tables, but their main function is not the analysis of the timing of births (in analogy to the life expectancy obtained from the life tables, it would be the waiting time to the birth of the next child), but the levels and trends of fertility rates across different ages or parity categories. Traditionally, fertility tables were used in the analysis of marital fertility, where the exposure to first birth started at the time of marriage (Henry, 1951; Feeney, 1983; Chiang, 1984). From a simpler analysis of period fertility rates of the second kind, fertility tables control for effects of parity, composition of female populations at reproductive age and provide also a rich set of indicators that enables a thorough analysis of fertility level and time.

The period fertility tables, like the cohort fertility tables, are increment-decrement life tables, in which we can model the process of childbearing in synthetic or hypothetical cohorts of women specified by age and parity. In the general model the period life tables describe the childbearing histories of synthetic cohorts of women who live their lives under the fertility conditions of a given year t, and where we assume the absence of mortality and migration. In what concerns period fertility tables and to the indicators derived from it, Sobotka (2004: 74) makes reference to the exposure-based indicators represented in is work by age-specific birth probabilities. For the author, the period fertility tables *are methodologically superior to incidence rates and provide considerably more reliable measures of first birth timing and intensity*.

To illustrate the construction of the period fertility table[1], Table 2.1 provides the example of Portugal in 2009 in the transition to the first birth. As the majority of life table's analysis, here the main focus will be the last column (cumulative births), however we briefly describe all measures in the table, where $B_1(x)$ is the first birth in the year 2009 and $E_0(x)$ is the female populations in risk of having the first birth in the year of 2009.

Our first indicator $m_i(x)$ the conditional age-specific fertility rates, is given by:

$$m_i(x) = \frac{B_x(x,t)}{E_{i-1}(x,t)} \qquad [2.6]$$

In column four we have $q_i(x)$ the probability of having an ith birth in the age interval $[x, x+1)$, that is given by:

$$q_i(x) = \frac{m_i(x)}{1+[1-a(x)]*m_i(x)} \qquad [2.7]$$

Next we have $l_i(x)$ the table population parity i at age x The $l_i(x)$ have some particularities, we assume 10,000 for $l_0(x_{min})$ and 0 for $l_i(x_{min})$ when i equal to 1,2,3 and 4. Then for:

$$l_i(x) = l_i(x-1) * [1 - q_{i+1}(x-1)], \text{ for } i = 0 \qquad [2.8]$$

$$l_i(x) = l_i(x-1) - b_{i+1}(x-1) + L_{i+1}(x-1) * m_i(x-1), \text{ for } i = 1,2,3 \qquad [2.9]$$

and for $i = 4$

$$l_{i+}(x) = l_{i+}(x-1) + L_{i-1}(x-1) * m_i(x-1) \qquad [2.10]$$

Column 6 present to us the $b_i(x)$, the table number of births of order i in age interval $[x, x+1)$. The $b_i(x)$ is obtained by:

[1] See HFD Methods Protocol (2011) for complete and detailed information and methods.

$$b_i(x) = L_{i-1}(x) * m_i(x) \quad [2.11]$$

The $L_i(x)$ is the table population exposure of women of parity i within age interval $[x, x+1)$ and in our example is presented in column 7. As in the $l_i(x)$ also the $L_i(x)$ presents different calculations according to the birth order.

For $i = 0$

$$L_i(x) = l_i(x) - l_i(x) * q_{i+1}(x) * [1 - a(x)] \quad [2.12]$$

For $i = 1$,2 and 3

$$L_i(x) = l_i(x) - l_{i-1}(x) * q_i(x) * [1 - a(x)] - l_i(x) * q_{i+1}(x) * [1 - a(x)] \quad [2.13]$$

And for $i = 4$

$$L_{i+}(x) = l_{i+}(x) - l_{i-1}(x) * q_i(x) * [1 - a(x)] \quad [2.14]$$

Finally in column 8, we present $Sb_i(x)$, the cumulative births of order i by exact age x. The $Sb_i(x)$ is obtained by:

$$Sb_i(x) = \sum_{z=x_{min}}^{x-1} b_i(z) \text{ for } i = 1,2,3, or\ 4+ \quad [2.15]$$

Table 2. 1: Portuguese illustrative example of fertility table for 2009: the transition to motherhood

Age	$B_1(x)$	$E_0(x)$	$m_i(x)$	$q_i(x)$	$l_i(x)$	$b_i(x)$	$L_i(x)$	$Sb_i(x)$
12	2	52894	0.00004	0.00004	10000	0	10000	0
...	...	...	...	...	...	...	...	...
25	2737	49961	0.05479	0.05333	7688	410	7483	2312
...	...	...	...	...	...	...	...	...
49	2	7582	0.00026	0.00026	1389	0	1389	8611

Source: Human Fertility Database. Own elaboration.

The period fertility tables describe fertility progression in a so-called *synthetic cohort* of women on the basis of conditional age and parity specific fertility rates observed in one calendar year. Parity and age adjusted total fertility rate (PATFR) is one the main outputs from fertility tables elaboration, as well as table mean age at childbearing (TMAC).

The PATFR it's a measure proposed by Rallu and Toulemon (1994) based on the use of probabilities (transition rates) to have another child by age in fertility table[2]. The sum of these partial transition rates, by parity, gives rise to the final indicator. Thus the PATFR can be interpreted as final offspring of a synthetic cohort. Again, odds are observed at a given time and the value of PATFR does not correspond to any actual generation, but is the most accurate way to assess the intensity of fertility of a population at a given time.

$$PATFR = \sum_i PATFR_i = \frac{\sum_{x_{min}}^{x^{max}} b_i(x)}{10{,}000} \qquad [2.16]$$

where $b_i(x)$ is the number of births of order i in age interval $[x, x+1)$.

While TMAC is calculated employing:

$$TMAC = \sum_i TMAC_i = \frac{\sum_{x_{min}}^{x^{max}} \overline{x*} b_i(x)}{\sum_{x_{min}}^{x^{max}} b_i(x)} \qquad [2.17]$$

where $\bar{x}$ is the mean age at births of order i in age interval $[x, x+1)$.

2.3.4. Measuring the *tempo effect*: complementary proposals for Total Fertility Rate adjustment

Most researchers studying fertility trends agree that *tempo* effects bias contemporary TFR levels. Therefore, alternative ways to use TFR were motivated by the identified distortions. Many authors proposed alternative TFR measures, or even to "correct" the measure through adjustments. Among them, lets emphasize Brass (1991) that calculated adjusted TFR with marital data by parity order, and Ryder (1964), with its translation formula (between period and cohort). However our focus will be in recent measures. In 1998 Bongaarts and Feeney presented an adjustment to TFR, the adjusted total fertility rate (TFR*), assuming that fertility is only influenced by age, parity, duration and period but not by the cohort. Underneath these conditions to the authors (1998: 275) the TFR *that would have been observed in a given year had there no change in the timing of births*

2 PATFR as all fertility measures requires much more detailed data for its calculation than the simple TFR.

during that year maybe estimated by computing as a sum of order-specific total fertility rates (TFR*) which take order-specific changes in the mean age of fertility schedule, $r_i(t)$ as an adjustment factor:

$$TFR^{*}(t) = \sum adjTFR_i(t) = \frac{TFR_i(t)}{[1-r_i(t)]} \qquad [2.18]$$

where the $r_i(t) = \frac{[MAC_i(t+1)-MAC_i(t-1)]}{2}$ and the $MAC_i(t)$ is the mean age at childbearing order i.

The adjusted TFR* depends on how the age schedule of fertility rates observed at any time can be transformed into the schedule observed at any other time by inflating or deflating and/or by shifting the schedule to higher or lower ages. This is equivalent to assuming that fertility is determined strictly by period effects. Although TFR* can be applied to births of all orders combined, higher accuracy is obtained by applying the formula separately to each birth order component of the TFR, because the constant shape assumption is more valid for the fertility schedule at each order than for all orders combined (Bongaarts and Feeney, 1998). This adjustment measure present two main problems that can be summarized in two main issues, (1) the TFR* as well as the conventional TFR may be distorted by changes in the distribution of women by parity and (2) the period changes affect different cohorts in different ways, the tempo changes in fertility may also change the shape of the fertility schedule (Sobotka, 2003).

In order to respond to this problem Sobotka (2004) suggested the use of a three-year moving average of the TFR* and compute the adjustment only for birth orders up to 3 to increase the stability in the time series of the $adjTFR$ which displays large annual fluctuations. The overall TFR** is estimated as a combination of the TFR* for birth orders 1 to 3 and the ordinary TFR for births orders 4+:

$$TFR^{**}(t) = adjTFR(t)_1 + adjTFR(t)_2 + adjTFR(t)_3 + TFR(t)_4 \qquad [2.19]$$

Later, in 2009, Goldstein et al. argued that by applying the Bongaarts and Feeney adjustment, we lose the last year of time series and by using a three-year moving average, we lose another year. To obtain more recent data for analysis of the latest fertility trends, the authors developed a simple procedure that allows estimating the $adjTFR$ for an additional year. They calculate first the crude $adjTFR$ using $r_i(t) = MAC_i(t+1) - MAC_i(t-1)$. And to improve the last year estimate slightly, we should use a smooth, computing the average of the last two full observations combined with this very last point.

The same authors that proposed the adjusted TFR*, later in 2004 and 2006 (Bongaarts and Feeney) as variant of the previous method, proposed the tempo and parity-adjusted total fertility (TFR_P*). When fertility timing presents rapid changes the use of fertility table could be also conditioned by the relationship between different parities. Bongaarts and Sobotka (2011) referred that as the main reason to obtain relatively PATFR poor results when adjusted to higher orders. Thus, the TFR_P* avoid this problem by considering each event (birth) separate from the previous and the following ones. Such measured presents more stable trends since the late 1990s, which could mean that the recent upturns in the period TFR across Europe are largely explained by a *decline in the pace of fertility postponement and the resulting reduction in tempo distortions* (Bongaarts and Sobotka, 2012: 2). The tempo and parity-adjusted total fertility is given by:

$$TFR_p^*(t) = \sum_i TFR_p^*(t,i) = \sum_i 1 - \exp\left[-\sum_a \frac{p\,(a,t,i)}{1-r(t,i)}\right] \qquad [2.20]$$

where $p\,(a,t,i)$ are the conditional fertility rates for each order is treated as separate non-repeatable event. For this case the denominator of the hazard by parity equals all women who have not yet reached parity i. And $r(t,i) = (MAC(t+1,i) - MAC_i(t-1,i))/2$. The TFR_P* has been used in the estimation of the tempo effect on mortality patterns, and therefore side-lined on the fertility analysis (Bongaarts and Feeney, 2006). The method itself differs from the *adjustedTFR* by transforming age and parity fertility rates into period *quantum* measures.

Goldstein and Cassidy (2014), inspired by Rodriguez (2006) suggested a model that can be easily extended to include the variation in postponement by age within each cohort and also period effects on the *quantum* of fertility. To the authors in the adjusted TFR only data from the period fertility is needed, where all cohorts are truncated to the available length (in case of non-completed cohorts). While Bongaarts and Feeney (1998) proposed a model assuming that the age shift occurs in the period, Goldstein and Cassidy (2014: 1799) proposed a model where the age shift is assumed to occur at the cohort level. In their article, the authors presented the cohort shift model with period *quantum* effect and *introduce an adjusted measure of period total fertility (…) which can be used to recover the total fertility that would have been observed in the absence of postponement*.

2.4. Results

Over the past 50 years, European fertility has experienced periods of high and very low fertility. In fact, over the last three decades, TFR have been declined first to historical low levels and later to below replacement values across all European countries. These changes are consequence of the dramatic changes observed in Europe on fertility and family behaviours.

Throughout this section the fertility evolution observed in six selected European countries – Austria, France, Hungary, Portugal, Spain and Sweden – will be discussed from the cohort to the period perspective. Whenever data availability allows, this study focus on completed cohorts or cohort information until age 40, and to period fertility trends since 1940.

As mentioned in the introductory section, we present first the results for the evolution of cohort fertility through the total CTFR and total CMAC. To further discuss on the cohort fertility postponement and recuperation providing also an analysis by parity (first and second child) with the benchmark cohort model approach. This first analysis will give some insights on the fertility postponement, while the period analysis could enable new perspective on the recuperation.

The results on period fertility are presented first by the analysis via TFR and MAC. As a first approach to identify the fertility postponement, the change between the total mean age at childbearing and mean age at the first childbearing will be presented and discussed. Latter the TFR will be decomposed (by a segmented regression) to identify when fertility patterns changed and using of ASFR, identify how and where that change occurred. Finally we proceed to the analysis of several proposed methods on the adjustment of total fertility rate.

2.4.1. Recent trends of low fertility cohort patterns in a comparative overview across Europe

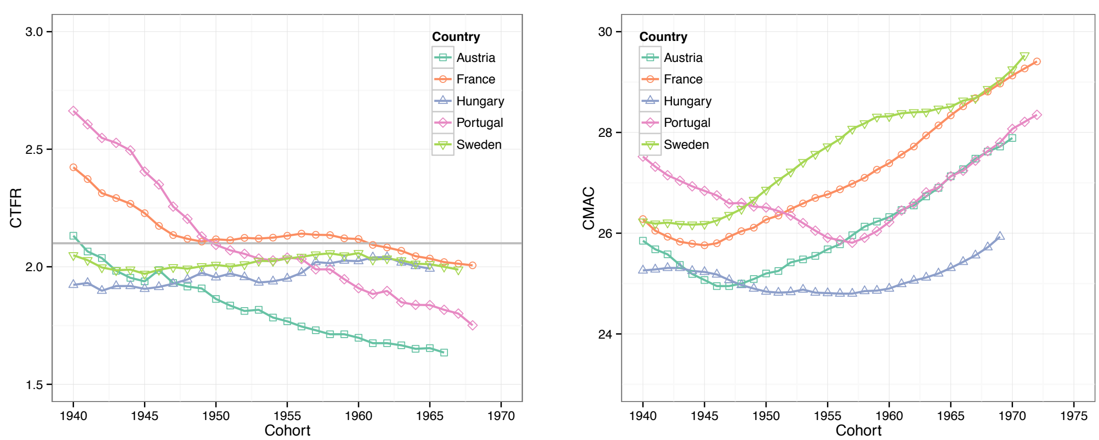
The on-going profound transformation of childbearing patterns in Europe is clearly manifested in cohort fertility trends. Figure 2.2 compares total fertility rates (a) and the mean age at childbearing (b) for five (out of six initially presented, due to the lack of cohort information for Spain) European countries. The *quantum* and *tempo* effect broadly used in the analysis of period fertility, it's also observed in the cohort trends. The evolution of the cohort fertility rate reveals that among older and younger cohorts, the differences increased particularly in Portugal. Still, in the older cohorts born from 1940 to 1950, there is a very precise definition of fertility patterns. Sweden and Hungary had in that period the most stable fertility levels, even that by that time already below the replacement level of 2.1. Austria was also at the same fertility level, however with a declining trend. Similarly, for Portugal and France we also identify a declining trend. However, the fertility levels are slightly high when compared to the other three countries. By the 1950 cohort the fertility was already at the level of 2.1 in Portugal and in France.

In this context of low cohort fertility patterns, Portugal is the country with the greater decline, with less 1.5 children per woman. In fact, if at the beginning of the analysis was the country with highest values at the end by the 1968 cohort, the Portuguese fertility (1.8) as well as the Austrian were the lowest (1.6 by 1966 – last cohort available). On the opposite direction from the Portuguese cohort fertility is Sweden, with the most stable level around 2.0 children per woman across all cohorts, only with a small decline in the younger cohorts, a decline to values from mid 1940s cohorts. Also for Hungary was found a stable pattern and a recuperation of fertility levels for cohorts of women born between 1957 and 1962, registering an average offspring of two children per woman. The cohort fertility of French women was gradually decreasing, but not so rapidly as Portugal, particularly for the cohorts after 1950. Yet, the average French cohort fertility remained above two children per woman.

Later on this chapter we will discuss on the period fertility decline and postponement, however, observing still figure 2.2 (a), we are able to distinguish that although in decline, Portugal is the country that has a higher mean age at childbearing at older cohorts. Portugal is also the country that for longer time saw its average age decrease, however from the 1956 cohort onwards, the mean age increased in parallel with Austrian patterns. Nevertheless, at the older cohorts Sweden and France are the countries with the highest average age at childbearing. If France fairly maintains the same pace of growth for Sweden a small bump downward was observed by the 1960 cohort. Within the selected countries under analysis, Hungary registered the lower mean age across all cohorts, with a small increase that started after 1955 cohort.

Figure 2.2: Cohort total fertility rate (CTFR) and Cohort mean age at childbearing (MAC) evolution for selected countries

(a) (b)



Notes: 1) CTFR measured until age 44 and CMAC measured until age 40[3]. 2) For detailed data see table A.1 in Appendix A.
Source: Human Fertility Database. Own elaboration.

In opposition to the period fertility (figure 2.4) where some propensities to the fertility recuperation can be observe across all countries (with exception to Portugal), in the cohort fertility no signs of recuperations are visible, furthermore Portugal and Austria are in constant decline, even with the very same patterns at the mean age a birth.

[3] Traditionally cohort fertility has been analysed for those women who had reached age 50. However relatively small proportions of total cohort fertility occur after age 40. Thus, possible errors in estimates of the fertility of women in 40s are likely to be relatively small.

The period or cohort fertility decline is the result from the postponement into later ages in the transition to motherhood, but mainly in the transition to the first birth. To better discuss the fertility postponement our proposal is to use a benchmark cohort model. Using this method, the first step is to observe the increase in the mean age at childbearing for (at least) five consecutive cohorts[4], thus the first cohort will be the benchmark cohort.

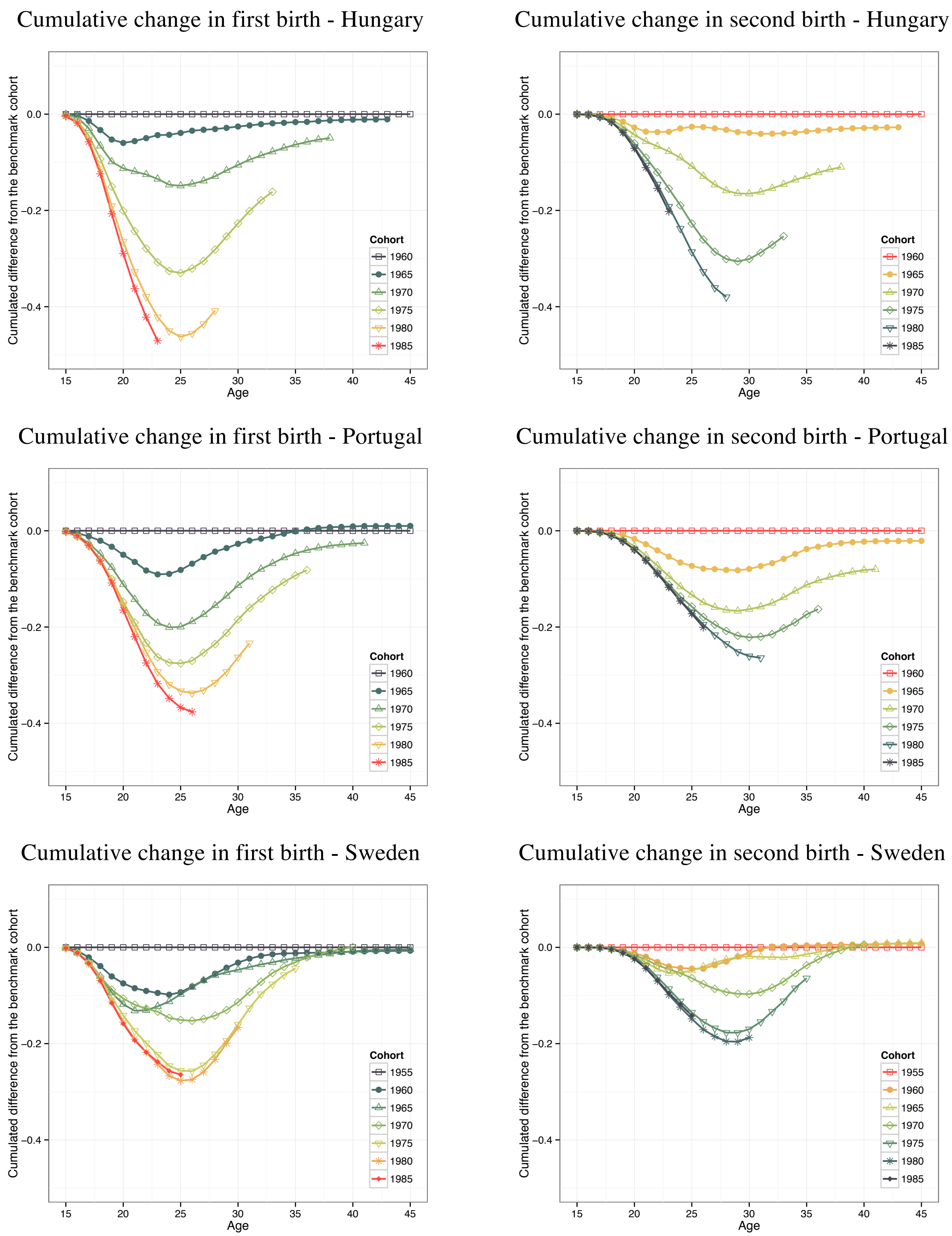
Figure 2.3 illustrates cross-country differences in the dynamics of cohort first and second birth postponement process (for the total cumulative change at birth see figure A.1 in Appendix A and tables A.1 to A.6). The benchmark cohort differs for each country and is chosen just at or before the start of the postponement: 1955 for Sweden and 1960 for Hungary and Portugal. In Sweden, a vast portion of initial first and second birth decline has been "offset" by an increase at later ages.

The pattern of first and second births has changed relatively smoothly and gradually, without any cohort standing out. While a more dynamic change is observed for Portugal and Hungary, for both countries the changes between the 1965 and the benchmark cohort are few, specifically in Hungary. It's only by the 1970 cohorts that the change increase is higher in the first birth transition. Within the three countries, Hungary is the only with major changes and higher decline postponement levels, notably between the 1970 and 1975 cohort, in the transition to the first and second births. Still, and taking into account the cumulated changes from the benchmark cohort, on the fertility peak there is no substantial differences observed at the age patterns.

In Portugal the evolution is slightly different, and by the 1985 cohort, compared to Hungary in the transition and postponement to the first or second birth, is significantly lower. However, in the transition to the first birth it's possible to observe that in parallel to the benchmark cohort, the 1965 cohort recuperated fertility and even surpassed it after age 36. For Sweden, the fertility patterns previous discussed (figure 2.2), predicted small changes from the benchmark cohort onwards. Between 1960 and 1970 cohorts it was possible to identify fertility recuperation. And in the transition to the second birth was even possible to observe that by age 30 no changes are registered between the 1955 and 1960 cohorts.

[4] Completed cohorts should be used. In the absence of complete cohorts the model could be elaborated with completed fertility by age 40.

Figure 2.3: Cumulative change in first and second birth progression by age and birth cohorts Hungary, Portugal, and Sweden



Notes: 1) The benchmark cohort is defined as the first cohort experienced an increase in the mean age at first birth that continued for at least five cohorts. Thus for Hungary and Portugal the benchmark cohorts are 1960, while in Sweden was 1955. 2) The cumulative changes to the total births are presented in Figure A.1, and by birth order to Austria in Figure A.2 of the Appendix A. Complete values from Table A.1 to Table A.6.
Source: Human Fertility Database. Own elaboration.

Table 2.2 summarises key indicators of the postponement transition in the analysed countries. There is only a variation in fertility levels among the benchmark cohorts, regarding the Portuguese fertility a value around 1.9 children per woman and for Hungary and Sweden around 2.0. The postponement indicator, *Pc*, shows a decline in early fertility for all three countries, especially Portugal (-0.4). Yet, the Recuperation index (*RIc*) suggests that Sweden has the highest recovery mainly to the second birth with an increase of about six percent. The higher recuperation in Sweden is confirmed by the final decline of only -0.06, as for Hungary was -0.18 and for Portugal -0.22.

Still, as Sobotka et al. (2012: 64) stated *the difference between the relatively high and stable fertility rate in Sweden and the corresponding cumulated fertility rate of the 1967 cohort in other countries may be due to different fertility levels among the benchmark cohort ($CTFR_b$), due to different levels of fertility decline at younger ages (P_c), or due to different levels of recuperation, as captured by the RIc.*

Table 2.2: Selected indicators of postponement and recuperation, in Hungary, Portugal and Sweden, for the 1970 cohort.

	Hungary	**Portugal**	**Sweden**
Benchmark cohort	*1960*	*1960*	*1955*
Cumulative Fertility at age 40	2.01	1.88	2.01
Observed P_c at 1970 cohort	-0.30	-0.40	-0,26
Observed RI_c Total – Cohort 1970	0.40	0.44	0.77
Observed RI_c Parity 1 – Cohort 1970	0.67	0.87	1.00
Observed RI_c Parity 2 – Cohort 1970	0.33	0.51	1.06
Final Decline FD - 1970 cohort	-0.18	-0.22	-0.06

Note: for Hungary, order-specific results are computed using age 38 in the 1970 cohort.
Source: Human Fertility Database. Own elaboration.

This preliminary analysis from the cohort perspective, allowed to identify transformations on the childbearing patterns across the countries under analysis were observed. In such context Portugal changes in cohort fertility trend emphasizes the country particularities further discuss in the following sections.

2.4.2. A brief retrospective overview on period fertility postponement as result of the late entry in the motherhood

One of the most distinctive features of the European demographic change since the 1960s is the decline in total fertility rate *escorted* by the increasing on the mean age at childbearing. As already noted in the preceding subsection when assessing cohort fertility. Figure 2.4 constitutes a starting point in period fertility analysis by comparing the total fertility rate (a) and means age at childbearing (b) for the countries under analysis in the period from 1960 to 2012. The decline pattern in TFR reflects the transformation across Europe in the second half of the last century and the first two decades of the current one.

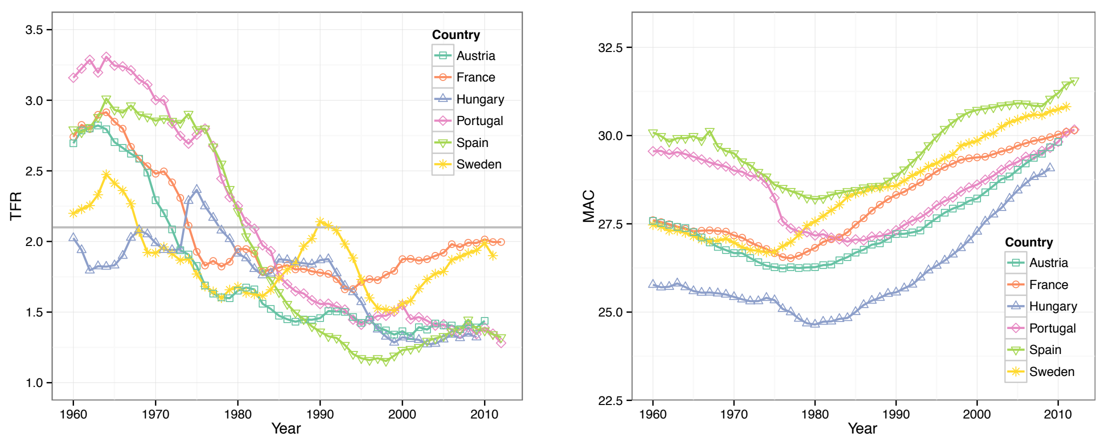
In the beginning of the period under analysis we can immediately identify two patterns until 1970. On one hand, within the six countries under analysis Sweden and Hungary had at that time the lowest fertility rates, in fact Hungary was already at that time below replacement level (2.1). On the other hand, Portugal is highlighted by the highest fertility rates with values of around 3.2, while for Spain, France and Austria the values are between 3 and 2.5. Rydell (2002) acknowledged that there was a *strident* decline in period fertility trends around 1965 in almost all of Western Europe, at the same time that in south of Europe the break on fertility occurred only after the mid-1970s. The fertility decline from the mid-1960s and 1970s was followed in the majority of the countries by roughly ten years of constant fertility decline.

With the exception of the Hungarian and Swedish fertility strong fluctuating patterns (but also with decline patterns), across the other countries under observation, a constant decline was observed, mainly between the 80s and the beginning of the 21st century. When in 1990s, Austria, France, Portugal and Spain registered fertility levels below replacement, while Sweden experienced a fertility level of 2 and also in Hungary the signs were of a period recuperation. However, the decline scenario was still in progress and by the year 2000, only Sweden and France had a TFR higher than 1.5 children per women. The remaining four countries are the reflections of the different European regions where the demographic expression by 2000s was the *lowest-low fertility*. Since then, the fertility decline appeared to reverse with the evident exception of

Portugal and Hungary and as well for Spain, that after the first signs of recuperation fertility after 2008 declined once more. As all across Europe even that only temporarily, fertility has converged to almost identical levels.

Figure 2.4: TFR and MAC evolution between 1960 and 2012 for selected countries

(a) (b)



Notes: For detailed information please see table A.14, Appendix A.
Source: Human Fertility Database. Own elaboration.

Nonetheless, is not enough to discuss on the TFR *quantum* without pay attention on the *tempo effect* identified in the mean age at childbirth. Until the mid-1980s, within the countries under analysis, e.g., Portugal and Spain had the highest fertility values, which were hand in glove with the highest mean age at birth (figure 2.4 b), however that is not the figure of contemporary fertility. Take Portugal as an example, in 1960 mean age at chilbearing was 25.6 and the same value reappears in 2008, while for the same years TFR was proximally 3.2 and 1.4. What changed within that time-period are what we intent to explain.

The most recent mean age at childbearing values are the result of the fertility postponement, while in the 1960s was the reflection of high fertility rates. The mean age at childbearing has been increasing continuously after 1980 to all countries. An increasing trend more pronounced in Hungary and Sweden by more than three years. In opposition, the smaller modifications occurred in Portugal with a difference value of less than one year, from 1960 to 2012. In that period, on average the mean age for the countries under analysis increased by two to three years, with the exception to Portugal, where the mean age increased by less than one year. When we observe the curves evolution, Spain and Hungary stand out as the countries across all period with the highest and the lowest mean age. While in the 1960s the range of the mean age from ages 26–31 in past decade the range decreased (ages 30-32), therefore the peak of childbearing is shifting and the mean age at childbearing becomes more homogeneous.

When compared the total MAC to the first birth (table 2.3), we identify for Hungary and Portugal differences of around three and four years within the two mean ages in 1960, while for the most recent data the difference diminished to around 2 years for both countries, as indeed was identified in Austria and Sweden.

Table 2.3: Summary table for the differences between the total mean age at birth and the mean age at first birth, for selected years and for Austria, Hungary, Portugal and Sweden.

	Austria			**Hungary**			**Portugal**			**Sweden**		
	MAC	MAC 1° birth	Dif.	MAC	MAC 1° birth	Dif.	MAC	MAC 1° birth	Dif.	MAC	MAC 1° birth	Dif.
1960	27.6	…	…	25.8	22.9	-2.9	29.6	25.3	-4.3	27.5	…	…
1970	26.7	…	…	25.4	22.8	-2.6	29.0	24.8	-4.2	27	24.2	-2.8
1980	26.3	…	…	24.7	22.4	-2.2	27.2	24.0	-3.2	27.6	25.2	-2.3
1990	27.2	25.0	-2.2	25.6	23.1	-2.5	27.3	24.9	-2.4	28.6	26.3	-2.3
2000	28.2	26.4	-1.8	27.3	25.1	-2.2	28.6	26.5	-2.1	29.9	27.9	-2.0
Last avail. year	29.8	28.2	-1.6	29.1	27.4	-1.7	30.2	28.6	-1.6	30.8	29,0	-1.8

Notes: 1) The last year available: 2010 for Austria, 2009 for Hungary, 2012 for Portugal and 2011 for Sweden. 2) For the complete table see the Appendix A, Table A.15.
Source: Human Fertility Database. Own elaboration.

The changes across time and countries point out that above all are the results from social and individual transformations (see chapter 3) in the context of a new demographic paradigm. In general, the evolution discussed above, captures the process of fertility changes during the shift towards later childbearing. Overall the *quantum* decline and the tempo postponement had a stronger relationship to the to the European fertility.

2.4.3. Segmented fertility: evidence to the period changes across Europe

Several times pointed out as an imperfect measure of period fertility patterns, TFR remains as the main measure used to describe and compare fertility across countries and regions. As a reflection of the age-specific fertility rates, TFR contains in itself the curves changes. However, even that changes in the TFR can be identified, only by the use of ASFR we can identify how that changes really occurred and how they behave by age. The use of piece-wise segmented regressions allowed identifying for the six countries under analysis TFR changes statistically significantly, creating breakpoints when this happens. Thus, each breakpoint also allowed identifying different associated patterns in the ASFR.

Figure 2.5 plots the two indicators by each selected country between the year 1960 and 2012 (or last available year, depending on the country under observation). The number of breakpoints varies between countries and time, Austria is the country with less breaks (five), while for France, Portugal and Sweden six breaks were identified, and finally breaks for Hungary and Spain are seven. Nevertheless, the same number of breaks does not correspond to equal fertility patterns.

In a very broad-spectrum we verify with figure 2.5, across the different segmented TFRs, that the first break occurred until the middle 60s: firstly, in 1962 for Austria and Hungary; secondly, in 1964 for France and Spain; and finally, in 1965 for Portugal and Sweden. Still, such similarities do not reflect the same trends on the TFR, e.g., Austria and Hungary had the first break by 1962, but at that period in Austria the TFR increased while in Hungary was decreasing. By the end of the period the fertility patterns changed and for Austria and Portugal no changes in the TFR since 2000 were statistical significant to create new breaks, while for France since the mid 1990s that we observe such patterns. Also Hungary and Sweden revealed similar trends from the late 1990s. Spain is the exception, since 1997 until 2008 TFR presented one break and a second one from 2008 onwards, as a reflection of the fertility decline in the most recent years.

Austria has a long history of low fertility trends, the second demographic transition trends, including the postponement of marriage and childbearing, emerged in Austria since the 1970s (Sobotka, 2015). A rapid decrease on average number of births allowed to observe for Austria before 1980 three breaks. The fertility decline could be thus analysed has having three paces of decline, with focus in the years between 1968 and 1975 were significantly faster. Since 1976 until 1999 the fertility decline was a sort of *plateau* while after that period a recuperation trend can be observed. If the segmented TFR point out the trends in the fertility, the ASFR allows to understand that, the main changes between the several breaks are due to (1) the decline in the total number of births, (2) the change in the fertility peak to earlier ages with a simultaneous decline (from 1968 to 1975), (3) the starting point of fertility postponement by the late 1970s, (4) the stabilization of fertility trends with continuous patterns until 2012.

As Rydell (2002: 2) states, and as will discuss later in this chapter*, the south of Europe has a rather homogenous demographic pattern, the situation in France differs to a large extent and resembles the situation in the Nordic countries*. E.g., in France the entry into partnership or cohabitation materialises at younger ages. As mentioned before the first TFR break was by 1965 when fertility decline continuously within two breaks until 1977, with a sharp decline between 1974 and 1977 with a decline of 0.25. After this sharp decline, from until the 1980s the fertility with a small increase in the TFR was followed once more by a decline for more than ten years. French TFR within the group of segmented countries TFR presents homogeneity in the last break, which starts by the time of fertility recuperation in 1995.

The ups and downs observed in the TFR are well bounded, in the age-specific rates, between 1960 and the curve shape is only a reflection from the decline in fertility. From 1977 to 1995 the decline and postponement are visible by the changes in the peak age of fertility as well as a more compact shape of the curves. Still, from 1995 onwards (yellow curves) its visible the on-going postponement at younger ages with a recuperation at older ages, enabling the TFR growth since that year.

Besides Sweden (as we will discuss later), Hungary has the higher fluctuation in TFR, however we can say that from 1960 to 2009, fertility basically decreased showing different patterns in the dissimilar periods within this epoch. Spéder and Kamarás (2008) emphasize that Hungary by the beginning of 1960s was with a TFR of 1.8, being one of the countries in the world with the lowest fertility. In fact in our segmented TFR the first break was exactly at that time, when fertility declined, for just after increase again, even that only temporary (until 1976). From that period onwards, fertility reduced to the lowest value of 1.3 by 1999 when the last break was identified. Nonetheless and despite the oscillations observed with the TFR, there were no fundamental changes in the ASFR essentially until 1992. Till that year if we just observe the curves without the fluctuation in the TFR, we can just say that fertility declined, and that by 1980s the postponement in Hungarian fertility started. Beside that observation, it was indeed only by 1990s that the ASFR sharply declined and the fertility peak increased by almost five years. Fertility in Hungary changed substantially from young to older ages.

The fertility decline across Europe reflects the family formation transformations, and Portugal is the perfect example to express social transformations, as well as countries with extreme social regimes in the past century. During this time Portugal had, in the 1960's, the highest emigration movement; between 1961 and 1974 the colonial war and high female employment rates; in 1974 the national revolution; in 1986 Portugal at the same time as Spain became part of EEC; and during the 80's it was observed a rapid education feminisation. As a reflection of the 1975 Revolution, the family formation and fertility decision changed (Mendes and Tomé, 2014a) and by the beginning of the 1990s second demographic paradigms were all-round in Portugal (and Spain). The Portuguese fertility trend was as in the other countries under analysis in decline, like it is identified in the first break in 1965, showing the first signs of fertility decline.

The Portuguese fertility decline never achieved the values of the neighbour Spain, however, by 1995 the minimum TFR ever registered was achieved. When in 1996 TFR started to increase as for other European countries, the expectation was for constant fertility recuperation. Still from 2000 onwards started a period of fertility decline. The first two breaks in the Portuguese fertility are characterized by a decline observed immediately on the age-specific fertility rates, while in the third break the decline was first a change to young cohorts has the results from the high fertility at younger ages. It's on the last three breaks that postponement started to be highly visible, with the change in the peak age at childbearing.

Figure 2.5: Segmented TFR and ASFR, from 1960 to 2012 for Austria, France, Hungary, Portugal, Spain and Sweden

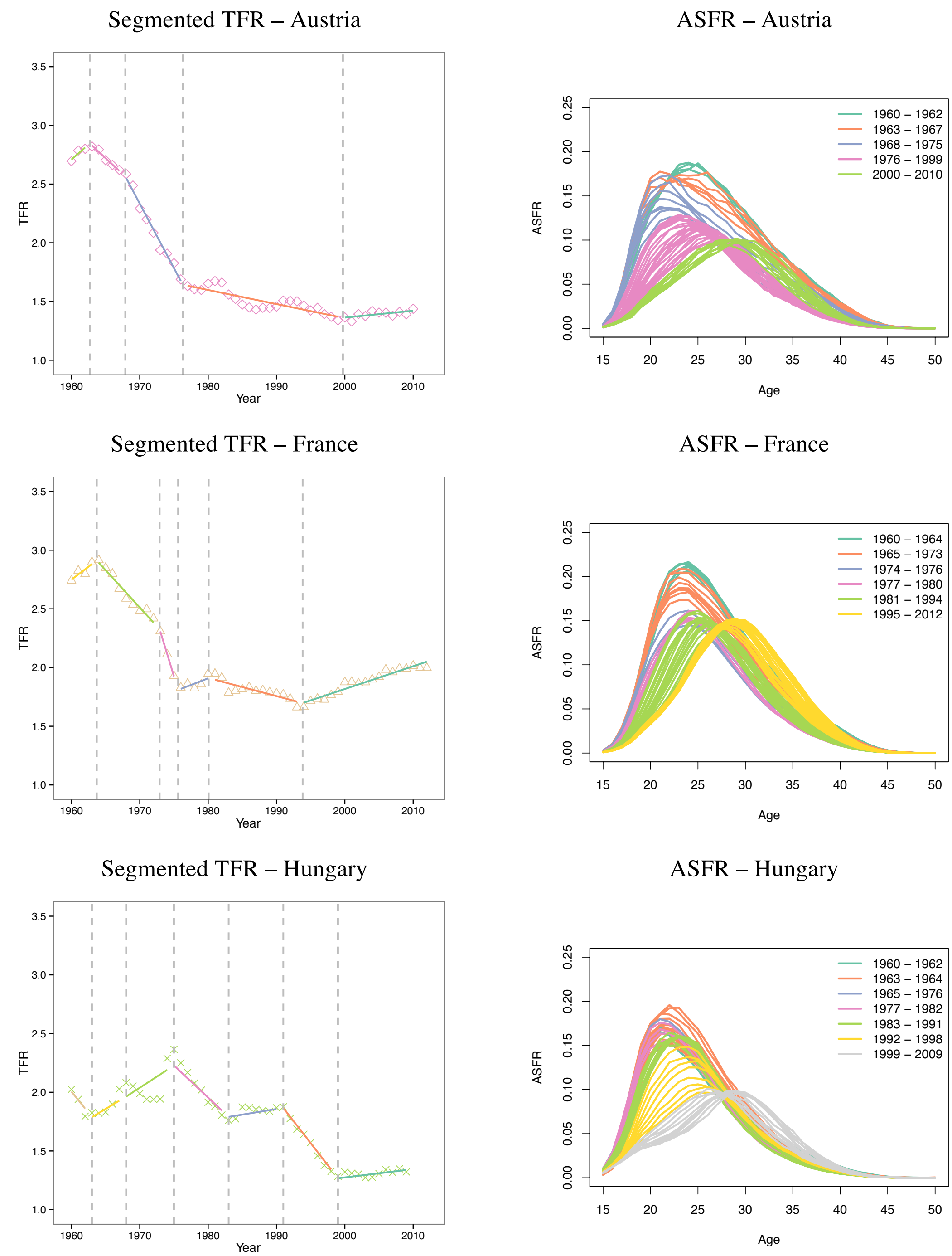
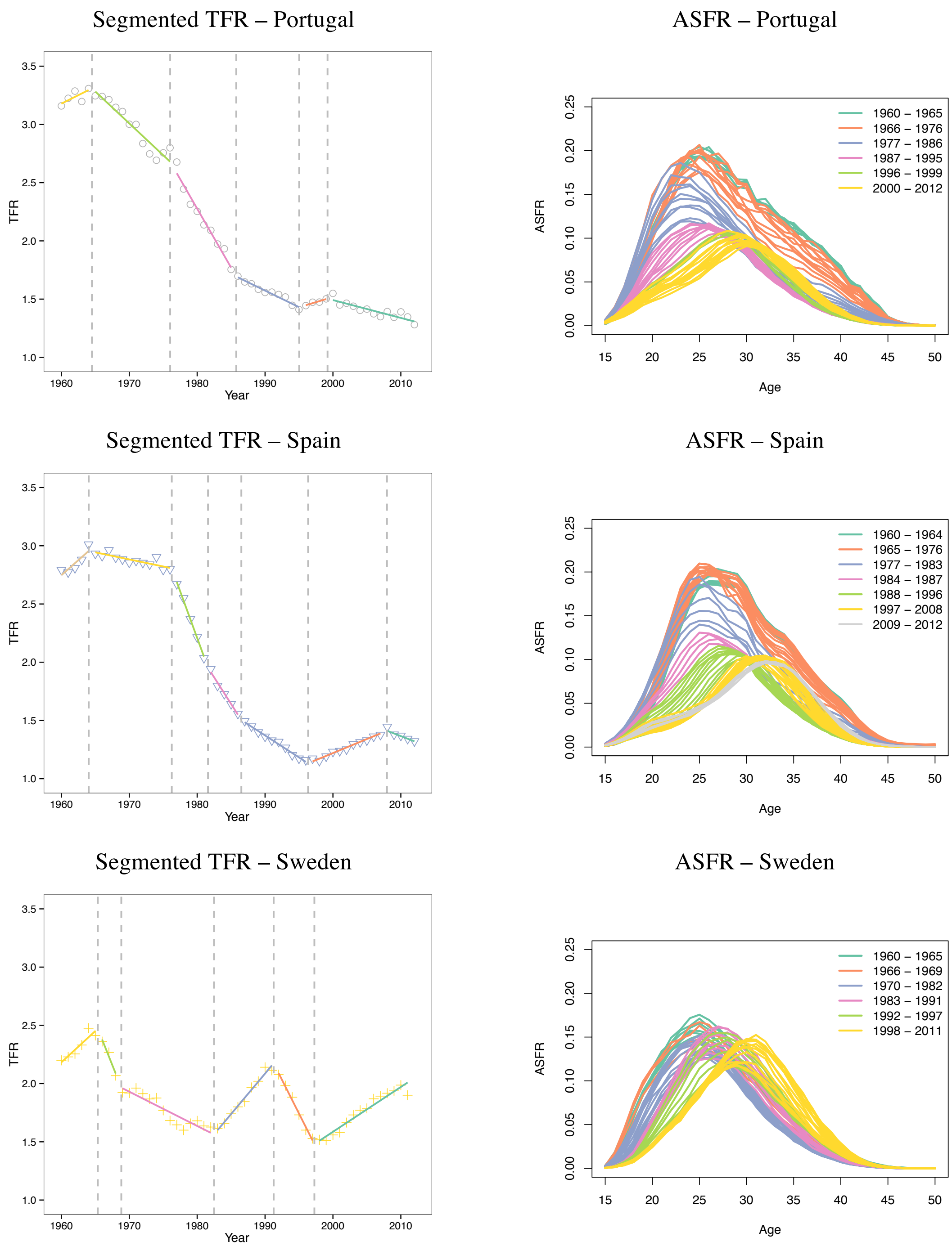


Figure 2.5: (continuing) Segmented TFR and ASFR, from 1960 to 2012 for Austria, France, Hungary, Portugal, Spain and Sweden



Notes: Detailed data on the age-specific fertility rates in Appendix A, from table A.7 to table A.12.
Source: Human Fertility Database. Own elaboration.

With similar patterns when compared to Portugal, Spain had still a very particular fertility evolution. We dare to say that Spain is the country in our analysis, with the simplest pattern of fertility characterized with a constant decline. From 1964 to 1976, Spanish fertility was characterized by a constant but small decline followed by steeper one until 1997. By that time Spain was referred in the literature as one of fertility *lowest-low* European countries (e.g. Kohler et al., 2002; Kohler and Ortega, 2004).

Spain is the exception with regard to fertility patterns in the last two decades. An upturn on the TFR between 1997 and 2008 create expectations on the Spanish fertility recuperation, failed in 2009 when fertility declined once more. Furthermore, when the segmented TFR is reflected in the ASFR, first a decline is observed mainly for the curves under the first three breaks with no changes in the age of peak fertility (which mean that no significant postponement was observed). It was within the last two breaks that the postponement effect was really visible.

As mentioned before, apart from Hungary, Sweden had the most fluctuating TFR patterns, still with the highest fertility rates since the 1990s. As Portugal, also Sweden had the first TFR break by 1965, followed by a decline in fertility levels until 1982. The ups and downs observed across Swedish fertility were identified by Sobotka (2004), as partially induced by the extension of the period eligibility for paid parent leave for mothers in 1986, which accelerate the couples own decision to have more than one child. In one decade (1980s to 1990s) the TFR rose to the values of late 1960s. Still, some years later the TFR values were in 1998 almost the same as in 1982. After 1998 the Swedish fertility changes are in direction, together with the postponement transformations, recuperation.

Notwithstanding the oscillations observed within the TFR, there are no expressive changes in the age-specific fertility rates. Sweden is in fact the country in our analysis with fewer changes within the age-specific rates. The substantial changes are at the peak fertility age, which changed by more than five years between 1960 and 2012, as result of the massive postponement.

2.4.4. From the birth order contribution to the Total Fertility Rate to the postponement in the transition to motherhood and to the second birth

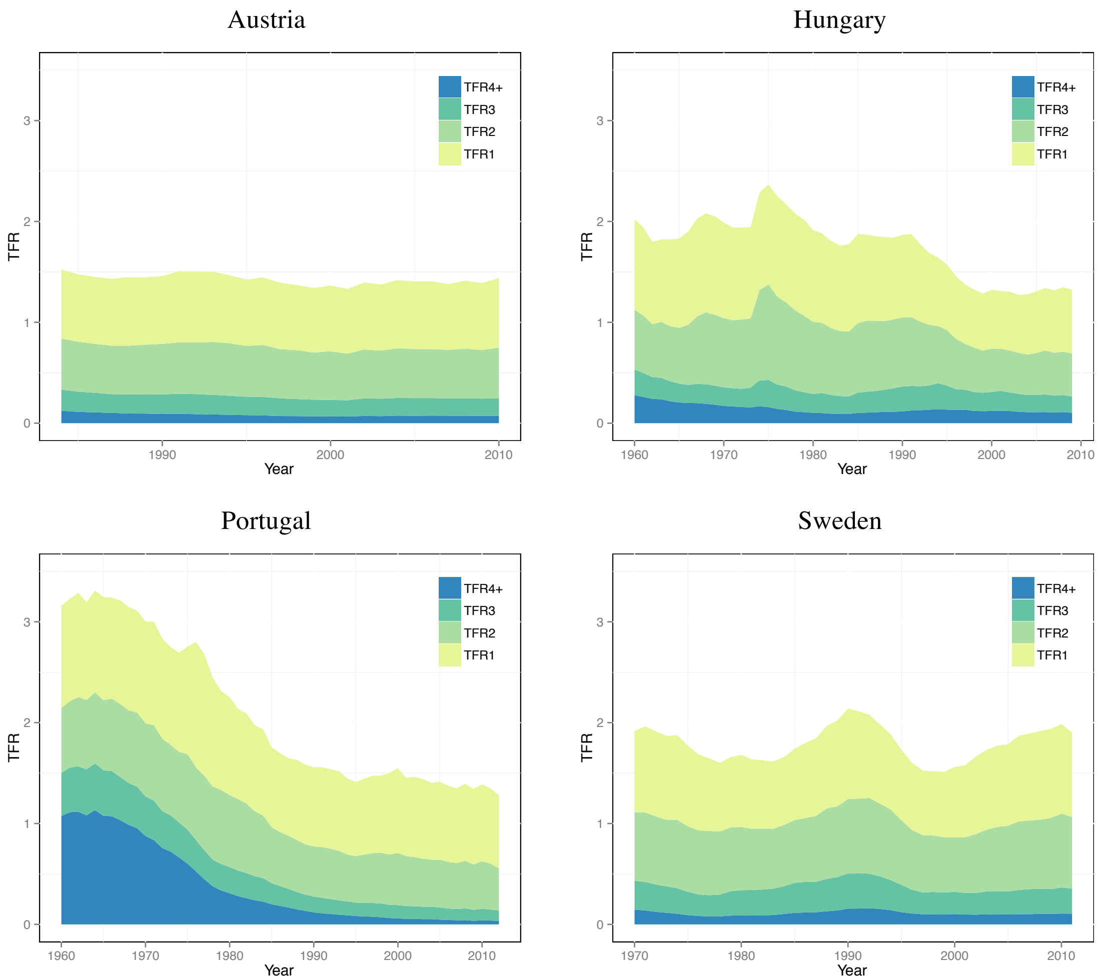
The postponement previously observed in the total number of births by country is partially explained by the direct changes in the transition to the first birth and consequently to the following ones. The fertility postponement is intrinsically related to the postponement of the entry into parenthood, in that the moment when the couple decide to become parents could influence the decision on the second and following births.

Furthermore the motherhood transition and the transition to the second birth have been widely discussed in the literature, e.g., Goldstein and Kreyenfeld (2011), Frejka and Sardon (2007), Kohler and Ortega (2004), Castro Martin (1992). We further identify that in countries as Portugal, with low fertility levels, fundamental changes in the recent patterns of fertility are directly related to the first and second births. Figure 2.6 plots the contribution of each birth order to the total fertility rate, i.e., it corresponds to the stacked representation of TFR by parity order (for detailed information see Appendix A, table A.16). The analysed time periods differ from country to country, due to data availability restrictions, starting in 1960 for Hungary and Portugal, in 1970 for Sweden and in 1984 for Austria.

Due to the shorter time period information on the Austrian fertility by parity, the country has the flatter trend, result from the absence of higher values from the 1960s and 1970s. Yet, from 1984 until 2010 the contributions by parity are steady, with a small decline on the higher order (4+). The Swedish and Hungarian parity fertility patterns, presented a constant contribution from each parity order. In both countries the first birth contribution increased by two percent in Sweden, and four percent in Hungary while the contribution from the second birth to the TFR increased less than three percent. As for the contribution of the highest birth order, the Swedish women declined by three percent while the Hungarian increased by one percent.

The main focus of figure 2.6 is thus the Portuguese evolution. From 1960 to 2012 the contribution of first births to total fertility rate increased by twenty-five percent. From 1960 to 1975 the main contribution to the TFR was from parity 3 and 4+ with a contribution from five percent in the 1960s and thirty-four by 1975. It was by the revolution time that the fertility of higher order decreased significantly its contribution to the overall total fertility rates. In 1976 the year after the revolution, as result from younger fertility, the contribution from the first and second births increased and the contribution from the highest order declined to less than thirty percent.

Figure 2.6: Stacked TFR by parity order, in Austria, Hungary, Portugal and Sweden



Notes: For Austria due to data availability the plotted information is only since 1984 and for Sweden from 1970.
Source: Human Fertility Database. Own elaboration.

Already identified in figure 2.4, Portugal, Austria and Hungary had by the late 2010s identical TFR levels and MAC as well a very similar mean age at first child (table 2.3). Yet, the differences are identifiable when the parity contribution to the total fertility is analysed. The more analogous among the three countries is the contribution of second births with approximately thirty-four percent. For Austria and Hungary the first birth contribution is around forty-eight percent in Portugal that contribution is ten percent higher. Nevertheless the difference for the total contribution is compensated in Austria and Hungary with contribution from higher parity orders. The Portuguese outlook revealed an almost null contribution form families with four or more children with a value of 0.025 by the year of 2012 against the value of 0.31 children per women from 1960.

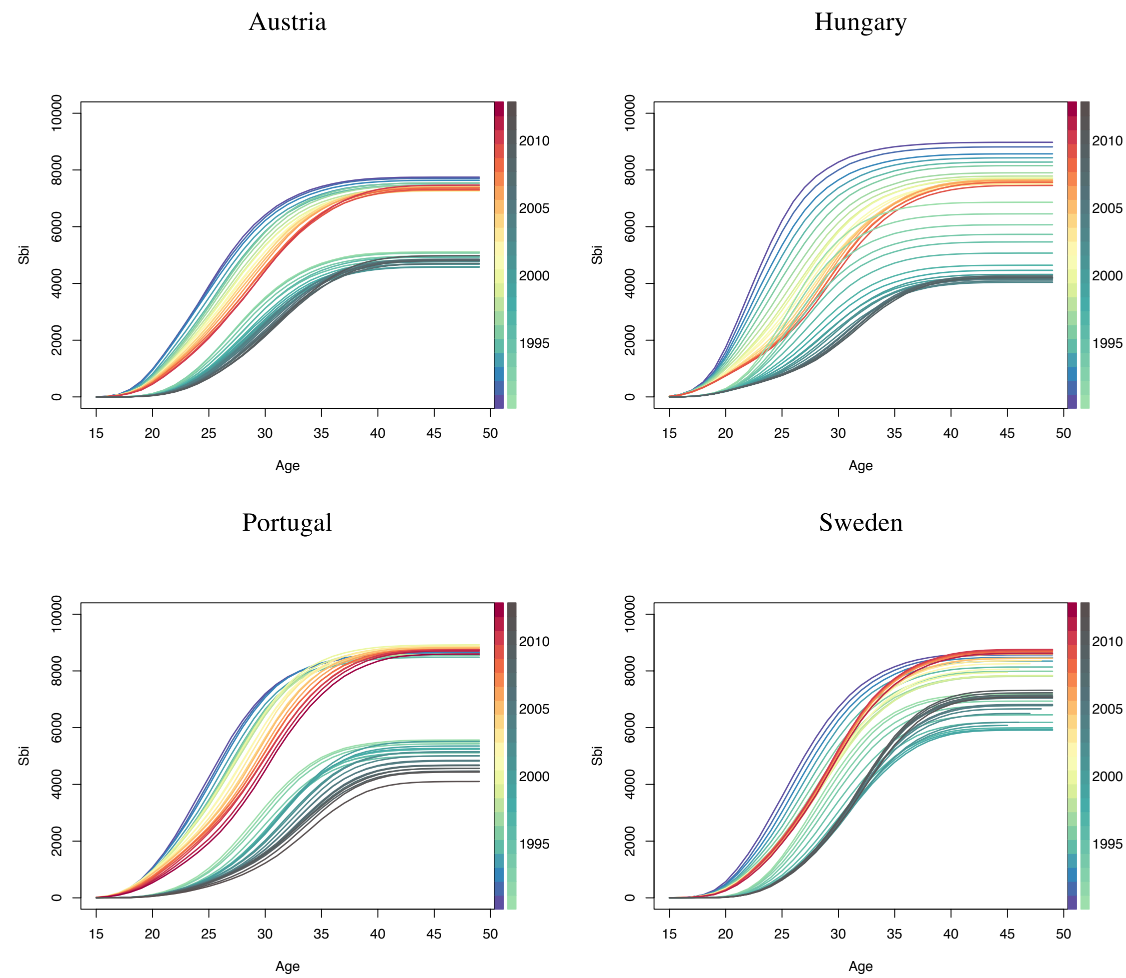
One of the most discussed characteristics from the second demographic transition (more detailed information and analysis presented in the following chapter 3) is the family formation postponement and the consequent delay in the transition to the first birth. Kohler and Ortega (2002), identify the fertility *ageing effect* as the result from high first birth postponement until such late age that ultimately the following births not occur. Such ageing affect gain importance with the constant postponement observed across Europe.

Furthermore, due to the significant contributions from the first and second births to total fertility rate the transition to both parities should be discussed. Thus, we discuss the fertility postponement through the visualization of cumulative births and how they evolved over the last decades. As mentioned before, when data is available and the fertility table it is possible to elaborate the final calculation related to the cumulative births of order i by exact age x defined before as Sb_i.

Figure 2.7 plots the transitions to first and second birth for Austria, Hungary, Portugal and Sweden between the years of 1991 and 2012. The common trend for the four countries was already observed in the previous analysis and discussion regarding fertility postponement, particularly of first birth. With the exception to Hungary where no signs of recuperation at the first birth are visible, for Austria and mainly for Portugal and Sweden even with a postponement to later ages, in more recent years the number of first births supressed the older years, especially after age 35. If we consider the median age (were 50 percent of women exposed to the event of becoming a mother and to have a second child) significant differences between and within countries can be observed. From 1991 to the end of the period under analysis, Sweden was the country with the smallest differences, at the median age. The postponement was of about three years, while in Austria the change was for four years, five years for Portugal and six in Hungary.

The postponement took place very tenuously in Austria, and on average the differences between the median age at first and second birth are about two years (table A.2 in Appendix A). A smaller recuperation was observed at later ages especially in the transition to the second birth. For Hungary, the fertility changes patterns are unique, in the sense that, is among the four countries the one with larger transformation and a greater decrease in the number of births. Expressed by the difference of six years at the median age at first birth (from 1991 and 2009).

Figure 2.7: Cumulative births (Sb_i) in the transition to the first and second child (from age 15 to 50), in Austria, Hungary, Portugal and Sweden



Notes: 1) The figures present two colour palettes. The palette with the colour range from blue to red regards the transition to first child, while the palette with the colour range from light to dark green regards the transition to the second child. 2) To all countries the starting point year is 1991, yet the last year available was, 2010 for Austria, 2009 for Hungary, 2012 for Portugal and 2011 for Sweden. 3) Detailed information in Appendix A, tables A.17 to A.24.
Source: Human Fertility Database. Own elaboration.

In Portugal, from 1991 to 2012, and even with smaller difference when compared e.g. with Hungary, the median age registered a difference of five years. Yet, the changes in the fertility patterns at later ages (in the most recent years) seem allowed for fertility recuperation, or at least to mitigate the postponement effect. On the Portuguese cumulative second births the figure revealed a decline and strong postponement in the transition. Furthermore for 2012 the decline increases, on opposition to the recuperation observed for the first births. Portugal is the country with the highest average difference at the median age from the first to the second birth (approximately four years - table A.2 in Appendix A).

The Swedish fertility patterns in the transition to the first and second birth are homogenous over the recent years, with significant signs of fertility recuperation at older ages (after 30). From 1991 to 2000 on the transition to first birth, the median increased by three years, becoming constant until 2011 (the last available year to Sweden). The fertility patterns of Sweden stand out mainly by the recuperation of the second childbirths in the last decade.

The transformations across the last decades in European fertility and discussed over this chapter by the changes in six European countries, allowed to identified that the fertility postponement at the total births is explained by the different parity fertility patterns. When presented the fertility transition by the cumulative births order, we identify Austria as the example where the transition to motherhood and to the second child presented less changes, while Hungary had higher differences. Still, if on one side Sweden stands out by the fertility recuperation registered at later ages in both orders, on the other side, the Portuguese case reflects the fertility patterns where the first births recuperation (mainly at letter ages) is the main contribution to the final total fertility rate. However we must keep in mind that the fertility recuperation observed especially in Portugal is insufficient to allow period fertility recuperation.

2.4.5. Measuring the real *quantum* fertility without *tempo* effect

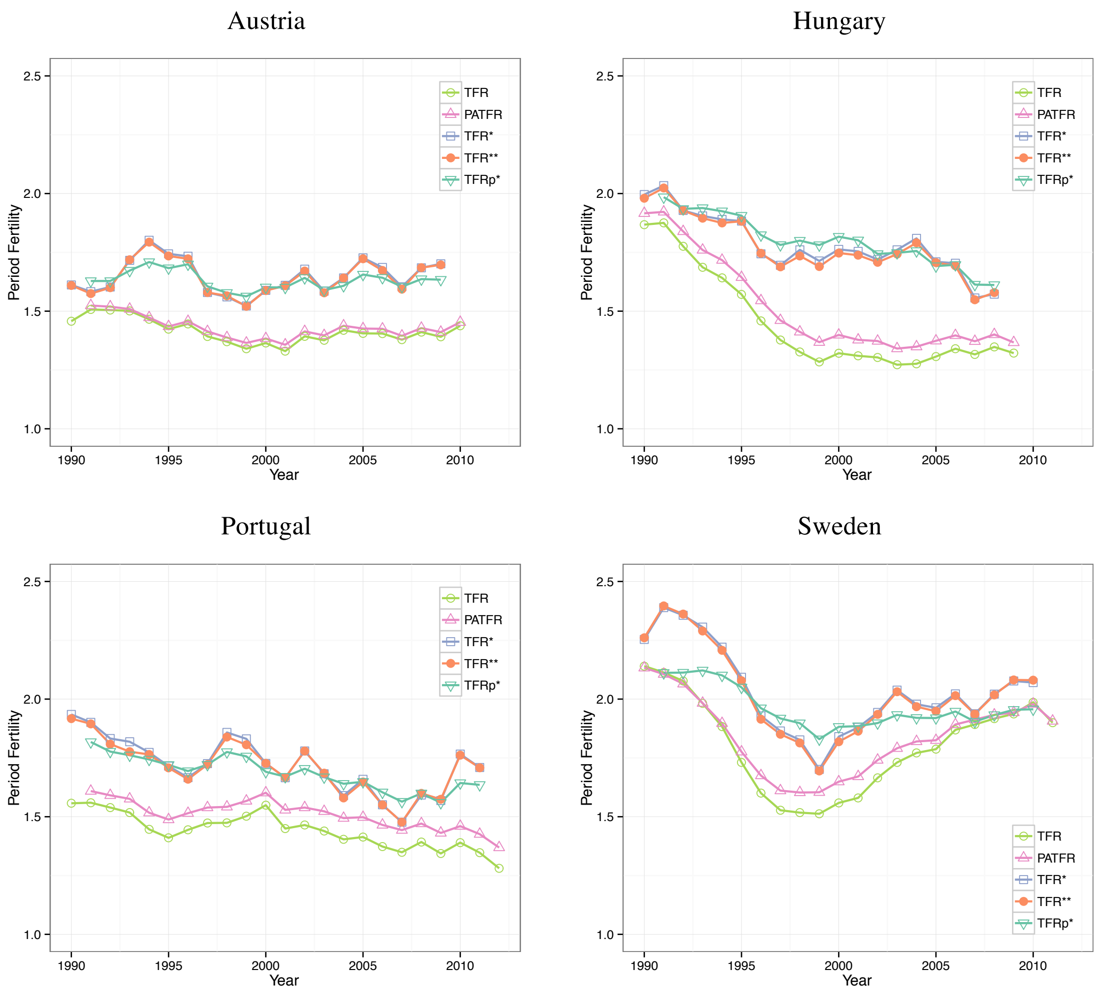
Although TFR is not affected by changes in the female age structure, the ASFRs are influenced by the distortion on the fertility timing, conditioning the final *quantum* in the fertility schedule measured by the TFR. The fertility postponement shifted the childbearing ages to later ages with a temporary effect of depressing the total fertility rate (Sobotka et al., 2012). Since 1970, fertility postponement has become one of the most prominent features of European fertility trends (Sobotka, 2004). Moreover the distortions observed in TFR are broadly discussed in the literature (please recall sections 2.2 and 2.3.4), and several tempo-adjusted period fertility indicators are proposed to improve period fertility measure.

In this subsection we analyse differences between the selected countries in their period levels from 1990 to 2012 accounting for the tempo effect. With the purpose to remove tempo distortions caused by the changes in the timing of childbearing, several indicators considered "adjusted" variants of the conventional period TFR are presented and discussed. Figure 2.8 summarizes the evolution since 1990 and across the past three decades measured by the traditional TFR, the adjusted TFR* and TFR**. Furthermore we also control for the parity composition of the female population with the PATFR (not adjusted) and TFRp* (detailed information table A.25, Appendix A).

Commonly, all the adjusted indicators present higher values than their non-adjusted counterparts indicating fertility tempo effect due to the postponement. Thus, the differences observed across Austria, Hungary, Portugal and Sweden are transversal, where the adjusted indicators are higher than the observed TFR. Across all countries the TFRp* suggests a stable fertility rate with fewer fluctuations, than the other tempo adjustment methods. E.g., for Austria and Portugal, the TFRp* suggests a stable fertility rate, with smaller impact from the ups and downs in the observed TFR. The adjusted indicator reflects the upturn in the observed TFR. Also pointed out by Bongaarts and Sobotka (2011), while TFRp* suggests a stagnation in the fertility *quantum*, the other adjusted measures indicate a slight increase. Measures can differ widely in specific time periods, especially during the times of rapid fertility changes and trend reversals, therefore indicators as TFR* and TFR** *react* more to effective TFR changes.

Besides the fact that the adjusted TFRs present higher fertility rates, the ones registered in Austria, Hungary and Portugal are a reflection of their lower TFRs. For those countries, the adjusted TFRs present values from 1.5 to 2 children per woman, while for Sweden the values are around 2 or higher all over the period.

Figure 2.8: TFR, PATFR and Adjusted TFRs, in Austria, Hungary, Portugal and Sweden



Source: Human Fertility Database. Own elaboration.

The PATFR is an indicator that measures fertility with greater accuracy than TFR itself, by controlling the tempo and parity composition of the female population. By controlling for a given birth order, the hazards from one order to the next one allow to obtain more accurate results regarding the mean number of births. When data availability allows obtaining fertility tables we can consider the analysis of TFR controlled for period and age. For all four countries the PATFR is superior to the TFR. Yet, within our analysis, only Hungary and Portugal presented higher, but still no significant differences between the TFR and the PATFR. For Sweden, since 1995 to 2005 TFR decreased, resulting in higher differences between both indicators, while for Austria, the patterns and fertility levels are the same.

Like it was discussed earlier, tempo adjustment measures provide a framework that enables to estimate the tempo and *quantum* effect, answering to the fundamental question: *What would be the level of period fertility in the absence of postponement?* Table 2.4 provides a summary of fertility on the last decade, controlled by tempo and parity (PATFR) and without the tempo effect (TFR*, TFR** and TFRp*).

In the absence of tempo effect, the higher effect on the fertility *quantum* would be in Hungary with a recuperation of more than 0.38 births, yet from the TFR* to the TFRp* there are significant differences. While for Sweden if we consider TFRp* (the indicator with less fluctuation) the changes in the final TFR would be 0.12. For Austria and Portugal the differences in the fertility from the original indicator and without the tempo effect are more homogenous even when controlled by parity (TFRp*).

Table 2.4: Summary table for the TFR, PATFR and Adjusted TFRs, on the past decade in Austria, Hungary, Portugal and Sweden.

		Austria	**Hungary**	**Portugal**	**Sweden**
		(2000-10)	(2000-09)	(2001-12)	(2000-11)
	TFR	1.39	1.31	1.39	1.80
	PATFR	1.41	1.38	1.47	1.84
	TFR*	1.65	1.71	1.64	1.98
	TFR**	1.65	1.69	1.64	1.97
	TFRp*	1.62	1.55	1.63	1.92
Quantum effect	TFR*	-0.26	-0.39	-0.25	-0.18
	TFR**	-0.25	-0.38	-0.25	-0.17
	TFRp*	-0.23	-0.24	-0.24	0.12

Source: Human Fertility Database. Own elaboration.

For all four countries, the fertility trend indicates over all proposed adjusted TFRs, fertility never lowers than 1.5 children per women. In sum, adjusted indicators do seem to provide optimistic (higher) fertility patterns. Furthermore, when controlled by tempo effect and birth order the fertility trends seem more stable and accurate.

2.5. Discussion and concluding remarks

2.5.1. Discussion

This chapter has described and discussed the cohort and period fertility patterns across six selected European countries, form 1960 to 2012 (widest available range). Such period was characterized across all Europe by a fundamental change in the fertility figures, the shift of fertility to a later childbearing age (*postponement*) and the consequent fertility decreasing level (*quantum*). Changes in the total fertility rates (by cohort or period) postulate a vivid impression of European fertility trends also identified by previous researchers (e.g., Soboka 2004, Surkyn and Lesthaeghe, 2004). The *postponement* and *recuperation*, as well as the *tempo* and *quantum* effect are visible not only in period fertility but as well in the cohort perspective. From the older to the younger cohorts it was possible to observe the intense transformation from high to low fertility levels.

Without exception, fertility postponement has taken place in all countries under analysis. Portuguese women presented the lowest level of period fertility (1.2 in 2012), and besides Austria, also registered the lowest cohort fertility (1.8 in the 1968 cohort). Yet, such low fertility patterns are not directly related to the higher mean age at childbearing, in that perspective the Spanish and Swedish women had the higher period and cohort mean ages. If by the 1960s Portugal had the major difference (-4.3 years) between the total mean age at childbirth and the mean at the first child, by 2012 the difference declined to the average differences experienced by Austria, Hungary and Sweden (-1.7 years). Cross-countries differences allow confirming, with the use of segmented regression, that even with several differences under the fertility patterns, all countries presented identical trends.

As mentioned before, Rydel (2002: 12) states that *there was a sharp break in fertility trends around 1965 in almost all Western Europe, followed by 10 years of rapid decline in fertility until historically unprecedented low levels were reached*. As we can observe in all countries the first breakpoint on the TFR occurred by the mid 1960s, Austria and Hungary, however, within that same period experienced more than one significant break. The fertility postponement was indeed a constant characteristic since 1960 but, with the exception of Portugal (since 2000) and Spain (since 2008), in the last identified fertility break, all countries presented signs of fertility recuperation.

The second demographic transition theory pointed out relevant demographic paradigms such as the family formation postponement and the consequent delay in the transition to the first birth (van de Kaa, 2002; Surkyn and Lesthaeghe, 2004; Kohler et al., 2002). The ageing effect as result from the constant postponement until later ages reduced the timeline for the following births can occur (discussed further in chapter 6).

Furthermore, the relationship between the total fertility and the correspondent parity contribution revealed between countries, allowed to identify the fundamental changes occurred in the fertility patterns. A strong negative impact can be clearly identified while women continue to postpone their first child and remain with one child. Beside the severe postponement observed at later ages, Portugal, as well as Sweden, demonstrate signs of fertility recuperation at later ages.

Detailed analysis of tempo-adjusted measures in the past three decades enable a perspective of period fertility trends without any tempo effect. In all countries the TFR was negatively influenced from the shift on the fertility patterns to later ages. The fertility tendency indicates that, for all countries possible to calculate adjusted TFRs, no value lower than 1.5 children per women is achieved. Like suggested by Sobotka in 2004 (pp 172) we can interpret such results as an *indication that lowest-low fertility in Europe is a result of increasing age at motherhood and, therefore, a temporary phenomenon that will fade once the postponement of childbearing stops*.

In the last decade Hungary experienced the highest tempo effect at the final *quantum* fertility and Sweden the lowest. The identified outcomes are result of the social, cultural and economic context from each country individually (Beck and Beck-Gernsheim, 2002). And even when period fertility was measured by a more accurate measure (PATFR), controlling the tempo and parity composition of the female population, the average difference between the obtained PATFRs and TFRs is marginal.

It would be naïve to assume that the changes on the fertility patterns from the six countries under analysis *occurred by themselves* without the influence of social and economic transmutations. The observed low period fertility rates are associated with the on-going delay of childbearing occurred in the period and cohort fertility *quantum*. Consequently, the intrinsically relation between tempo and *quantum* effects resulted in the gradual decline both in the period and cohort values. The trends of low fertility countries could be explained by the difference in the factors motivating fertility recuperation across other European countries such as France or Sweden. Thus, the social or economic measures implemented in some countries could explain the fertility increase in the last decade (e.g., Neyer and Andersson, 2004). The following chapters will discuss those transformations with special attention to the Portuguese fertility patterns and trends.

2.5.2. Concluding remarks

The final period and cohort fertility levels decreased across the past decades over all countries under analysis, and mainly for Portugal there seem to exist a direct relationship between period and cohort fertility trends. The observed period fertility *quantum* is the direct result from the postponement contribution from several cohorts across the same period. The cohort analysis has been fundamental to describe the period fertility trends and the low levels in both real and synthetic cohorts are correlated. Until 1982 Portuguese women decline intensively their *quantum*, and since that year the number of births haven't allowed over the past decades to replace the Portuguese population, not reaching the demographic needed 2.1 children per women, which is the level at which a couple had only enough children to replace themselves[5]. It was also after that year that the postponement effect increased.

The total fertility rate is an age-standardized, single-value, i.e., a summary measure of fertility, a measure with a powerful and easily understood, interpretation. Yet

[5] The replacement level of 2.1 children per women, assumes that it is expected that (1) every woman has a children with (2) no changes in mortality rate and (3) on the absence of migration.

such measure when obtained in the period perspective is extremely influenced by the *tempo* and *quantum effect*. When measuring the fertility through the PTFR, as through the CTFR the postponement observed in both indicators causes an effect that deflates the age-specific fertility rates. Thus the purely demographic analyses throughout this chapter allowed identify for Portugal a double fertility postponement, in both period and cohort measures, regardless the postponement effect.

Without the period postponement effect fertility levels could increase, yet never to levels of population replacement. And also the differences between younger and older cohorts through the benchmark cohort method allowed identify that the low levels of period fertility are also noted in the cohorts level.

Furthermore in the Portuguese context, previous analysis allow to conclude that (1) from a period or cohort perspective, the fertility recuperation at later ages do not compensates the postponed from younger ones; (2) Portuguese women continue to postpone their first child and, on average, stops there, having no more children; (3) Even that Portugal presents such low fertility trends, is not a country exclusive situation, once that Austria (particularly) is side by side with the Portuguese trend; Yet compared to the Iberian neighbour – Spain – Portugal, by the year of 2012, was for the first time at the lowest-low fertility level with 1.28 children per women and the difference between the mean age at childbearing and at birth of the first child was less than two years.

CHAPTER 3

PARENTHOOD TRANSITION: FROM INDIVIDUALIZATION TO FAMILY FORMATION

3.1. Introduction

The individualization theory has as main characteristic the emancipation of individuals from traditional social norms that resulted from the industrial society, characterized by the *freedom* from social classes, status, family or gender. Relations between early experiences in the family and transition behaviours are now well established. Over the past years and across several cohorts, the links between educational level and occupational status has been weakened and at the same time that family has reached new levels of instability, cultural representations of love and work emphasize flexibility, choice and impermanence.

Individualization is defined as a process of modernization in which individuals' behaviour is no longer conditioned by variables given by birth (e.g., sex, family, origin, or age) but variables that correspond to personal choice (e.g., personal effort and education) start to have more predictive capability (Gaspar, 2013). In such perspective and in the transition to parenthood we can so identify two main dimensions: 1) *family background* characteristics that born with the individual and that can also be acquired over the life course; 2) *individual values* and *social norms* established from each cultural and social context. To Beck and Beck-Gernsheim (2002) *depending on family background, education, occupation, personal relationships and biographical features women will pursue various strategies in their own individual quest*. Influenced by socio-economic context changes and by the increased level of education, the family formation and consequently, the transition to parenthood play today a central role in the definition of life trajectory.

Furthermore, in the context of the individualization theory, the values of individuals have changed, and not only the importance of family but also the female autonomy and the desire for smaller families have increasing importance in the society. In the process to measure social individualization, not only birth covariates but also covariates that correspond to personal choices provide more predictive capability. Thus, several questions could be raised. Nowadays, the individual characteristics continue to be decisive? Contemporary society is evolving towards a society in which the individual contexts characteristics may be gaining explanatory power in predicting fertility behaviour? What is the impact from the individualization process within a framework of low fertility?

Thus, this chapter investigates the transition to parenthood within two theoretical dimensions: 1) into the light of individualization theory, 2) with the family-background and either social or individual values. Those two theoretical dimensions are seen as predictive in order that can contribute with faithful insights to explain fertility postponement.

The main goals of this chapter are the following:

1. To discuss specific issues related with the individualization theory;
2. Evaluate the sociological and demographic paradigm of fertility decision and postponement;
3. To describe how the familial background, the social norms and individual values contribute to the fertility *tempo*;
4. And, to illustrate a potential explanation for the individual behaviours in the time of fertility decisions.

The analysis is based on period data corresponding to the 2013 Portuguese Fertility Survey (PFS), for men (aged 18 - 54) and women (aged 18 - 49) living in Portugal, with or without children.

Thus, this chapter is divided in 5 sections. The introduction is followed by a theoretical discussion on the individualization theory, driven by an evolutionary perspective from sociology to demography (section 3.2). Section 3.3 provides the description of data and methods. In section 3.4 the results are presented, but divided in three additional subsections. Subsection 3.4.1 presents the results for the fertility transition and explores how the familial background can influence it, while subsection 3.4.2 presents the influence of social norms and individual values on the transition to first birth, and finally in subsection 3.4.3 the results of several event history analysis models are presented. The subsequent section discusses and concludes this chapter.

3.2. Theory of individualization – from a sociological to a demographic perspective

Societies continuously change and evolve over time, and with them the attitudes, norms and values orientations that individuals assume. Going through civil wars, foreign dominations, scientific progress, industrialization and religious revolutions, societies mature, and accumulate cultural heritage that is at the basis of social and demographic progress. The path towards modernity is a long and slow process that extends over time. However, looking to the extent to which European societies have adopted modern post-materialist value orientations and behaviours, we observe significant cross-country variation. While some countries, such the Scandinavian ones, are well ahead in embracing post-materialist attitudes, other such as the Mediterranean ones, appear to be having a hard time in leaving them behind(Aassve, Sironi and Bassi, 2011: 316).

To Beck (1992) and Giddens (1992) we are at the late contemporary era of *modernization* and *individualization*. Societies moved from imposed constrains, moral codes and traditional customs towards less rigid ones where major changes were stimulated by the economic prosperity, education and a more egalitarian welfare state. The social structures of class, gender, religion and family are withering away so that people no longer have pre-given life trajectories but compelled instead to make their own reflexive choices and hence create their own biographies (Duncan and Smith, 2006). A dimension of diversity within developed societies that was drawn in the beginning of the century is the phenomenon of individualization, for which the emphasis is placed at the individual level (Billari and Wilson, 2001). In few decades, the traditional and well know social aims have been replaced by the project of *self*. The long-term changes are the result of timing and sequencing of transition markers *caught up by the* historical time, reflecting also the short-term instabilities between and within cohorts. *The modernization of societies is often considered the underlying process driving long-term trends that differentiate successive cohorts, but short-term economic changes and historical events have difficult these trends* (Shanahan, 2000: 668).

Modernization of societies has coincided with the standardization and individualization of life course. Standardization is intimately related to the *compression form* at school ages, marriage, parenthood, and labour market, whereas individualization is found in increasingly diverse consequences of these markers. However, modernization and individualization trends have been complex not only by the short-term economic fluctuations and by the historical events, but also, within cohorts, by social inequalities such as gender, race and socioeconomic status (Shanahan, 2000). Buchmann in 1989 (*in* Shanahan, 2000: 671) stated that the *highly standardized trajectories of school, work and family have been shattere by several structural and cultural developments since the 1960s, leading to new levels and forms of individualization*.

To Gaspar (2013: 708) the modernization comprehends a process of individualization, and for that the author pointed out two main assumptions. On the first one, *the process of individualization indicates the phenomenon by which, as a society advances in the process of modernization the factors or variables given by birth (age, sex, family origin) tend to exercise less influence on individuals behaviour, attitudes, and perceptions while other factors that depend on personal effort tend to play a larger role in determining their behaviour, attitudes and perceptions. In contrast, traditional societies generate specific expectations about its members behaviour based in their sex, age and family origin*. The second hypothesis leads us to assume that*, as a society advances in the process of modernization, it moves toward the decrease in or even disappearance of gender inequality*.

In the context of individualization theory evolution, families are crucial in the perspective were the social ties of kinship and marriage that are weakened. It is no longer expected that we have to get engaged and marry in adulthood and then have “four” children, or stay in the same marriage for life (Duncan and Smith 2006). Different family involvements, related with variations in family structures and economic resources, lead to different pathways to adulthood (Shanahan 2000). Then *it is no coincidence that the* *emergence of the public scientific debate on childlessness paralleled the onset of dynamic changes in fertility, family patterns, and living arrangements, and a concomitant value shift towards individualization and personal self-fulfilment (…). Indeed, social legitimisation of voluntary childlessness and rising levels of final childlessness are associated with this transition* (Sobotka 2004: 126).

In the demographic context, individualization is a term that can be used as an instrument for developing different perspectives in the subject and to detect different life trajectories. To Ehmer et al. (2011) *individualization is primarily a framework concept that needs to be defined more specifically, translated from the macro to the micro level, and combined with further theories*. To the authors and regarding the fertility theories, so far the individualization perspective had focus in three main concepts, 1) *autonomy and freedom of choice*; 2) *human dignity*; and 3) *individual self-fulfilment*. The first concept is linked to the possibility that whether the fertility decline was the expression of a new and modern era, enabling couples to make their own reproductive and family planning choices. The second one is related to the right to live in equal ways independent of origins or other characteristics, such as religion or gender. The human dignity concept is related to the societal and individual investment in the up-coming generations, depending on the historical context. Finally, the individual self-fulfilment concept is related to the freedom of choice that is itself not unconditional, but yet based on education and on the possibility of societal participation (mainly female empowerment).

Many say that women are the most benefited from the process of individualization, which directly or indirectly affects the family dynamics (Ehmer et al., 2011; Beck and Beck-Gernsheim, 2002; Gustafsson, 2001). Beck and Beck-Gernsheim (2002: 54) state that *when the present generation of women is compared with earlier ones, the danger is that continuing material and social inequalities between men and women will be pushed out of the picture by an image of ever advancing progress*. In a century, rapid changes have taken place in the context of women's lives, which implies complex and contradictory process. Women were increasingly released from direct family ties and the female demographic and social biography experienced an individualization boost. Nevertheless *women still bear many more responsibilities than men within the family and are much less protected in the labour market. These conditions* *generate numerous contradictions in women's lives, among others, the high level of work-family conflict its always there* (Gaspar, 2013: 713).

In such context, the values of individuals have changed, and not only the importance of family but also the female autonomy and the desire for smaller families have become more important in the society. Influenced by socio-economic context changes and by the increased level of education, the family formation and consequently, the transition to parenthood plays today, a central role in the definition of life trajectories. Family and parenthood dynamics are gradually changing as result of historical evolution, the progressive decline of social traditional norms and changes towards individualization has made itself. The individual negotiation and life planning replaced the traditional social rules and models. Parenthood has become a matter of choice, an agreement between partners about "being ready" to have a children. Family norms, social concepts and attitudes have not disappeared, but rather transformed (Sobotka, 2004). *Whereas family always used to occupy the whole field of vision, now men and women are becoming visible separated individuals, each linked to the family through different expectations and interests, each experiencing different opportunities and burdens. In short, the contours of distinctively men and distinctively women lives are now becoming apparent within the family (…)* (Beck and Beck-Gernsheim, 2002: 90)

Changes in individuals related not only to attitudes, values and family organization, but also in the labour market sphere, are largely consistent with the demographic behaviour developed in *tandem* with a new demographic pattern (Giddens, 1991; Beck, 1992; Aassve, Sironi and Bassi, 2011). Such social and demographic transformation was increasing, and nowadays is well known as the Second Demographic Transition (SDT), which is characterized essentially by new forms of living arrangements, family formation and fertility postponement (Lesthaeghe and Van de Kaa, 1986). In fact theories focusing on the individualization process have an important contribution to demographic theories in general and to the explanation of family and fertility dynamics in particular. Individualization is a multidimensional term, which, in terms of fertility analysis can refer to the family, as well as to institutional areas (from education to labour market and welfare state).

To Van de Kaa (1987) the idea is that in many European countries, spearheaded by the Scandinavian ones, the importance of the family declined and was replaced by widespread support for more liberal demographic behaviours, such as divorce, cohabitation and out-of-wedlock childbearing. However some argue that, *the demographic transition was not a consequence of a change in the attitudes towards the family; rather it was the result of an adaption of traditional values to new environmental settings*, as an adjustment to the individualized societies (Aassve, Sironi and Bassi 2011: 316). The demographic transition had, besides the distinct decrease in mortality correlated with the improvement of living conditions, other demographic direct consequence: the fertility decline. It was no longer necessary larger offspring to generate even larger offspring as a way to guarantee old age support, and due to the new production technology the demand for cheap labour by children declined. Once that social, individual attitudes and value orientations are a major *protagonist* in explaining demographic behaviour, is then argued that couples adjusted to the new environmental settings, suppressing their desired and effective fertility (Lesthaeghe and Van de Kaa, 1986).

Modern attitudes and values were willingly embraced, and the low-fertility rates arising in modern societies are exactly the expression of a new set of attitudes, children lost their centrality and family and institutions loses the importance that characterized it before. This has probably been the most influential model of contemporary demographic change in Europe since its formulation in the mid 1980s. The concept of second demographic transition refers to important changes in family behaviour, such as an increase in unmarried cohabitation, the postponement of marriage and parenthood and an increase in childlessness. Second demographic transition theory can essentially be seen as one dimension of a wider individualization theory, with a similar expectation of convergence to diversity (Billari and Wilson, 2001).

To sum up, once that this is a question broadly discussed in the literature (Kane, 2013; Kertzer et al., 2009; Philipov and Jasilioniene, 2009; Sobotka, 2004 and 2008; Van de Kaa, 2002; Lesthaeghe and Van de Kaa, 1986), we can quote Surkyn and Lesthaghe (2004: 47): *the demographic changes are linked to (i) the accentuation of individual autonomy and ethical, moral and political spheres; (ii) to the concomitant rejection of all* *forms of institutional controls and authority; and (iii) to the rise of expressive values connected to the so called higher order needs of self-actualization*. There is considerable disagreement about whether the last decade's changes in the demographic behaviour represent a transition in the same spirit as the demographic transition from the industrial revolution. Those who consider the *cultural evolution approach,* argue that the differences in today's modern attitudes are a natural consequence and continuation of the societal transformation set in motion by the industrial revolution, driven by the economic development follow a continuous diachronic path (Aassve, Sironi and Bassi, 2011). *The core of the second demographic transition concept lies in the connection of demographic shifts and value transformations, namely growing individualization, a decrease in normative control and a shift in individual preferences* (Kantorová, 2004: 247).

It was after 1970 that the second demographic transition was identified all over Europe, however it is not accurately established when does the changes in family formation spread. Surkyn and Lesthaghe (2004) state that by the end of 1980s, several features of this demographic transition seem to stop at the Alps and Pyrenees. The South European countries (Italy, Portugal and Spain) had started the postponement phase with respect to marriage and fertility, but features such as cohabitation and births outside wedlock, had either failed (Italy) or were just beginning to spread (Portugal and Spain). After 1990 this framework changed rapidly, and in the Iberian Peninsula, the proportion of births outside marriage rose rapidly, as a result of informal cohabitation and procreation, which was spreading.

In West Germany as well as in France e.g., as a sign of a rise of individualization and equality between men and women, the cohabiting unions increased, more sceptically to the Germans than to the Frenchs. Family dynamic changes was seen as a process of individualization, as part of the polarization in the progression of emancipation. Later in Italy, Kertzer et al. (2009: 93) identified consistent empirical evidence that egalitarian gender norms, spousal (female) autonomy, premarital cohabitation rates and divorce rate are stronger in the North of the country. The same authors state that *attitudinal indicators that tap individualization vary regionally, declining as one moves from the most secularized northwest to the traditional South*. In Poland, Mynarska (2009) identified an impact from the changes in the ideological process, were liberalization of norms, and individualization, gained significance with time, keeping fertility levels low.

There is no single recipe in the modernization evolution explained into the light of sociology (individualization theory) or demography (second demographic transition theory), however, it is nonetheless expected that countries will lead themselves towards the acceptance of modern demographic attitudes. Although the second demographic transition theory does not offer an explicit explanation for ideational changes, it suggests that not only the economic development is positively correlated with higher acceptance of modern attitudes and behavioural norms, as well as the educational attainment can be used as an indicator of these changes. Education is found to be associated with more liberal attitudes regarding the sphere of family ties, but also in the diffusion of ideas such as gender equality and women's empowerment.

Several conceptual distinctions have emerged to describe the diversity of family experiences through time, and together they represent a fundamental re-orientation from viewing families' snapshots to viewing families as longitudinal complexities. We can then say that individualization, second demographic transition and all changes in the individuals' contexts are a transversal relationship, or in a more accurate way, multidimensional. With the evolution of societies, social norms have lost their weight and families, as well as their dynamics have changed, leading to a process of individualization. The "negotiation" between the couple replaced the traditional social norms and rules. Within the last decades of European fertility analysis had as main characteristic the postponement of family formation and the consequent decrease of the family size dimension. Today many couples wish at the beginning of their reproductive life to have an offspring of two, however many have only the first (Frejka, 2010; Kohler and Ortega, 2002; Kohler et al., 2005; Sobotka, 2004).

As mentioned before, parenthood becomes a matter of choice, a determined strategy between the couple when they feel is "time be a parent". In such context several issues are relevant. Nowadays, the individual characteristics continue to be decisive? Contemporary society is evolving towards a society in which the individual contexts characteristics may be gaining explanatory power in predicting fertility behaviour? What is the impact from the individualization process within a framework of low fertility?

3.3. Data and Methods

3.3.1. Data description

The 2013 Portuguese Fertility Survey (PFS) provides data that is used for computing transition rates. The survey represents women in their childbearing age living in Portugal (18 to 49 years old), and men also living in Portugal, with ages varying between 18 and 54 years old. The major advantage of the PFS is that is a highly reliable and representative data set, providing authentic information[6].

Before discuss the selection of the dataset, it is important to draw attention to some shortcomings of the PFS. Its major drawback regarding the analysis of demographic events is that does not provide the *fertility history* to all individuals living in Portugal. The questionnaire application was restricted to those who are in the fertile age window, then cohort approaches are limited, and unfortunately we cannot compare considerable different cohort patterns. Also, the age *time* at childbearing can only be inferred from the parity order and age of the children. The survey hasn't held on the country regions, excluding the possibility to search for regional differences. Other limitation is related with age, once that after age 40 few observations were registered in some categories from the variables. For this reason, we restrict our data analysis up to age 40. Also the marriage or cohabitation age (with the actual partner), is not available, being the only possibility to consider a variable which gives the information about the age at first cohabitation, which does not mean that is the age of first marriage (or the marriage that originate a birth). Furthermore, we omit from our analysis those who do not want to have a child. In the end, this leaves us with the 1324 males and 3143 females (unweight sample) aged 18 to 40 and residents in Portugal in 2013.

The dependent variable used here was the age at birth of first child, controlled for several variables. Instead of key independent variables, we considered two dimensions, where the covariates are presented with the final clusters of its categories. In the first dimension covariates regarding the familial background are presented:

---

[6] The Portuguese Fertility Survey is the result of a complex sample. For each individual it was provided a weight identified, as has the number of individuals in the total population with the same characteristics. Such weight is used to obtain estimates on the total, means and population proportions. Furthermore to obtain standard deviation and standard error also the sample design is included in the analysis. All calculation was preformed with the Survey package with R software.

- *Sex*. Not many often fertility datasets include information on both sexes, however in our sample we have the possibility to describe men and women fertility transition patterns;
- *Nationality*. Used here to compare fertility dynamics in the perspective of Portuguese and non Portuguese individuals, without specifying the country of origin;
- *Birth cohort*. To identify the possible impact of individualization theory instead of individual's age we used birth cohort. Two cohorts are presented[7], (1) before April 25th and (2) after April 25th;
- *Educational level*. Once that no differences were find in previous analysis in the educational levels until upper secondary level (inclusive) we set two categories: (1) until upper secondary education, and (2) higher education[8];
- *Parent's education* (*Father educational level* and *Mother educational level*). In the case of the parent's education previous research on the data revealed that they differ only in two main categories, (1) lower than secondary education, and (2) upper secondary and higher level;
- *Number of siblings*. In this covariate the significant categories are two, (1) until one brother and (2) two or more;
- *Parent's divorce*. Here we took into account four categories, (1) Never (2) Divorced (3) Never lived together, and (4) Other (including those who never lived with the parents or lived institutionalized);
- *Age of leaving parental household*. For this covariate, three categories were measured, (1) Until age 21 (2) After age 21, and (3) Never leaved the parental house;
- *Age at first cohabitation*. Previous research on the data pointed out two categories, (1) Not before the first birth (which mean that the individuals has no experience of cohabitation before the first child) or before age 22, and (2) After age 22;
- *Age at first job*. In this case, we assumed that the behaviour for those that started to work later might differ from those who had a first job at earlier ages or haven't even worked. Then the categories under analysis are (1) After age 18, and (2) Before age 18/Never worked/Not working at the survey time.

[7] The break point was between the two groups of cohorts was the 1974 National Revolution. For further information see chapter 2.

[8] Include individuals with at least one level of high educational level, the minimum educational levels is an individual with a bachelor or equivalent.

In the second dimension regarding the social norms, individual values and fertility postponement, the selected variables were:

- *Desired number of offspring*. Taking into account presented a review of the literature, we point out two categories for the desired number of child, (1) Until two, and (2) Two or more;
- *Ideal number of children in a family that not your*. As in the previous covariate, in this case the approach was exactly the same, and two categories are considered relevant in the analysis, (1) Until two, and (2) Two or more;
- *Maternal conciliation* between family and work. When asked about the opinion regarding conciliation between family and work of the mother individual's answer in two main ways, (1) Not working, and (2) Working;
- *Parental conciliation* between family and work. In a different direction from the previous covariate, the individuals when asked about their opinion on the relationship of family and work for the case of parents gave two main reasons, (1) Not working and working at part-time job or from home, and (2) full time job out of home;
- *Maternal and parental presence*. Individuals were asked about their opinion if: *It is harmful to a child at age school that the mother works outside home?* and *It is harmful to a child at age school that the father works outside home?*. The answer to both questions was (1) Agree, and (2) Disagrees;
- *Personal fulfilment*. This covariate *measures the perception that one have regarding the need of a men or a women to have a children to feel fulfilled*. Thus the categories of this covariate are (1) Entirely agree, and (2) partially disagree;
- *Family significance*. The family significance was measured by (1) Agree or (2) Disagree, that *a children need a mother and a father to grow balanced*;
- *Female autonomy*. Measured by the perception that individuals had on questions as, *Mothers who work outside home can have such a good relationship with their children as mothers who work at home?* and *A women can raise a child alone without wanting to have a stable relationship?* For this covariate the categories of measure are (1) Entirely agree, and (2) partially disagree
- *Postponement*. The fertility postponement was measured by the combination of two of the survey questions (*The desire for a career and personal and social life active leads women to not have a child*? and *Women postpone the birth of children and end up quitting to have children because of their age*?). In this covariate the answer categories are, (1) Entirely agree, and (2) partially disagree;

- *Offspring balance*. The last covariate considered in our analysis asked to individuals if they (1) Agree or (2) Disagree that, *It is preferable to have only one child with more opportunities and fewer restrictions than having more children*.

In the search for a result that accurately explains the transitions to parenthood, several approaches were considered, mainly the known survival analysis or event-history analysis. Event-history analysis is the instrument of choice for a detailed analysis, but for a general overview of the pattern of consensual and marital fertility it has the disadvantage that it easily involves the analyst in an unnecessarily complex description of partnership transitions (Hoem and Jalovaara, 2013).

3.3.2. Methods description

To examine fertility transition with a set of variables to evaluate the impact of individualization theory we use event-history techniques. *Survival and event-history analysis is an umbrella term for a collection of statistical methods that focus on question related to timing and duration until the occurrence of an event* (Mills, 2011: 23). And an event can take many forms, such as a birth, marriage, political revolution or death. Moreover when survival and death are in the same sentence we immediately link it to a life table and in fact that is the main ideal behind survival and event history analysis. Sobotka (2014) identifies four main approaches' to measure and analyse fertility (see Chapter 2, subsection 2.3.2). The approach that provides more accurate indicators is based in age and parity-specific childbearing *probabilities* and *intensities* (known as hazard rates).

Rodriguez (2006) identified h*azard rates* as the best approach in analysing parity-specific fertility events. The logic of using hazard rates (as consequence of using hazard models) regarding the birth order is straightforward. From the demographic perspective Yavuz (2008, 244) states and exemplified in the best way possible the hazard models: *at each duration, t, measured from a previous k^{th} birth (or if we study first birth, from first marriage or from a certain age indicating onset of exposure), a woman is under risk of having her $(k+1)^{th}$ birth. This risk, denoted $\mu(t)$, gives the intensity of experiencing an* *event at time t. Thereby, μ(t) is the risk or hazard that a woman who had k^{th} order birth t months ago (and who had not had another birth since then) will have $(k+1)^{th}$ birth in month t. In a standard life table analysis all women are assumed to have the same risk at any time segment. Hazard models instead assume that hazard rate, the dependent variable, is dependent on time duration since the start event and on a set of independent variables (x). In other words, hazard models assume that among women the hazard rate varies depending upon their individual characteristics*. Despite that this clear example recalls time measured as months, we can make the same association if dealing with, e.g., days, weeks or years.

The hazard rate also often labelled transition rate, intensity, failure time or risk function in the context of demographic analysis is intrinsically related to the life table method, event-history analysis and to survival techniques. The main characteristic of event-history analysis and survival data it's that they measure dynamic events, where individuals are followed over time, and events occurs over that same time (Brostrom, 2012). If the transition rates are calculated with the required accuracy, the results also reflect accurate estimates. However, since the information relating to life trajectories is often incomplete, not reflecting thus complete cohorts, combining information from several individuals makes the calculation of transition probabilities more comprehensive and realistic. Thus, how they are calculated is critical to obtaining accurate results (Aalen et al., 2008; Willekens, 2006 and 2014).

Life event-history and survival techniques analysis could be, non-parametric, semi-parametric and parametric. In this chapter we will make use of non-parametric and parametric models to investigate the parenthood transition and the factors to such transition. The usual life table method as well as the Kaplan-Meier (KM) Estimates is included in the non-parametric group, and there is no assumption about the shape of the hazard function. Mills (2011: 32) states that both methods are *excellent preliminary descriptive techniques to use at the beginning of data analysis*. Thus we will use the KM models to describe and analysis for a group of variables (described in the previous subsection) the transition rates to first birth considering the individualization theory. Such analysis was drawn as in previous fertility transition studies (Mayer and Schulze, 2013; Eryurt and Koc, 2012; Baschieri and Hinde, 2007; Kreyenfeld, 2004; Kantorová, 2004), giving us a more precise and accurate knowledge of the events. In the category of semi-parametric models, the Cox Regression is the most known and used by the scientific community (e.g., Okun, 2013; Kertzer et al., 2009; Martin, 2006; Van Bavel and Kok, 2004). Semi-parametric models are particularly flexible once they do not require assumptions on the hazard shape, and no particular probability distribution need to be chosen in advance. Also such methods are considered "robust" fitting generally well to the data regardless of which parametric model is appropriate (Mills, 2011). Parametric models are models where the survival time is assumed to follow a particular distribution. Parametric models require more restrictive hypotheses in the form of function, with the Weibull, Gompertz, lognormal and generalized gamma as the most common forms of function distribution. These models provide the possibility of modelling the effects of various characteristics on the occurrence of the event under study and thus of dealing with the heterogeneity of a population (Kantorová, 2004).

For our investigation we assume a proportional hazard model with a baseline Weibull distribution (parametric model). Under this framework the baseline hazard is characterized as monotonic (constantly increasing or decreasing). The traditional fertility analysis takes into account the fertile window (15-49 years), however in our case and has mentioned before the analysis is truncated at age 40, when the ASFR curve is already decreasing and thus the use of a hazard Weibull distribution fits better than other distributions such as the piece-wise (pch) or the Gompertz (results in appendix B figure 1). As in other proportional hazard models, the Weibull shape needs to be assumed. When the shape is higher than one (monotonically increasing), it shall be understood as increasing over time, and lower than one is decreasing when time increases (monotonically decreasing). In the case that hazard is exactly one, i.e. the hazard is constant, we have an exponential model (Mills, 2011).

In such model, the coefficient covariates shift the baseline hazard proportionality without change its shape. The proportionality assumption can be partially relaxed by including interactions between the baseline function and the covariates. A general representation of the hazard function could be presented has (Tesching, 2012):

$$\ln \mu_i(t) = y\,(t) + \sum_m \alpha_m x_{im} + \sum_m \beta_m w_{im}(t) \qquad [3.1]$$

where ln $\mu_i(t)$ is the logarithm of the occurrence risk of the event for individual i at the time t, $y\,(t)$ is the baseline hazard duration dependence, x_{im} the time-constant categorical covariates, w_{im} time-varying categorical covariates, and α and β the regression parameters.

On the theoretical part of this chapter, we argued on the relationship between individualization theory and fertility postponement trough the perspective of individual dimensions (familial dimension and values and social norms). Also, we pointed out the implications of individualization theory on fertility postponement. In order to construct the model that explain the fertility determinants we first control for the familial background covariates identifying the significant covariates. Later the social norms and individual values covariates set was added to the initial model. The final process was to account for possible interaction models (e.g., Kreyenfeld, 2002 and 2010; Tesching, 2012).

Whereas survival analysis measures the time until the occurrence of any event of interest, and features such as level of education, age at first job or the number of siblings, can change when a follow study it is considered, when this does not happen, as is the current study, the approach is necessarily different. As in previous studies (e.g. Eryurt and Koc, 2012; Baschieri and Hinde, 2007; Kantorová, V., 2004) the current one is based on a survey, for that reason it was considered that the characteristics indicated by individuals at the survey time (2013) were the same at birth of first child. Consider for example, the *individual* Z was unemployed at the time of the survey, it was assumed to survival analysis that this characteristic was present at the birth of the first child. On the other hand, the question the same *individual* Z on the age at first job, it said never throughout their life have had a paid job, but already had two children (in 2013 the time of the survey), then took along the analysis that this individual did not work before first child.

We performed the KM analysis and the event history analysis with the *survival* and *eha* (event history analysis) package, in *R* software.

3.4. Results

In this section we present the results in three subsections. Subsection 3.4.1 presents the results for the fertility transition and explores how the familial background can influence it, while subsection 3.4.2 presents the influence of social norms and individual values on the first birth, and finally in subsection 3.4.3 a coherent model combining the previous variables and with the propose to identify the fertility determinants from individualization era is presented.

3.4.1. Fertility transition and familial background

Meanwhile *men and women are becoming visible separated individuals, each linked to the family through different expectations and interests, each experiencing different opportunities and burdens* (Beck and Beck-Gernsheim, 2002: 90), its important to identify if the transition patterns are the same for either men or women. In the context of demographic and sociological analysis of individual behaviour, education and the social context of individuals are mentioned in the literature as the main characteristics related to the postponement of fertility at the individual level. The educational evolutionary factor and increasing the opportunities in the labour market intensified the impact that increasing the level of education has in the decision to enter the parenting (Bhrolcháin and Beaujouan, 2012). The entry into adulthood and the family formation paradigm have been changed in recent decades, identified as one of the main outcome of a new society characterized by the phenomenon of individualization, where the free choice at the individual level is key feature. The current families are the result of increasingly heterogeneous different behaviours reflected individual values (Billari and Wilson, 2001), although the social moral standards imposed to condition the household and individual behaviours (Micheli and Bernardi, 2012).

Figure 3.1 presents the transition rates for first birth to the variables, sex (a), nationality (b), cohort (c) and educational level (d). In the transition to first birth, figure 3.1a reports that women are more likely to have the first child at younger ages, with a median age of 28, while for men the median is 31. That difference in median ages can give the support to the common sense that typically women marry older men. Also the teenager risk it is almost null and the period with higher transition risk stops at ages 36/37.

Over the last decades in Portugal the emigrant fertility represented approximately five percent of the total births in the country (Magalhães, 2013). However that five percent of foreign contributing to the country fertility had different evolutionary patterns. Nevertheless at the present moment, and taking figure 3.1b into account, it is almost impossible to identify differences between Portuguese and foreign in the transitions rates to the first birth. The transition risk is very similar over the KM curves. Still the risk to the natives is higher between ages 20 and 29.

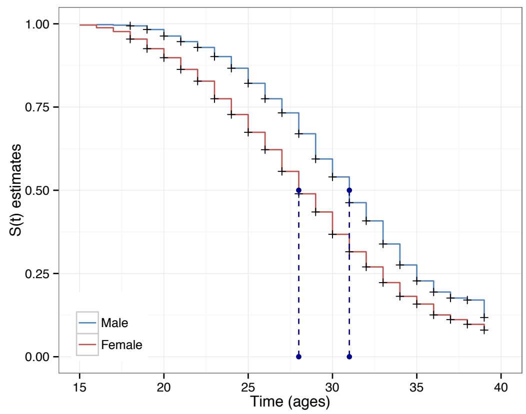
All demographic analysis is centred on ages or cohorts perspectives, in the particular case of Portugal, as result of the social changes registered after 1974 with the revolution (see chapter 2) and from the pronounced fertility decline after 1981, we consider important to establish a comparison between those born before and after the revolution. It was expected to observe differences between those two cohort groups, however in figure 3.1c we observe that at the beginning of their reproductive life the risk is equal, and after age 24 until age 35 the risk increases to those born at older cohorts, also for this group the median age was 28. Still the differences between the median age for the two cohorts born before and after the revolution are only two years.

The educational characteristic is distinguished in the literature as one of the main (if not the main) factor on the transition to parenthood as well as for fertility postponement and decline (Billari and Philipov, 2004; Bratti, 2003; Kreyenfeld, 2002; Lappegard and Ronsen, 2005). It is proposition stated that women with higher education levels postpone longer their fertility as a result of later needed entry into the labour market and to the first cohabitation (or first marriage).

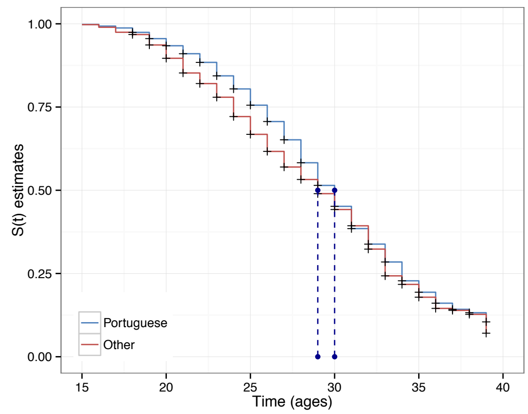
The increase in schooling levels resulted in the consequent postponement of women entry into the labour market. Thus, are the individuals with education up to secondary education that enter first in the parenthood *arena*, with a median age of 28 years, while for individuals with a higher level of education the median age is 33 years. Also for this last group the risk of becoming a parent is more pronounced after age 25.

Figure 3.1: Transition to first birth by sex (a), nationality (b), cohort (c) and educational level (d)

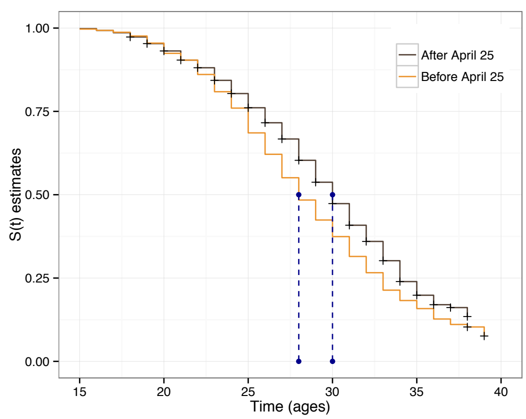
(a)



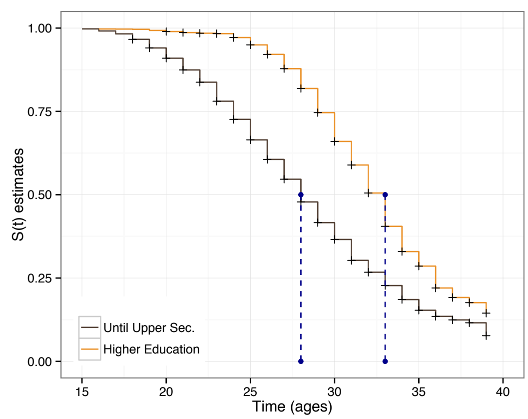
(b)



(c)



(d)



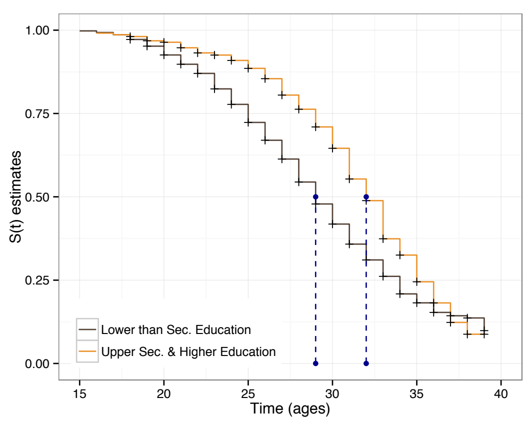
Source: 2013 PFS. Own elaboration.

Not only the individual level of education, cohort, nationality or sex, should be considered as decisive factors to the fertility decision and transition. The level of education of their parents can and should also be taken into account especially in the perspective of their social context (Shanahan 2000). Besides that also the number of siblings may influence the transition risks, as well, the possible parents divorce, also can be determinants in the fertility *tempo* and *quantum*. Figure 3.2 illustrates the transition risk to first birth by father (a), and mother education level (b), number of siblings (c) and parents divorce (d).

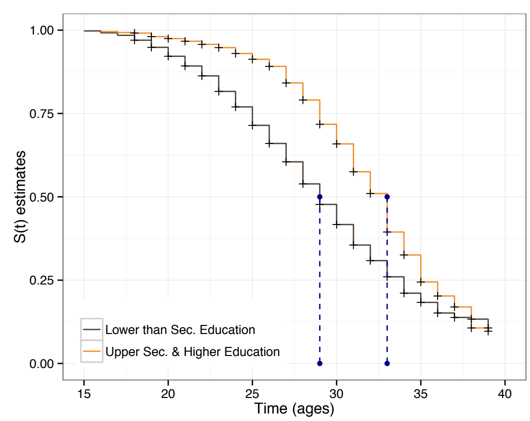
Between parents educational level (figure 3.2a and 3.2b) there is no significant differences, mainly to those who their parents had a secondary our lower educational level, for this category the median age was 29 years. Yet, for those whose parents have an upper secondary or higher educational levels the risk is different from the father to the mother, with median ages of 32 and 33 years. Without any statistical evidence we can however state that the educational level of the potential grandparents is relatively lower than the effect from the potential grandmothers in the risk of transition to the first child.

Figure 3.2: Transition to first birth by father educational level (a), mother education level (b), number of siblings (c) and parents divorce (d)

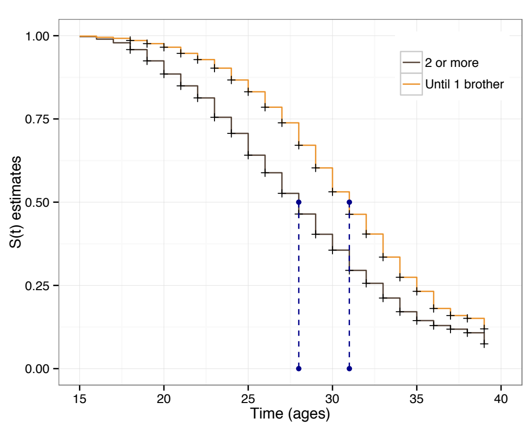
(a)



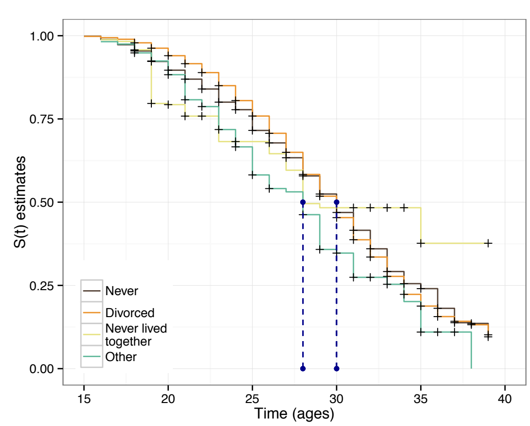
(b)



(c)



(d)



Source: 2013 PFS. Own elaboration.

The number of brothers and sisters could also limit the fertility decisions and transitions, thus figure 3.2c reveals that for those without siblings or at least with one, the transition rates are higher and to this category by the age of 31 half of the individuals have already the first child. Meanwhile, to the other category the median age was 28. These differences in the median ages of four years reflect a negative effect of small family sizes in the postponement of fertility.

And if it happens the parents divorce? Can that influence the transition rates and the risk of becoming a parent? Figure 3.2d reveals that no. For individual that their parents had never ben divorced or that divorced at least one time, the transition rate are roughly the same and the median age for both categories is 30 years. With lower risk to become a parent and lower median age (28 years) are those that never lived with the parents (category other) or that parents never lived together.

The desire and the need for economic stability by the young couples, steered them to the family formation postponement and consequently to the fertility postponement and decline. For the young's of today the age to leave the parents home is being postponed to later and later ages therefore increasing the age at first cohabitation[9]. In the last decades it has been observed a delay also at the entry to the labour market either for women and men, due to the extension of the educational background (Billari and Kohler, 2002).

Figure 3.3 plots the transition to first birth, by age, of leaving parents home (a), age at first cohabitation (b) and age at first job (c). As noted above the age that the each individual leave parents home is dependent of the age that they are able to support financially their needs, so it is in fact expected that those who leave their parents home earlier in life will transit earlier to parenthood. Therefore in figure 3.3a we can observe that half of those who leave their first household until age 21 by age 25 had already the first child, while for those that moved after that age the median was 30. Often, couples leave the family household to live with a partner, as a complement for the previous information, it is also important to analyse the age at first cohabitation (figure 3.3b). The figure gives the information that those who haven't lived with a partner or did it before age 22 register a median age of 28 years while for those that for the first time lived with a

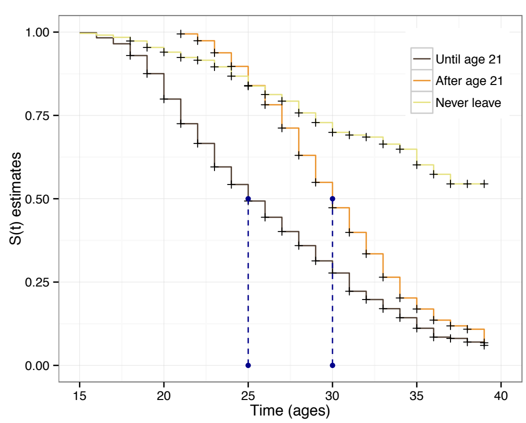
[9] Here age at first cohabitation refers to individuals in the first legal or non-legal relationships were the couple lived together.

partner after age 22 have a median age of 31 years. The median ages are not expressively different.

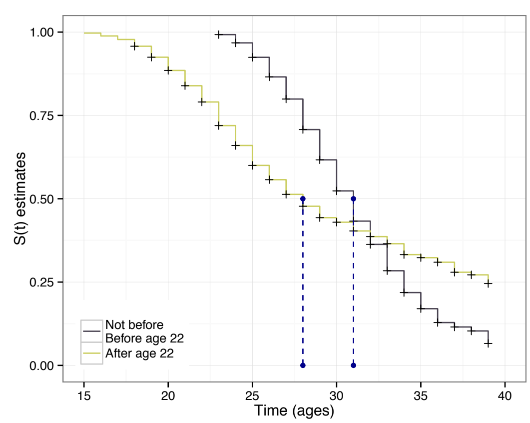
If the young leave household of origin later in life and that happens has a result of late transition to the labour market is then expected to find evidences that later ages at first job will postpone fertility. Figure 3.3c plots the transition rates by the age at first job by two categories, where it is in fact possible to observe that postponement is higher to those that started to work after age 18 (median age of 32 years), compared to those who started to work earlier in life (before age 18), never work or was not working by the time of first birth (median age of 28).

Figure 3.3: Transition to first birth by age of leaving parents home (a), age at first cohabitation (b) and age at first job (c)

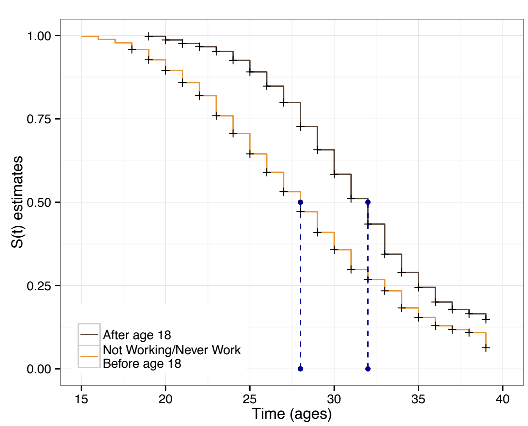
(a)



(b)



(c)



Source: 2013 PFS. Own elaboration.

3.4.2. Fertility, social norms, individual values and postponement

The actual societies moved from imposed restrictions moral codes and traditional customs, toward other less rigid, where the main changes were stimulated by economic prosperity, education and a more egalitarian social status. The social structures, religion and family weakened. Men and women no longer have their pre-set choices, and began to reflect on their decisions, including the family formation timing, creating their own biographies and adapting itself the moral and societal values. Individual and social values and perspectives had change trough the last decades. Men and women role in the family context had changed and with that also the desired family size.

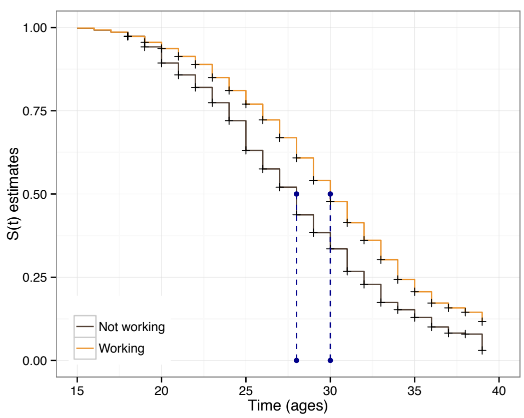
Figure 3.4 presents the transition rates to first birth considering the individuals opinion on maternal conciliation (a), paternal conciliation (b), maternal presence (c) and paternal presence (d). The conciliation of family and employment presents different perspectives to men and women, even at the covariates categories (figure 3.4a and b). The early transition to the first child occurs for those who have the opinion that is better to a child at scholar age to have a non-working mother (figure 3.4a) and a father working in full time (figure 3.4b), with median ages of 28 and 29. On the other side to those who have the opinion that a *working mother* and a *father not working, working at part-time or from home* have the first child later with a median age of 31 years.

When questioned about the maternal and paternal presence and the risk to have the first child, in the case of the opinion on the parental presence (figure 3.4d) the transition risk are the same and median age to each category is 30 years. For the question on the maternal presence (figure 3.4c) we can highlight that the ones that disagree that is *harmful that a mother work outside home* whom have the first child later in life with median age of 30 years.

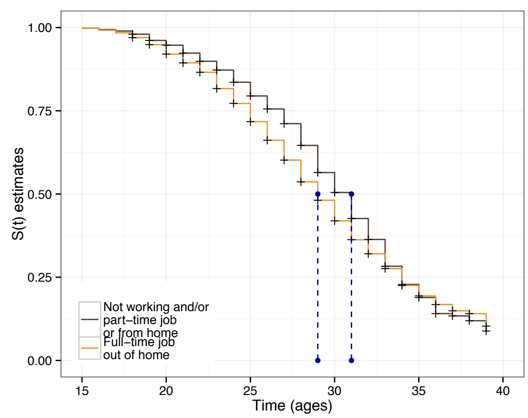
The free self-determination is one of the main characteristics in the contemporary societies as a result from the individualization phenomenon. Therefore new social and individual issues have developed, such as the importance and the family role in the societies, the desired number of children, and the individual fulfilment. Figure 3.5 plots transition rates to the desired number of children (a), ideal number of children in a family (b), family significance (c) and personal fulfilment (d).

Figure 3.4: Transition to first birth by maternal conciliation (a), paternal conciliation (b), maternal presence (c) and paternal presence (d)

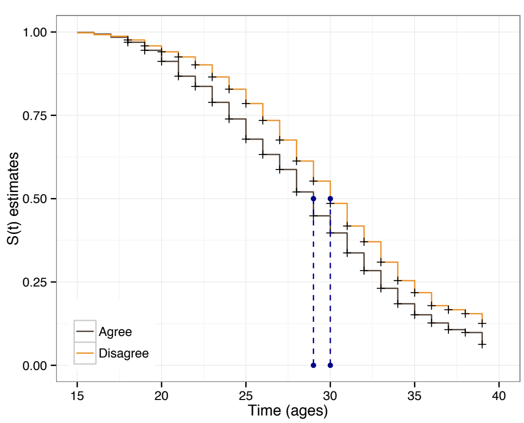
(a)



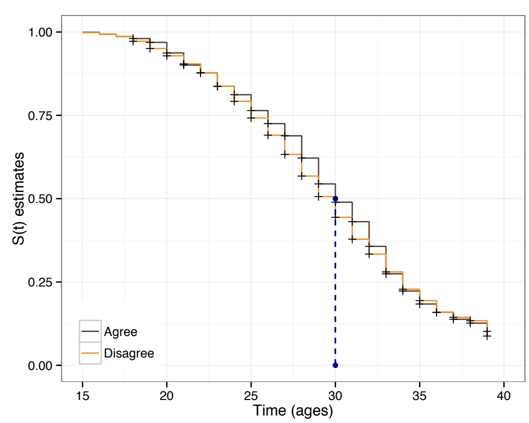
(b)



(c)



(d)



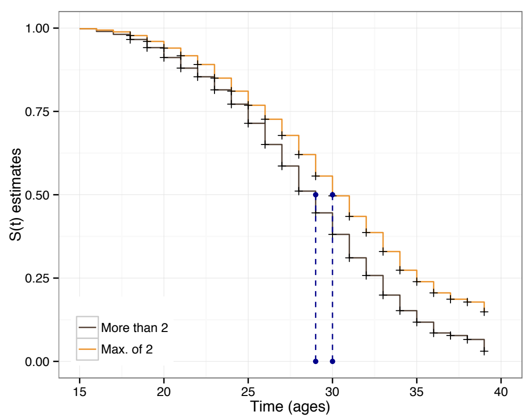
Source: 2013 PFS. Own elaboration.

To Sobotka and Beaujouan (2014) the ideal desire size of a family reflects the number of children that each individual considers ideal for a family (than their own). And in fact our results confirm such perspective. Those that expect to have two or more children (figure 4.5a) and those for whom the number ideal of children in a family is two or more (figure 4.5b) have the same patterns in the transition rates and a median age of 29 years. While for those that only expect to have in maximum two children and to those who the ideal size of a family is in maximum also two children share the same median age of 30 years.

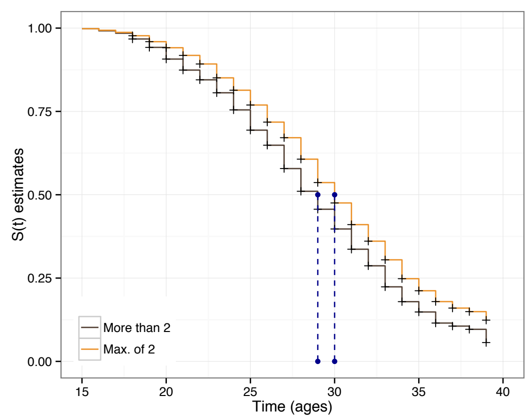
The family importance (figure 5c) and the personal fulfilment (figure 5d) are directly related to the new definitions of family as well as the new family role in the social context. Those who disagree that a child needs to live with parents to grow balanced (figure 5c) along with those who somehow disagree that a woman or a man need a child to feel accomplished (figure 5d), are those who postpone for longer time the decision to have the first child, with median age of 31 years.

Figure 3.5: Transition to first birth by desired number of children (a), ideal number of children in a family (b), family significance (c) and personal fulfilment (d)

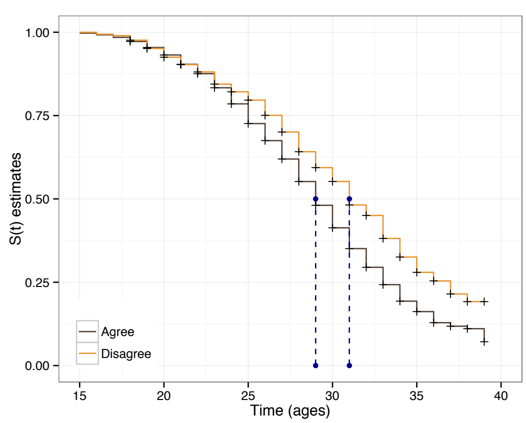
(a)



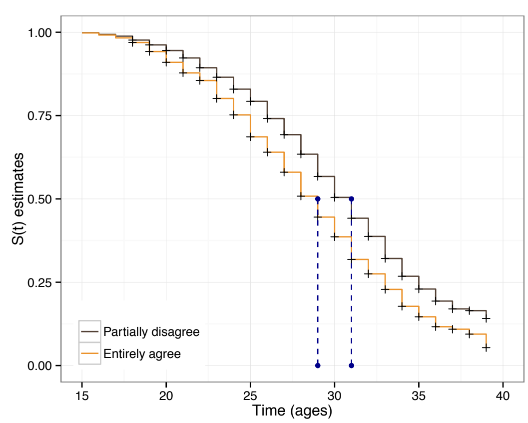
(b)



(c)



(d)

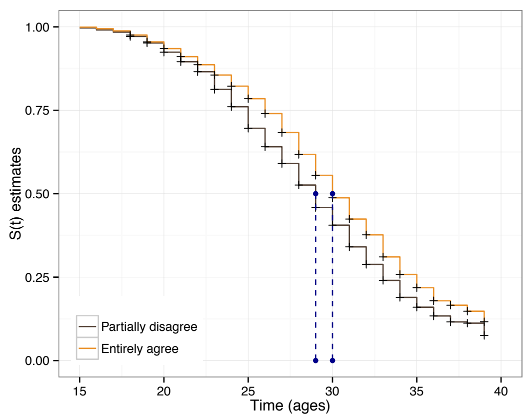


Source: 2013 PFS. Own elaboration.

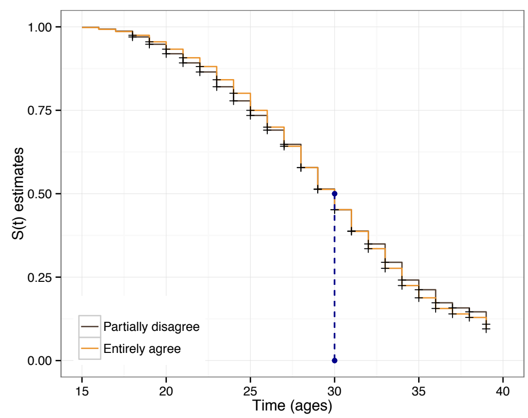
In figure 3.6 we can see the transition rates to first birth through the perspective of female autonomy (a), postponement (b) and the offspring balance (c). For those who entirely agree that women commitments in conciliating work and family life in a balanced way, and can educate a child alone (figure 3.6a) the transition to the first child happens later in their life trajectories with a median age of 30 years. Regarding the co-variable postponement (figure 3.6b) no difference are identifiable between the categories and to both the median age is 30.

Figure 3.6: Transition to first birth by female autonomy (a), postponement (b), and offspring balance (c)

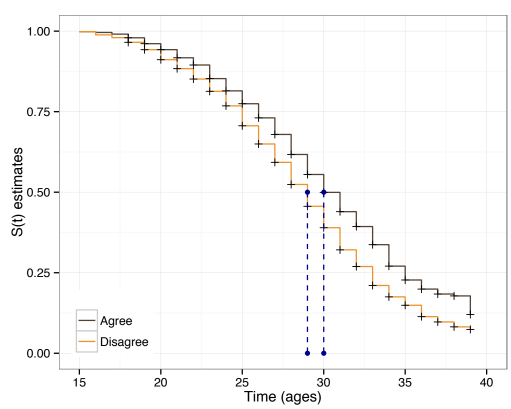
(a)



(b)



(c)



Source: 2013 PFS. Own elaboration.

Finally we can focus our attention in question of offspring balance (figure 4.6c), at this figure is possible to observe that the median ages to those who agree or disagree that it is *preferable to have only one child with more opportunities and fewer restrictions than having more children*, only differs by one year (30 and 29 respectively).

The motivation for the previous analysis was to describe the parenthood transition risks. We summarized the obtained results in the Kaplan-Meier curves to allow for better understanding of patterns and identify the median ages by each covariate. By excluding the influence of other covariates, it was possible to identify distinctive patterns. Nevertheless the constrain from the data should be considered, once that each one of the variables it was defined taking into account the answers at the time of the survey and not when each individual had their children.

Given these constraints and to sum up, we can state that, from the background characteristics the individual's whit higher risk of becoming a parent are, women's; with Portuguese nationality; from older cohorts (previous to the Revolution); with lower educational levels (until upper secondary), with two or more siblings; those who never left the family of origin; those that leave the parents home earlier in life; also those that experienced the first cohabitation after age 22; and those that never worked or have done it before age 18.

It was additionally possible to identify that from a group of characteristics recognized as social norms and individual values, that the risk is also higher to those with the desire of two or more children; those who have the opinion that the best for a child is that the mother doesn't work and father work out of home; those believing that a child to be balanced need booth father and mother; and those that entirely agree that a men or a women need a child to be totally fulfilled.

The influenced relationship between the above mentioned characteristics and fertility evolution go beyond the transition to the first child. These findings are consistent with those of other studies which, using varying fertility outcomes and analytical methods, report differences in fertility transitions when adjustment for family-background factors such as the number of siblings, parents' education, and age of leaving parents home (e.g., Billari and Kohler, 2002; Bhrolcháin and Beaujouan, 2012; Liefbroer and Corijn 1999; Lappegard and Ronsen 2005; Kravdal 2007; Kravdal and Rindfuss 2008; Tavares 2010).

Nonetheless, each one of the previous covariates and dimensions described above should be analysed taking into account the influence of other covariates. For that in the subsequent section we present the results of tree models where the time until the first bird was controlled for family-background and by social norms and individual values.

3.4.3. Transition to parenthood determinants in Portugal

Table 3.1 presents models for the prediction of parenthood transition from age 18 to 40. Coefficients are presented in relative risk format, and hence indicate the proportional shift in the baseline hazard due to a unit change in that variable. Counting only to significant covariates three models are presented, the first controlled for the family-background characteristics (Model 1). A second model that besides family-background characteristics control also for the social norms and individual values (Model 2), and the final model including significant interactions (Model 3). In the models elaborations all variables analysed in the previous sections were considered, however fixing a p-value ≥0.25, several were the variables without statistical significance (see table B.1, Appendix B). In the case of the covariates within the family-background characteristics they are: the educational level of the father, nationality, age of leaving parental household and parent's divorce. While for the case of covariates within the social norms and individual values, the non-significant are: ideal number of children for a family; paternal conciliation between family and labour market; maternal presence; female autonomy and the covariate postponement.

When evaluated the family-background characteristics (Model 1) it is possible to identify that compared to men, women's risk to become a parent is higher by eight percent. Controlling the parenthood transition by educational level we identify that those whose maximum level of instruction was upper secondary or higher, the relative risk is almost sixty seven percent lower than those with higher educational levels. While regarding the effect of individual's cohort, we find a negative time trend. Compared to the situation before 1974 (before April 25th), there was a clear drop in the first birth transition to the young cohorts. The relative risk to become a parent is lower by 15 percent to younger cohorts (Model 1). Mothers' educational level was also included in the models and compared with those that their mothers had lower educational levels, to the ones with upper educational risk of becoming a parent diminished by twenty tree percent. Still in the model only with the family-background (Model 1) characteristics we identified higher risks of becoming a parent to those with two or more siblings. Also those who start working before age 18, never worked or weren't working at the time that the first child was born, the risk of becoming a parent was more fifty percent compared to those that started to working later (after age 18). Finally, age at first cohabitation was included, and for those that haven't ever experienced cohabitation, or have done it before age 22, the risk to have a first child is forty four percent higher than for those with a first cohabitation after age 22.

The inclusion of social norms and individual values characteristics (Model 2) does not change significantly the result. Nevertheless the covariate cohort has no longer statistical significant. With the inclusion of social norms and individual values, we identify that when individuals have a desire for bigger family sizes, the risk of becoming a parent is twenty five percent higher when compared to those who desired families until one child. In the transition to the first birth there is a positive effect to persons which believe that the best is that a mother doesn't work to take care of a child (maternal conciliation), and the father should work outside home (paternal presence). It is also possible to identify a positive effect to those who disagree that a child needs a mother and a father to grow balanced (family significance), while for those who partiality disagree that men and women need children to be fulfilled the effect is negative.

With the increasing years spent in the educational system it is expected a relationship between the educational level and the age at the first cohabitation and understand how that combination can influence the transition to parenthood. It is furthermore expected that women and men present dissimilarities when analysed from the point of view of age at first job. In order to exemplify these aspects, and besides controlling for familiar-background and for social norms and individual values,

Table 3.1: Results from event history model, relative risks of the transition to first birth

	Model 1	Model 2	Model 3
Sex			
Male	1	1	1
Female	1.788 ***	1.871 ***	1.389 ***
Educational Level			
Higher Education	1	1	1
Until Upper Secondary level	1.664 ***	1.685 ***	1.148 ***
Mother Educational Level			
Lower than Sec. Educ.	1	1	1
Upper Sec. & Higher Education	0.773 ***	0.778 ***	0.774 ***
Cohort			
Before April 25th	1	1	1
After April 25th	0.851 **	1.038	1.043
Age at first job			
After age 18	1	1	1
Not working/Never work/ Before age 18	1.534 ***	1.515 ***	1.086
Age at first cohabitation			
After age 22	1	1	1
Before age 22/Never Coabited	1.437 ***	1.559 ***	0.525 ***
Siblings			
Until 1	1	1	1
2 or more	1.369***	1.249 ***	1.219 ***
Desired number of children			
Max of 2		1	1
More than 2		1.432 ***	1.423 ***
Opinion on Maternal Conciliation			
Working		1	1
Not working		1.182 **	1.185 ***
Opinion on Paternal Presence			
Agree		1	1
Disagree		1.191 **	1.215 ***
Opinion on Family significance			
Agree		1	1
Disagree		0.798 ***	0.810 ***
Opinion on Personal fulfilment			
Entirely agree		1	1
Partially disagree		0.799 ***	0.793 ***
Opinion on Offspring balance			
Agree		1	1
Disagree		1.337 ***	1.338 ***
Sex: Age at first job			
Female: Not working/Never work/ Before age 18			1,509 ***
Educ. Level: Age at first cohabitation			
Until Upper Secondary level: Not before age 22/ Never Coabited			3,801 ***
log(scale)	3.657	3.701	3.617
log(shape)	1.770	1.797	1.809

Notes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
Model 1: family-background characteristics.
Model 2: family-background characteristics + social norms and individual values.
Model 3: family-background characteristics + social norms and individual values + significant interactions.
Source: 2013 PFS. Own elaboration.

We this included in Model 3 two possible interactions: the interactions (1) between sex and the age at first at first job, and (2) between the educational level and the age at first cohabitation. In the relationship between sex and age at first job, we identify that for the a woman not working at the time of first birth, that never worked or started to work before age 18 the first birth risk is more than fifty percent when compared to a woman that started to work after age 18. Table 3.1 finally reports an interaction between educational level and age at the first cohabitation were we identify a expressively positive relation between lower educational level (until upper secondary) and those who experienced the first cohabitation before age 22 or that haven't experienced before first birth.

3.5. Discussion and concluding remarks

3.5.1. Discussion

This chapter has analysed the parenthood transition on the perspective from individualization theory to family formation. Entry into parenthood is the result of several combined covariates, which analysed separately allowed to understand how each of them potentiates or not the fertility transition. However the best way of knowing in fact the determinants for this transition and subsequent behaviour is through joint models, where the relationships and interactions between the different variables will be taken into account. Thus, first we described through the Kaplan-Meir curves the transition rates to first births without considering the relationship between covariates. Latter on, we controlled the transition to first birth by two dimensions mentioned in the literature as the fundamental to fertility postponement into the light of individualization theory the family background and the social norms and individual values (Beck-Gernsheim, 2002; Gaspar, 2013).

Long-term fertility research in demography has essentially focused on the fertility dynamics. An important reason for this focus was the direct link between women and their children. When family and parenthood were lifelong stable institutions, the analysis of female fertility patterns provided an almost complete picture of fertility dynamics. Yet, today's family and parenthood are more dynamic and diversified. In recent decades, new family forms, such as single parents families, social parenthood, and patchwork families, have increased in modern societies (Alich, 2009). The 2013 Portuguese Fertility Survey allowed to carry out an analysis taking into account both men and women. The analysis throughout this chapter corroborates the results advocated by Zhang (2008), which identified a higher men median age in the transition to parenthood, on average two to three years higher than for women's. However, although men and women have different patterns in the transition to the first birth, those not mean that the fertility determinants to there fertility is substantially significant. In fact, throughout this chapter the main difference within sex was identified only in the correlation to the age at first job.

Family background influenced the association between family formation and fertility, a deep relationship that goes beyond the first child. The results of each individual background reinforced this interpretation. Consistent with the general pattern of the second demographic transition, the youngest cohorts display a significantly lower likelihood in the transition to parenthood as also identified by Domínguez-Folgueras and Castro-Martin (2008).

In the context of demographic and sociological analysis of individual behaviour, education and the social context of individuals emerge in the literature as the main characteristics related to the fertility postponement (Billari and Kohler, 2002; Bhrolcháin and Beaujouan, 2012; Liefbroer and Corijn 1999; Lappegard and Ronsen 2005; Kravdal and Rindfuss 2008; Tavares 2010). The educational evolutionary factor and the increasing opportunities in the labour market strengthened the impact of education on transition to first birth (Bhrolcháin and Beaujouan, 2012). In fact, over this chapter we identify a postponement for those with higher educational levels in an analogous result to different studies on the fertility transition and postponement. In the same context Kreyenfeld (2004), studying motivations and decisions for transition into parenthood, concluded that more than economic factors, education is key factor in the postponement of fertility.

Bettio and Villa (1998) and later Billari and Kohler (2002), definite that the fertility postponement is the consequent result from the constant postponement on the age that each individual leaves the family household as a consequence from the lack of steady economic stability in the absence of labour market participation. In our analysis was not only possible to identify this trend, observing a delay in the transition to first birth for those who later left the parents household, but as well for those that later started to participate in the labour market. It was also possible to identify that the late entry into cohabitation increases the waiting time for the birth of a child.

The family background should be considered part of the social framework, and covariates such as age or the number of siblings need to be used as part of the fertility postponement comprehension. As for Castro-Martin (1992), we acknowledged that individuals from smaller families become parents later in life. As well as a relationship between the number of siblings and the number of desired offspring as point out as Cramer (1980) and Sobotka and Beaujouan (2014) stated before.

The entry into adulthood and the timing of family formation have been changed in last decades, as the main outcome of a new society characterized by the phenomenon of individualization, where the free choice at the individual level is a key feature. The contemporary families are the result of increasingly heterogeneous different behaviours that reflect individual values, although the social moral standards imposed to condition the household and individual behaviours (Billari and Wilson, 2001; Micheli and Bernardi, 2012).

Throughout our analysis it was possible to identify the existence of heterogeneous individual behaviours that contribute to a more homogeneous parenthood transition, which stands out for example that individuals who disagree that a child needs to live with his father and mother to grow balanced; also that consider important that a woman can reconcile work and family life; or who believe that a woman can be autonomous and raise their children alone are generally those who later become a parent.

Even that society does not expect that each individual get married and have four children as Duncan and Smith (2006) states, still men and women with stronger social norms and individual values have higher rates in the transition to the first birth. As in the past, in contemporary societies, the individual background is still significant in the decision of family formation, as well as the personal desire to have a family as an individual desired and not as society norm. However the risk of becoming a parent earlier in life is still related to strong social norms and values, as well as with low educational levels.

3.5.2. Concluding remarks

The fertility postponement identified and discussed in the previous chapter as a double postponement (cohort and period postponement) had a direct impact in the final fertility *quantum*. Portuguese women decreased their *quantum* until 1982, but it was after that year that the postponement effect was deeper. Thus, by the year of 2012, Portugal was for the first time at the lowest-low fertility level with 1.28 children per women and the difference between the mean age at birth and at the first child was less than two years.

Within such scenario of low fertility and decreasing differences between the mean ages at first birth and all the births, we can assume that in this chapter when we identified the motherhood transition determinants they are in fact the fertility determinants. In Portugal questions as, *What determines Fertility? And What determines the transition to motherhood?* – can be consider as only one.

The Portuguese homogenous later transition to motherhood is mainly explained by the higher educational level (from the individuals and from their mothers); the late transition to first cohabitation; the lower number of siblings (maximum of one); the desired number of two children (maximum); the possibility of maternal conciliation between family and labour market; the perspective that a child doesn't need both mother and father to grow balanced; as well as no need to have a child as personal fulfilment; and finally the idea that it is preferable to have only a child with more economic and social stability.

In Portugal transition to parenthood become a matter of choice, and *time* to become a parent in a given *synthetic cohort* is the result from the individual *real cohort changes* in the values and family organization, but also in the labour market sphere, largely consistent with the demographic changes.

CHAPTER 4

THE IMPACT OF WOMEN'S EDUCATION IN THE TRANSITION TO MOTHERHOOD: A COHORT PERSPECTIVE

4.1. Introduction

The changes in *education are a crucial foundation for a process of consciousness raising that enables women to deal actively with their own situation. Their explosive force comes from the fact that they do not take place in isolation, but historically coincide with major changes in what is considered a normal female biography* (Beck and Beck-Gernsheim, 2002: 58). Such educational development has a direct implication not only at the women society role but also a *negative influence* at the fertility *tempo* and *quantum*. The actual time in education is commonly perceived as mismatched with family formation. Therefore *European countries with low fertility often show relative strong education differentials in family size, characterized by low fertility levels and high childlessness among the women with higher education* (Sobotka, 2015: 17).

Then the direct multidimensional effect of education and fertility postponement appears to be the essential factor promoting fertility shift to later ages. In the sense that low fertility rates in Europe are leading to important changes in age structure and to slowing or suppressing population growth. The immediate impact of low fertility is the reduction of the number of children in the total population and increases the share of population concentrated in the working ages, raising support ratio and correspondingly raising the income per capita. Afterwards, as the smaller cohorts of children reach the working ages, the share of working age population declines, the share of older adult's increases and the total population ages. So, in a general way the support ratio falls, reducing the income per capita. The shifts of population in age distribution have significant macroeconomic consequences that feature prominently in the debate of the economic attitude in Europe. In countries as Portugal, with the conjugation of low fertility and economical crises, no significant changes are expected in the near future (Tomé et al., 2014).

Therefore, this chapter examines the relationship between education and cohort-completed fertility within four European countries, in two selected cohorts (due to data availability for completed cohorts), characterized by the starting point changes for the fertility cohort age shift.

The main goals of this chapter are the following:

1. To review and discuss the multi-dimensional relationship education and fertility;
2. Evaluate the arguments on the relationship between period fertility and education, illustrating observed changes for the Portuguese case;
3. Describe how the changes on the *tempo* fertility conditioned by the educational level influenced the final *quantum*;
4. And, to describe fertility trends by marital and employment characteristics quantifying the effect of women educational expansion on cohort fertility.

Our analysis is centred on the 1950 and 1960 cohort data corresponding to the 1991 and 2001 IPUMS (Integrated Public Use Microdata Series) samples, from where we extracted and reconstructed information for Austria, Hungary, Portugal and Spain, for women in the transition to the first child. Thus, this chapter is divided in 6 sections. The introduction is followed by a theoretical discussion on the relationship between education and fertility postponement, supported by an extensive literature review (section 4.2). In section 4.3 a review on the Portuguese specific educational system is presented, following the *evidence* of period fertility postponement due to educational levels registered in the lexis diagram (figure 4.1). The following section (4.4) presents the data selection and methods. Section 4.5 contains the main results of our investigation, namely the empirical relationship between education and completed cohort fertility. This section is dived in three other sections. Subsection 4.5.1 describes the transition to motherhood in the 1950 and 1960 cohorts with a comparative perspective between Austria, Hungary, Portugal and Spain. The following subsection (4.5.2) presented the results regarding the cohort on the TFR evolution by educational level, as well as the transition process.

Finally in subsection 4.5.3 we presented the estimated influence from education on the fertility patterns in two main characteristics: the marital and the employment status. The subsequent section (4.6) concludes this chapter.

4.2. Theoretical framework on education and fertility postponement

In 1984 Lídia was born somewhere in Portugal, and in that year was registered an average of 1.9 children born per woman. Portugal was still two years far from the European Economic Community (EEC – the European Union of today), 18 years far from the EURO, and in the European context, was still one of the poorest countries. Lídia's mother, the youngest of seven brothers and sisters, was born in 1965, ten years before the end of the dictatorial regime. She belongs to a cohort of women with low educational attainment, and in fact her educational level is less than the complete secondary school, being with the age of 15 already at the labour market. Later in 1989 when Lídia arrived to the primary school were in her classroom 25 students. From that group only five of them, including her, had and remain today (2015) without any siblings. Also from these 25 students in the classroom and born in the cohort of 1984, 10 have a university degree but only 3 have today at least one child.

The *narrative* outlined above is not exclusive from the Portuguese society, rather a transversal dynamic to all European countries. After the Second World War not only the South of Europe but also all western societies witnessed profound changes in the educational context and childbearing of the young women. In the European societies we assist to a considerable improvement in the educational system and in the requalification of the labour market as result of higher educational levels. In the meantime, there has been a pronounced postponement of entry into motherhood, due to the simultaneous increase of female participation in higher educational levels and the increase female role in the labour markets.

The massive postponement and recuperation of childbearing in low-fertility societies have presented important sociological and demographic developments during the past half-century (Frejka, 2010). After the pronounced decline of fertility (during the 1990s), between 2000 and 2012, fertility rose in the large majority of European countries.

This trend represents an unexpected reversal from fertility rates below 1.3 in most countries during the 1990s or in some cases in early 2000s. The number of countries with a TFR below 1.3 declined from 16 in 2002 to just one in 2008 (Goldstein et al., 2009).

Although the significant impact of economy and labour market in the societies, education is the factor distinguished as the most important aspect influencing the timing of childbearing and fertility outcomes of women (Spéder and Kamarás, 2008). In fact *most of the studies examining the association between educational attainment and fertility focus on the level of education and its impact on fertility, while at the same time, educational attainment is perceived as an individual attribute and is used as a proxy for a person's human, economic, cultural and to some extent biological capital* (Bagavos, 2010: 53).

If in one hand being enrolled in education is increasingly perceived as incompatible with childbearing and, thus, results in postponement of family formation and childbearing. On the other hand, women with higher educational attainments are more likely to follow a professional career and consequently differ in the process of family formation and dimension. Women with higher formation tend to form smaller families and remain childless more frequently. Thus, the relationship between educational attainment and the transition to motherhood has been an important topic of discussion in the literature (e.g. Bhrolcháin and Beaujouan, 2012; Tesching, 2012; Bagavos, 2010; Spéder and Kamarás, 2008; Hoem et al., 2006; Martín-García and Baizán, 2006; Lappegård and Rønsen, 2005).

Traditionally, the study of this relationship is in the perspective of how a woman's education affects her childbearing behaviour. *Most researchers who study the association between educational attainment and fertility focus on two dimensions of education: First, they concentrate solely on the level of education and its impact on fertility. Second, they perceive educational attainment primarily as an individual attribute and use it as a proxy for a person's human, economic, cultural, and to some extent biological capital* (Hoem et al., 2006: 332). Also Tesching (2012) states that empirical investigations have focused not only on the impact of female education on the level of childlessness or the ultimate number of children, but also on educational differentials in the timing and spacing of births. Less attention has been given to two other possibilities, *first* is that not just the education of a woman influences her childbearing behaviour, the birth of a child might also lead to changes in her educational career; *second*, and although researchers have frequently argued that the relationship between fertility and education is extremely complex, little attention has been also given to the possibility that the connections in the period and cohort have different dynamics.

The development of higher education across European countries, particularly among women, has been the major factor behind the postponement of parenthood. In low fertility countries, *where massive expansion of high education has taken place and the education process has extended well into the fecund years, the causality question has become murkier and the education-fertility association has become more varied* (Basten el al., 2013: 42). Influenced by the social and economic contexts and transformations, the educational level and the motherhood timing, play a central role in shaping the life courses trajectory (Beck and Beck-Gernsheim, 2002). In countries, such Portugal or Spain, the massification in the access to education in the 1960's and the *explosion* of female higher education seems to result in the significant postponement and decline of fertility. Portugal e.g., similarly to the other Southern European countries, experienced a drastic and rapid decline in live births. Castro-Martin (1992: 236) highlight that increasing educational level is connected to less traditional gender role models and to aspirations that compete with childbearing, furthermore fertility preferences *are considered to be better implemented by educated women through effective use of birth control*.

Throughout the 20th century, among women, higher education has been associated with lower fertility and with a negative educational gradient in fertility (Van Bavel, 2006) *pronounced in countries institutionally supporting long withdrawal of mothers from the labour market, where highly educated women face difficulties combining their work and family life, including Austria, Germany and Switzerland* (Sobotka, 2012: 284). In the last three decades fertility analysis for the European regions shows that birth decline and postponement are fundamental characteristics in fertility trends (Frejka, 2010; Frejka and Sardon, 2004; Kohler and Ortega, 2002; Kohler et al., 2005; Sobotka, 2004). Birth postponement has been the subject of comparative analyses in different European countries, resulting in the idea that higher levels of educational attainment and the extension in the duration of schooling are key factors in explaining birth postponement. Ní Bhrolcháin and Beaujouan (2012) identified from the early 1980s to the late 1990s in Britain and in France that the rise in educational enrolment has been a substantial contributor to the trend to later childbearing. In their study, the authors adopt a period approach measuring explicitly, *net of period differences in level*.

However the relationship between educational attainment and completed fertility is little studied. Still, previous studies on the cohort perspective demonstrated a clear association at the micro-level between education and the transitions to adulthood, marriage and first birth. *The link between aggregate change in education and birth timing have relied for evidence on the net effects of period or cohort in micro-level models of the occurrence of first birth (*Ní Bhrolcháin and Beaujouan, 2012: 312). Prskawetz and her colleagues (2008: 309) identified that in Austria *a substantial portion of postponed family formation can be explained by prolonged education and the later graduation age of students*. Also and although *older cohorts of academy-educated women had levels of childlessness and completed fertility similar to those of university-educated women, partly due to the importance of religious schools in the education system in the past younger cohorts born after 1950 have lower childlessness and higher fertility (pp 307)*.

Andersson et al. (2009: 313) identified within the Nordic countries childbearing median ages higher for the older cohorts (1960-64 vs 1950-54), as well as a similar patterns of recuperation can be observed for highly educated women compared to women with less education, resulting in small differences in completed fertility across educational group. Additionally, the same authors also identified *a positive relationship between educational level and the final number of children when women who become mothers at similar ages are compared*.

4.3. From low to high education, what changed since 1960 and how that modified the Portuguese fertility and family trends

The role of education in the evolution of individualization is wide spread. Only at the end of nineteenth century educational opportunities with access to women began to emerge. The number of uneducated young women fell as the proportion of women in upper levels of education increased to a degree that exceeded all expectations (Beck and Beck-Gernsheim, 2002). As Hoem, Neyer and Andersson (2006: 335) stated *some educational systems (e.g.: those of the Nordic countries) avoid early track differentiation and remain highly permeable. They allow pupils and students to change their educational tracks, to alter their main field of education (within wide bounds) at all levels, and even more importantly to exit from post-compulsory education and to re-enter it at all stages in their lives. (…) Flexible educational systems offer a person better opportunities to adjust her education to the development of her interests and talents, to changes in the life-course, and to changes in her plans for her future life.*

In part, the persistence of low levels of educational provision in Portugal can be seen as the legacy from the past. In 1950, around 46% of the Portuguese population aged 15 years and over were unschooled. Only 20% completed primary education (Pereira and Lains, 2012). Some progress was made and by late 1960s, universal primary schooling was finally attained (Amaral, 2003), some decades after the European core. Even though, by the end of the *Estado Novo* (1974)[10], one third of all the Portuguese were illiterate, one third of those aged 15 or older had full primary education, 3 percent had completed secondary education and a residual 0.6 percent had undergone university education (Neave and Amaral, 2012). Between 1974 and 2000, public expenditure on education rose from 1.8 percent of GDP to about 3.7 in 1980 and to 6.9 of GDP in 1999. The average years spent in school steadily rose, almost doubling from 4.7 years in 1974 to 8.26 years in 2010. The number of those reaching upper secondary and tertiary education grew substantially since the return of democracy and tripled since 1975, even that the school dropout rate remains very high, greater than that of other OECD countries, with the exception of Mexico and Turkey (Pereira and Lains, 2012).

[10] "Estado novo" is the name of the political regime prevailed in Portugal for 41 years without interruption since 1933 until 1974, when it was overthrown by the Revolution of April 25 (See Chapters 2 and 3).

Overall, in Portugal higher education today supplies for ten times more students than it did 30 years ago, in truth an *educational explosion*. This fast catching up with traditionally more educated countries unveils a very rapid drive onwards towards higher training, which took place within the length of one generation. From the year 2000 onwards, however, the numbers of new students entering directly from secondary schools have dropped, as have birth rates (Almeida and Vieira, 2012). The explosion in higher education is inseparable from the massification of access to education at basic and secondary levels and the outcome of strong and effective investment via the public sector in democratising the school system since 1974.

This situation was also a result of a new and intense demand for education by families in their daily quest to improve their children's educational attainment. The vertiginous drop in the Portuguese birth rate since the second half of the 1970s is a pointer to this watershed, which went hand in glove with a new notion of childhood and infancy, and their relationship to schooling. The idea of the child as a small adult, working for the family since early age, and thus, quite literally, just passing through school, has not entirely vanished.

Another specificity of Portuguese high education level is its early feminisation. It was in the course of the 1960s that the drive of women into higher education became unstoppable. In 10 years, female participation grew from 29.5 percent in 1960 to 44.4 percent by the end of the decade. During the 1980s, the 'turning point', i.e., when the number of women students exceeded the number of male students in Portugal, was reached. Against a broader European backdrop, Portugal, together with France, were the first countries to achieve this point. Iceland, Sweden and Norway reached it in 1985 and with a few years delay, countries such as Denmark, Spain, Italy, Finland and more recently, Ireland, Luxemburg and the UK attained this condition (Almeida and Vieira, 2012).

Although that the education levels in Portugal had experienced remarkable changes that may directly affect the evolution of fertility, few studies were conduced in the country with the aim to observe the impact of education in fertility postponement and decline. Almeida et al. (2002) after quantifying fertility in its intensity and diversity, claimed that the decline of fertility in Portugal is mainly explained by the increasing access and use of medical contraception after 1974; and by the new personal values about the sexuality, conjugality, childbearing and the role of the child in the modern family context. Nonetheless, the authors consider that the instruction level introduces a clear diversity among Portuguese women (mothers).

Cunha (2005) denotes education it is a decisive role as one of the principal component in explanatory studies related with procreative behaviours and representations in the field of fertility. Moreover, Oliveira (2009) identified a nonlinear relation between education and fertility in the specific case of Portugal, and a reduction in the fertility of lower educated groups along with the inverse tendency in the most educated people.

Conventional demographic wisdom holds that fertility levels among women have a negative relationship to educational attainment (Basten et al., 2013). On average Europeans spend 18 years of their life at the educational system. In the perspective of the most recent data on the countries under analysis the OECD identifies Austria as the country with the lower average time at educational system, with 16.92 years while Portugal has the highest average time with nearly 18 years (the only country above the OECD average of 17.7 years), slightly higher than for Spain (17.6) and for Hungary (17.5).

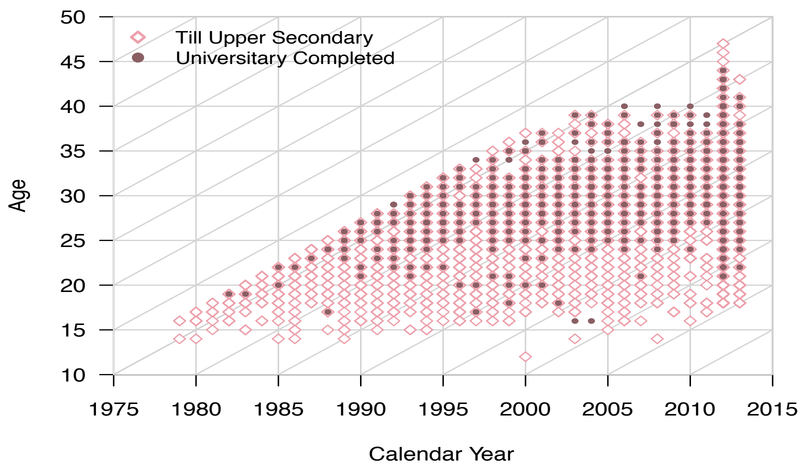
The 2014 OECD Life Index describes Austria as one of the countries where student's academics accomplishments are most affected by their family's socioeconomic background. For Hungary, the same report suggests the school system does not provide equal access to high-quality education. The evolution of Portuguese education is characterized by a still high share of students leaving the education system too early (between ages 14-16) and, consequently, with low skills (Wood et al., 2014). Spain, on the other hand, was identified as the country with school system relatively equal access to high-quality education.

An empirical example is given by figure 4.1, where the transition to first births in Portugal by mother's age and year of childbirth is plotted. Already mentioned in chapter 3, main differences in terms of educational perspective in Portugal occurred within two groups. The increase of mandatory school age to 18 years (in 2012[11]), creates in the present a homogenous pattern that differentiate education in (1) until upper secondary,

[11] Decreto-Lei nº176/2012

and (2) universitary completed. Figure 4.1 allows to evaluate the fertility postponement evolution, considering the mother age and year of their first child controlled by the education. With the Lexis diagram is fairly easy to observe the postponement to the mothers with tertiary educational level.

Figure 4.1: Transition to first birth in Portugal by educational level, and by the mother age and the year of childbirth (measured in 2013)



Source: 2013 Portuguese Fertility Survey (for further information on the Data-base, see Chapter 3). Own elaboration.

The period fertility postponement observed across Europe and identified by previous studies as a causal response to the improvements in the women participation at the educational system, resulted in shift of fertility to later ages, independently of educational gradient. Thus it’s possible to verify a higher birth incidence after age 25 that is mainly associated to women with an academic complete degree, but also characterized by low numbers of births until age 20. Also, the vast majority become a mother after leaving education thus at later ages (Billari and Philipov, 2004).

4.4. Data and Methods

4.4.1. Data description and sample selection

Our analysis is based on the IPUMS individual Census samples in the years of 1991 and 2001 for Austria, Hungary, Portugal and Spain from where we reconstruct the data for the 1950 and 1960 cohorts. For Portugal, Hungary and Spain the sample represents five-percent from the census data and ten-percent to Austria. Each one of the mentioned samples, covers standard socio-demographic characteristics such as individuals age, nationality, educational attainment, region of residence, household composition, etc. Each resident in the sample has a unique personal code that allows identifying its complete household composition. That allowed reconstructing the information to the individual's mothers including the childbearing history controlled by educational levels.

Before we discuss the selection of the data set, it is important to draw our attention to a particular shortcoming in the IPUMS samples. The fact that IPUMS does not provide the fertility history of the respondents is a major drawback from the samples in regards to the analysis of demographic events. For our analysis of education and fertility, we have linked children individual data to reconstruct the mother individual childbearing and educational histories.

However, for old mother's cohorts, it is possible to identify two scenarios. On the *first* scenario, we have the children who are still at the parental home; and on the *second* scenario, we can identify the children old enough to take care of their parents and in this case is possible that the household head is the descendant and not the parents. For this reason, we restrict our analysis to the birth cohorts born later than 1950; furthermore we restrict to birth cohorts between 1950-1960, combining from the samples, mothers aged 41 at the census time in 1991 and in 2001. All this constrains provide us homogenous samples and allow elaborate a small reconstruction of cohort fertility (table 4.1).

Already identified in previous research, by reconstructing the longitudinal information on education, we can *avoid the problems that commonly arise when researchers seek to explain fertility behaviour at a certain age by the educational level reported, and possibly attained at a later stage* (Andersson et al., 2009: 317). Thus, we analyse how the transition to motherhood and the total fertility rate are associated with women's level of education in the 1950 and 1960 cohorts, who had their children between 1965 and 2001.

Similarly to Andersson et al. (pp 315) the chosen 1950 and 1960 cohorts represented women *entered their reproductive life at different calendar years and with different social and cultural surroundings, including different political contexts concerning family policy, educational schemes, and gender equality* (2009). Moreover the changes observed through the benchmark cohort in chapter 2 allowed distinguish the 1960 cohort as the more consensual one. This was the first cohort when the average age at fertility began to increase and kept growing for five consecutive years. For that motive we chose the 1960 cohort to evaluate the changes in the educational impact to the fertility postponement in comparison to the 1950 cohort.

Table 4. 1: Sample size for the cohorts in analysis, representing the women aged 41 in 1991 and 2011 by selected countries

	Cohort 1950	**Cohort 1960**
Austria	4761	5872
Hungary	3721	3204
Portugal	3001	3415
Spain	11091	14116

Source: Own elaboration; IPUMS

4.4.2. Methods

Our analysis is essentially descriptive with the use of fertility tables and an in-depth analysis of fertility transition rates (probabilities) to the first child by mother's educational level. Andersson et al. (2009: 315) identified that *previous research reveals that reported associations between education and childbearing depend very much on how and when educational characteristics and fertility are measured*. Nevertheless, our approached, similarly to the one from the cited authors, results from the cumulated number of births from a given cohort.

The main focus is the educational categories:

(1) No educational level;

(2) Primary;

(3) Upper secondary;

(4) University completed.

To each category, fertility tables were elaborated and calculated indicators as the total fertility rate, the mean age at childbearing and the mean age at first child. Furthermore, and by reconstructing the mother information through children information, few are the covariates available to describe mothers under analysis. Besides educational level and cohort of births, our analysis will focus at the marital and employment status. In section 4.5.3 we correlate the educational level to the average number of births by marital and employment status in the 1950 and 1960 cohorts.

The main focus across this chapter is the fertility throughout the reproductive lives of mothers, thus, the use of fertility tables allowed to reconstruct transitions between age 15 and 41 giving at the end the total fertility rate of a given cohort. Yet, we made use of one of the most popular indicators and used in graphical form in demographic analysis, the so-called survival curve (from the life tables) to plot the transition rates (or survival probabilities) at each age. Although this study aims fundamentally to investigate the changes in the fertility timing, we also intent to analyse the *quantum* as an effect derived from the *tempo*.

Previously in chapter 2 (section 2.3.3) we address to the use of fertility tables. Yet, in this chapter instead of using the methods proposed by the Human Fertility Database, the fertility tables presented are slightly different, we adapted to the cohort, the period fertility table analysis proposed by Sobotka (2004, Chapter 3 – section 3.3.2). The main difference between this approach and the previous one is the inclusion in the analysis of a proportion of childless women by age (the proportion of those who *survived* to the event of having a first child).

The table is constructed for ages 15-41, where the first two columns are the data input for the calculation of first birth probabilities. Thus, $B_1(x)$ is the first birth across ages in the 1960 cohort, and $E_0(x)$ is the 1960 cohort women population in risk of having the first birth throughout their lifetime. These first indicators are obtained by IPUMS cohort reconstruction.

Next, we have the first birth probabilities defined as $q_1(x)$, and calculated by applying $q_1(x,t) = B_1(x,t)/E_0(x,t)$, where t denotes time and x the age. From column 4 to 7 by age we presented (4) the table population childless denoted as $l_0(x)$, and obtained by $l_0(x) = l_0(x-1) - b_1(x-1)$, represented as a survival curve at first age the set value is 100 000; (5) the table number of first births given by $b_1(x) = l_0(x)* q_1(x)$; (6) the average number of childless women, given by $L_0(x)$; and finally (7) $z_1(x)$, the cumulative proportion of first births.

All the mentioned indicators were calculated to the 1950 and 1960 cohorts for Austria, Hungary, Portugal and Spain with the aim to provide new insights about the age patterns in the transition to motherhood. In the next section, results are presented where one of the main focuses is the proportion of childless women into the scope analysis of estimated transition rates or survival probabilities.

Table 4. 2: Fertility table for the first birth for the 1960 cohort in Portugal

Age	**B_1(x)**	**E_0(x)**	**q_1(x)**	**l_0(x)**	**b_1(x)**	**L_1(x)**	**z_1(x)**
15	8	3415	0.002	100000	234	99883	0.002
16	16	3407	0.005	99766	469	99531	0.007
17	32	3391	0.009	99297	937	98829	0.016
18	87	3359	0.026	98360	2548	97086	0.042
19	125	3272	0.038	95813	3660	93982	0.078
20	170	3147	0.054	92152	4978	89663	0.128
21	254	2977	0.085	87174	7438	83455	0.203
22	296	2723	0.109	79736	8668	75403	0.289
23	285	2427	0.117	71069	8346	66896	0.373
24	287	2142	0.134	62723	8404	58521	0.457
25	237	1855	0.128	54319	6940	50849	0.526
26	184	1618	0.114	47379	5388	44685	0.580
27	176	1434	0.123	41991	5154	39414	0.632
28	165	1258	0.131	36837	4832	34422	0.680
29	139	1093	0.127	32006	4070	29971	0.721
30	112	954	0.117	27936	3280	26296	0.753
31	85	842	0.101	24656	2489	23411	0.778
32	64	757	0.085	22167	1874	21230	0.797
33	69	693	0.100	20293	2020	19283	0.817
34	56	624	0.090	18272	1640	17452	0.834
35	52	568	0.092	16633	1523	15871	0.849
36	45	516	0.087	15110	1318	14451	0.862
37	40	471	0.085	13792	1171	13206	0.874
38	32	431	0.074	12621	937	12152	0.883
39	34	399	0.085	11684	996	11186	0.893
40	15	365	0.041	10688	439	10469	0.898
41	6	350	0.017	10249	176	10249	0.899

Source: Own elaboration; IPUM.

Besides the traditional indicators capturing the general shift towards later childbearing, such as mean and median ages. As in previous research we made use of the interquartile range IQR= Q3-Q1, where Q1 and Q3, reflect the age when 25% and 75% of women already transited to motherhood. The median was obtained considering the $l_0(x)$ (population childless).

Such differences represent the population heterogeneity in first birth timing during a given period also as Sobotka discussed (2004: 43), *these indicators are particularly useful means for adding another dimension to the usual analysis of central tendency*. To measure the heterogeneity within the two cohorts under analysis, we used the IQR method, which considers the timing of a given transition only among people who would eventually experience this transition, given the fertility schedule of a given cohort.

4.5. Results

Low fertility has become a structural characteristic of the demographic regime in Austria, Hungary, Portugal and Spain. Thus, in the next sections empirical discussion on the relationship between education and fertility postponement will be presented and analysis with the aim to identify similar patterns to the ones already discussed about the period fertility. Latter, and to better understand the educational influence in the transition to motherhood, a brief discussion on fertility by marital and employment status controlled by the educational gradient will be presented.

4.5.1. Fertility transition in the 1950 and 1960 cohorts

The low cohort fertility trends discussed in Chapter 2 are the result from the socio-demographic transformations. The changes in the cultural and social norms that defined the suitable time for childbearing, as a response to the shift ages of other life events, such as marriage, increasing women's education and labour force participation, allowing for a more accurate control over women life course (Castro-Martin, 1992). Indeed, if we consider the Portuguese case, between the two cohorts under analysis, several changes occurred, not only in the educational system, as mentioned in section 4.3, but also at the social level. When the Portuguese revolution occurred in 1974, at that time the women from 1950 cohort were 24 years (already in the fertility window) while women from 1960 cohort were only 14 yeas old, thus more liable to assimilate the cultural and social changes.

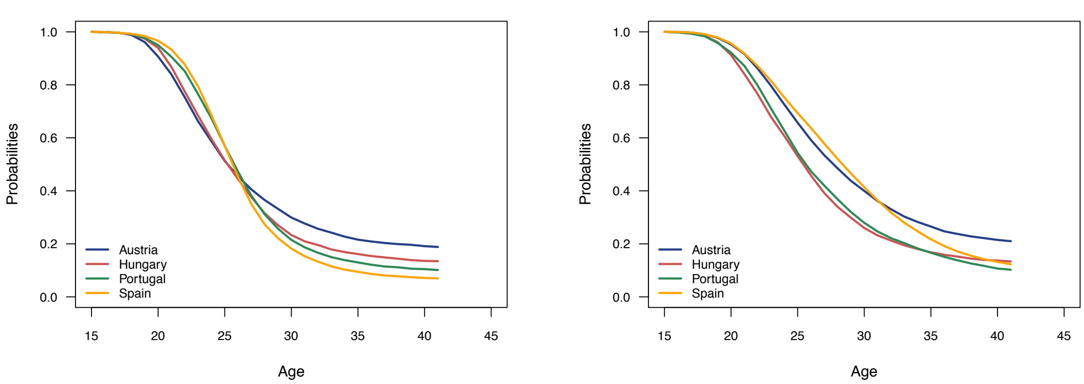
Before (chapter 2), the 1960 cohort was pointed out as a benchmark cohort to discuss fertility decline and postponement. Thus, in this section we focus our attention in the 1960 cohort comparing its fertility trends with the ones observed in the 1950 cohort. Figure 4.2 considering for that the survivorship curve ($l_0(x)$) which can also be defined for the propose of our analysis as a cumulative probability to become a mother.

In the 1950 cohort, Austria and Hungary are the countries with the faster transition to motherhood until age 25, thus with lower median age at birth. However, after age 25 for Austria the estimated probability transition had patterns of postponement. And also by 1960 cohort Austria had the highest postponement trend as well as Spain, still at later ages Austria had the highest signs of fertility delay.

Figure 4.2: Cumulative Transition rates to motherhood by selected countries to 1950 (a) and 1960 (b) cohorts

(a) Transition rates to motherhood to the 1950 cohort

(b) Transition rates to motherhood to the 1960 cohort



Notes: For detailed information see Appendix C, Tables C.1 to C.7.
Source: Own elaboration; IPUMS

Nonetheless Austria is not a particular case, in the sense that all countries under analysis had their own peculiarities in the motherhood transition. Spanish and Portuguese mothers, e.g., from the 1950 cohort had the highest transition rates after age 25. In fact from the four countries Spain had the lowest transition rates at later ages, as a result from the highest total fertility rate (see table 4.3).

Nevertheless, ten cohorts later fertility patterns across countries are somehow different namely with lower transition rates especially to Spain and Austria and stated above. Portugal and Hungary mix the fertility transition trends; still between the two cohorts the total fertility rate decline by 0.3 children per women while Hungary is from the four countries the only with no differences between fertility levels. Postponement was thus in progress, not only for the Portuguese mothers but transversely top entire Europe.

Frequently, to measure fertility timing, the mean age at childbearing (MAC) and mean age at first child are the most used measures. Table 4.3 summarises indicators capturing the fertility *tempo* and *quantum*. From 1950 to 1960 cohort, the average number of childbearing decreased to Portuguese, Spanish and Austrian mothers, while for Hungary no changes were observed. Between the two cohorts, only the Spanish women increased the mean age by 0.3 years, while for Austria and Hungary the mean age decreased by 0.1 years and 0.3 in Portugal. Yet, and like was observed in Chapter 2, a steady evolution of the total mean age at childbirth does not reflects directly the age at first birth. For our sample case, we observe an increase of less than one year across all countries with the exception to Spain that increase the mean age at first child by two years (25.3 to 27.3).

The highest changes in the median age are registered in Austria with a difference of almost five years between 1950 and 1960 cohorts. Still, the median ages of 25.2 and 27.7 are low when compared to the Spanish values of 25.2 and 28.4. While the median age increased by five years in Austria and three to Spain, in Hungary the increase was lower than half a year and for Portugal we observe a decline at the median age. Regarding the interquartile range, Portugal presented the highest differences with an increase of 2.3 years, even that with the lowest IQR in both cohorts (6.0 vs. 8.3).

Thereafter Austria registers a difference of 1.6 years and is for this country that the IQR ranges are higher (10.4 and 12.1 for the 1950 and 1960 cohorts). Followed closely by Spain with high IQR, still is the only country with a negative change (-0.6) from the 1950 to the 1960 cohort. On the other hand, Hungary presents similar values to Portugal with an increase of 1.1 years in the interquartile range. As an indicator of population heterogeneity the interquartile range indicates that the highest fertility heterogeneity was observed in Austria and Spain, as already observed in figure 4.2. Yet within the four countries only Spain saw the heterogeneity decreasing from the 1950 to the 1960 cohort.

Table 4.3: Cohort measures of fertility patterns and the estimated changes for the selected countries in 1950 and 1960 cohorts (to women aged 41 in the 1991 and 2001 census)

	1950 Cohort (1)	**1960 Cohort (2)**	**Changes 1950-1960 (3=2-1)**
Austria			
CTFR	1.8	1.7	-0.1
CMAC	26.2	26.1	-0.1
CMAC 1º	24.3	26.1	1.8
Median Age	25.2	27.7	2.5
IQR	10.4	12.1	1.6
Hungary			
CTFR	1.6	1.6	0.0
CMAC	26.2	26.1	-0.1
CMAC 1º	24.5	25.2	0.7
Median Age	25.2	25.4	0.2
IQR	7.0	8.2	1.1
Portugal			
CTFR	1.8	1.7	-0.2
CMAC	27.1	26.8	-0.3
CMAC 1º	25.2	25.4	0.2
Median Age	25.7	25.5	-0.2
IQR	6	8.3	2.3
Spain			
CTFR	2.0	1.7	-0.3
CMAC	27.6	27.9	0.3
CMAC 1º	25.3	27.3	2.0
Median Age	25.2	28.4	3.2
IQR	10.4	9.9	-0-6

Notes: CTFR – Cohort total fertility rate; CMAC – Cohort mean age at childbearing; CMAC 1º – Cohort mean age at the first childbearing; IQR – Interquartile range (Q3-Q1).
Source: Own elaboration; IPUMS

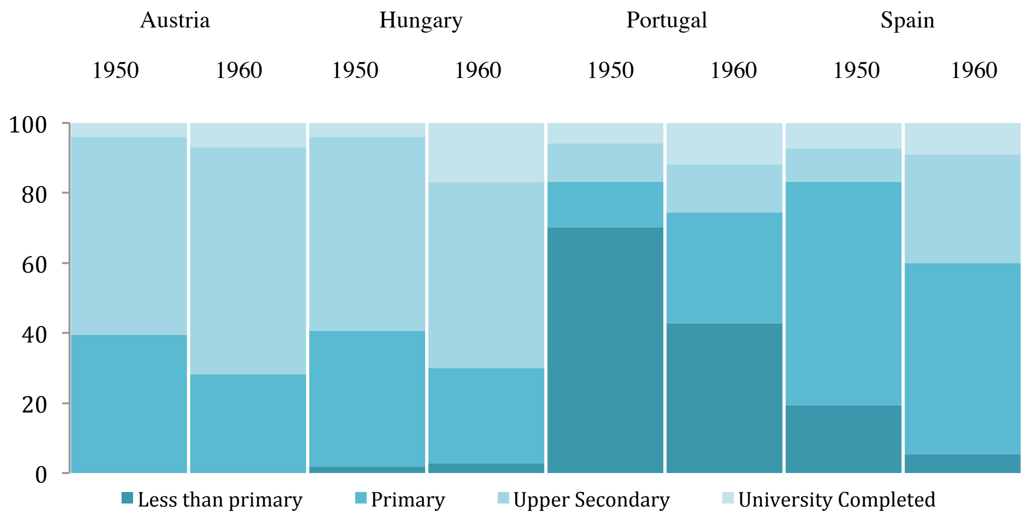
This preliminary analysis in the transition to motherhood by country and cohorts allowed identifying a postponement trend across the four countries with higher intensity in Spain, but followed closely by Austria. From 1950 to 1960 the main difference distinguished at the moment is exactly the postponement, while the fertility *quantum* did not change substantially. The following subsection provides empirical results by educational gradient with the aim to describe the educational contribution to the total fertility rate as well as for the fertility postponement.

4.5.2. Four countries and two cohorts: the relationship between increasing education and decreasing fertility

The previous section allowed understanding, in a very broad perspective, how in the 1950 and 1960 cohorts, the transition to motherhood across countries took place. In this section we address our analysis to the transition patterns to motherhood in the 1950 and 1060 cohorts and identify the difference within cohorts and countries. Yet, and before we can compare the differences between transition moments into motherhood, in figure 4.3 we can observe the differences between educational gradient within cohorts and countries, regarding the proportion of females exposed to the event. Such differences are the result of social and economic transformations distinctive for each cohort and country.

In comparison to the other countries, if we focus our attention in the Portuguese case, it is possible to identify a massif representation of females unschooled, with special consideration to the 1950 cohort, where this group represent around 70 percent of the sample. However and like it was mentioned in section 4.3, Portugal had a massive educational evolution reflected already in the 1960 cohort as we can observe, with a decrease to values lower than 40 percent. Besides Portugal, Spain had the highest percentage of women with lower educational levels, still with values lower than 20 percent in the 1950 cohort and five percent by 1960. In opposite position we have Austria and Hungary with a high number of women with upper secondary education. The main cross-country characteristic is the educational improvement with the *small* increase at high educational levels and the significant decreasing patterns at the lower ones.

Figure 4.3: Sample distribution of women exposed to transition to motherhood by educational level, in the selected countries in 1950 and 1960 cohorts



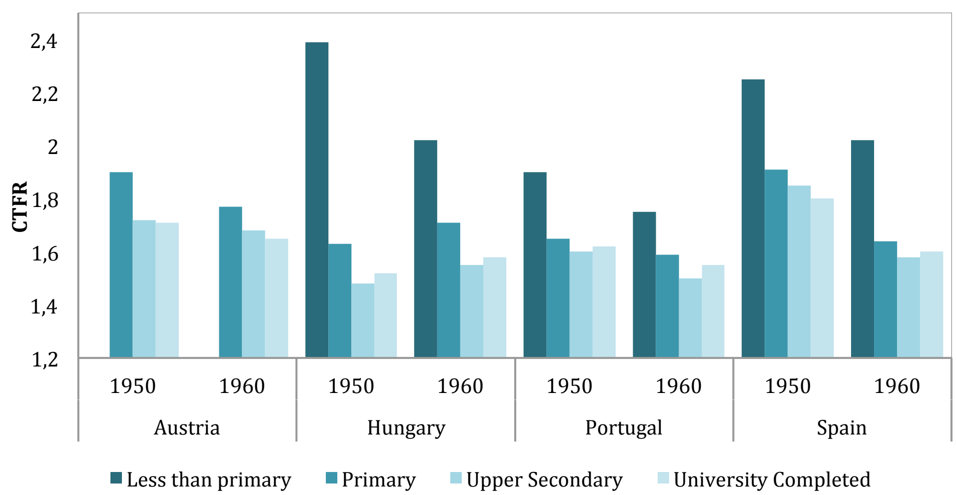
Source: Own elaboration; IPUMS

The fertility patterns observed across countries are influenced by the size sample of each educational level described above. The educational distribution of the country samples by cohort indicates expected meaningful differences in terms of TFR values and the way women for a certain level of education carried over to motherhood, particularly in the countries with higher unschooled mothers (Portugal and Spain). Before we evaluate and discuss on the effects of education on the timing of entry into motherhood, we discuss with figure 4.4 the differentials on fertility *quantum* by country and cohorts.

Within the two cohorts, mothers with no education compared to other levels of education had significant higher fertility levels. Our first remark corresponds to the analysis within countries and cohorts, where mothers with no educational levels had the highest fertility rates, followed by those with primary level. Our second remark refers to the highest and lowest values observed that occurs in the 1950 cohort in Hungary, with 1.48 to the upper secondary level and 2.39 at mothers with less than primary education. Our third highlight is related to the Austrian fertility, with the lowest global level and with fewer differences with the country fertility from one cohort to another, and to Spanish patterns with the higher values among all educational levels in the 1950 cohort (as stated by Sobotka in 2015).

In the 1960 cohort, Portugal had among all educational levels the lowest fertility rates, yet the values are in equilibrium with the still high proportion of mothers with no educational levels and an average birth number of 1.75 children per woman. Finally, figure 4.4 also allows distinguishing a pragmatic characteristic. With the exception of Austrian and Spanish mothers born in the 1950 cohort, within both cohorts for Hungarian, Portuguese and Spanish mothers from the 1960, the average number of children is higher to mothers with a university degree when compared with those with upper secondary education.

Figure 4.4: Cohort total fertility rate (CTFR) by educational level in the 1950 and 1960 cohort, for the selected countries



Source: Own elaboration; IPUMS

With such differences on the average birth number across educational level, we discuss now the transition to motherhood across mother's age in the 1950 and 1960 cohorts. Educational attainment has long been known to be associated with later childbearing at the individual level, and educational expansion has often been cited as an influence on the changing timing of fertility. However, direct evidence of the role of rising educational levels in influencing aggregate change in fertility tempo has been scarce.

The risk of becoming a mother changes with age and across time, in fact, between 1950 and 1960 cohorts, substantial differences has been identified both in fertility timing and *quantum*. Furthermore, figure 4.5 presents the estimated probabilities of transition to motherhood, decomposed by educational level, where stand out from the outset that those who later on their life course become a mother has higher educational levels (namely an university degree), while are women with low levels of education (or without any level) that sooner became a mother. Thus, in Austria there is a visible significant later transition to those with higher education. In both cohorts the transition patterns are quite similar, women with upper secondary education and primary had the same trends, but those with the lowest educational level had the higher risk of become a mother until age 30.

Figure 4.5: Cumulative transition rates to first birth by age and educational level, for Austria, Hungary, Portugal and Spain in the 1950 and 1960 cohorts

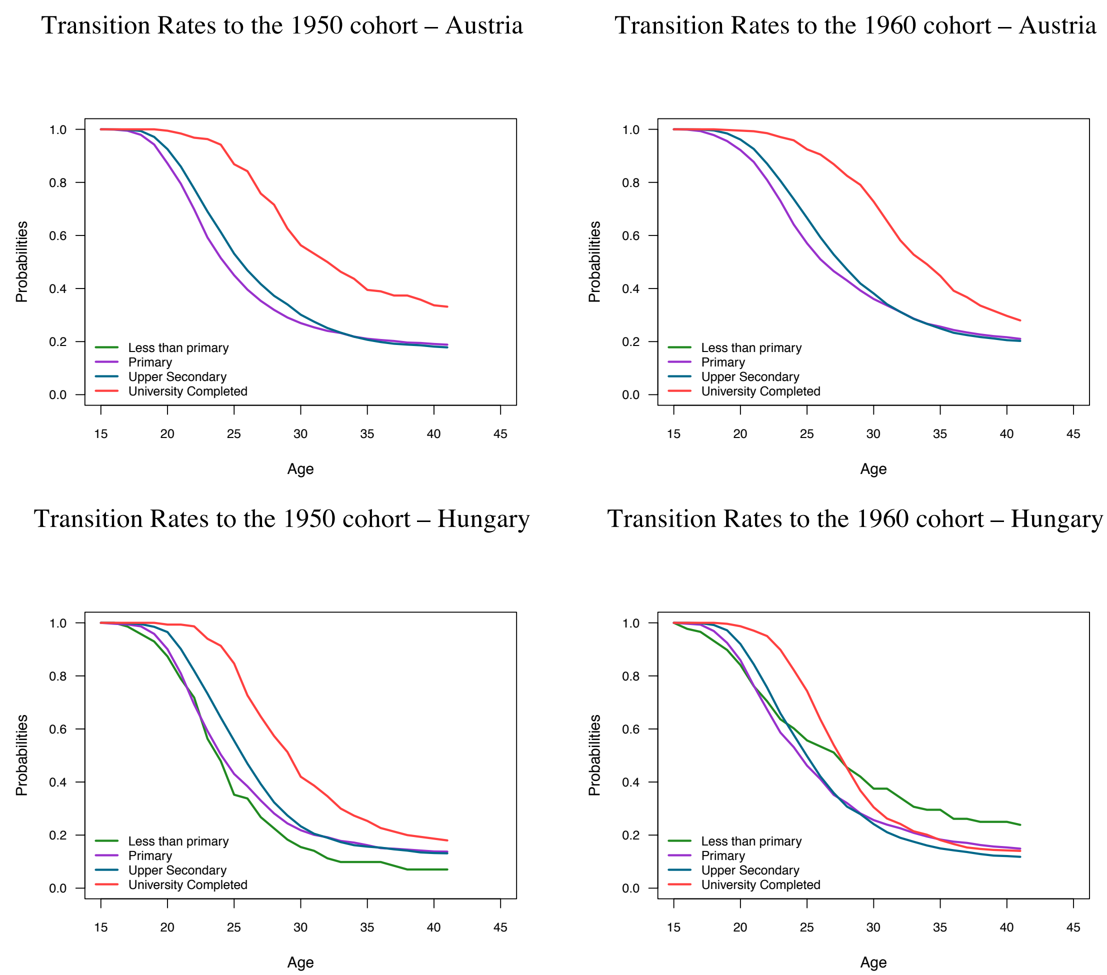
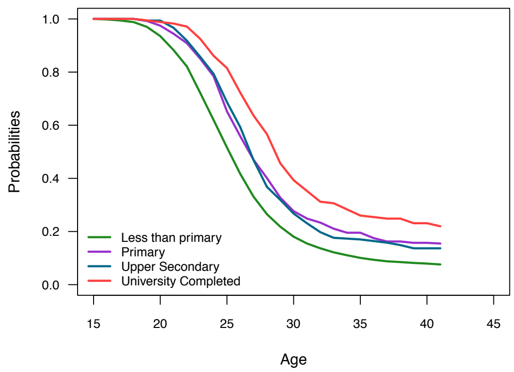
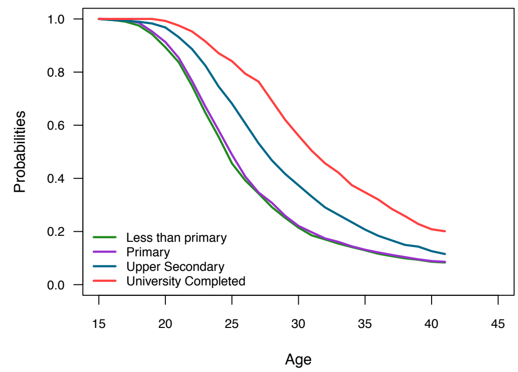


Figure 4.5: (continued) Cumulative transition rates to first birth by age and educational level, for Austria, Hungary, Portugal and Spain in the 1950 and 1960 cohorts

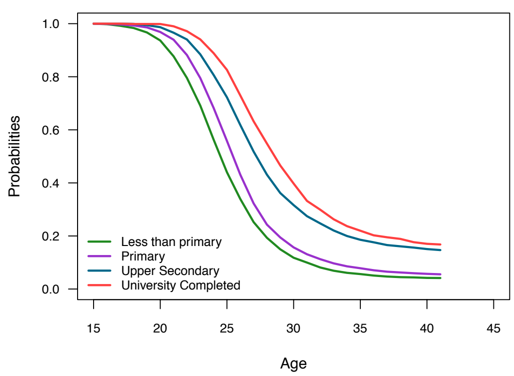
Transition rates to the 1950 cohort - Portugal



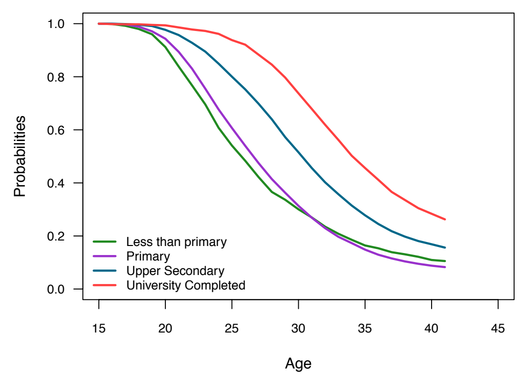
Transition rates to the 1960 cohort - Portugal



Transition rates to the 1950 cohort - Spain



Transition rates to the 1960 cohort - Spain



Notes: Estimated probabilities detailed in Appendix C, tables C.8 and C.9.

Source: Own elaboration; IPUMS

In Hungary, the risk of becoming a mother for females with higher education is null until age 25, from that age onwards the risk is higher for this educational level when compared with the other three levels. In the 1950 cohort, for the lower educational levels the risk is significantly higher, especially for those without any educational level. Still, in the 1960 cohort, after age 25 probabilities of becoming childless increase for those without educational levels, and later after age 30 the probability (or risk) is barely the same across all educational levels.

For Portugal, women born at the 1950 cohort with the middle educational levels (primary and upper secondary) had the same probabilities to become a mother, yet later at the 1960 cohort the change in the educational evolution created a change in the fertility patterns, and no differences could be found between mothers with no education or primary one. In Spain women born in 1950 presented two main pattern shapes in the transition to motherhood, one with higher probabilities to those with no education or primary and a second for those with higher educational levels, where the postponement can be observed. Still, for each one of the educational levels, the higher risk of becoming a mother occurs until age 30. Nevertheless, when we focus our attention at the younger cohort, the postponement is remarkably higher for those with a university degree. Spain had been already identified the country with the greatest increase in the mean age at childbearing and even higher at the first children (see table 4.3), followed closely by a decline at the average number of children.

Prskawetz and her colleagues (2008) identified to the period fertility that as result from the changes in the educational relationship between education and family formation and fertility, the mean age at childbearing increased to later ages into the thirties. Also the transition from lower to higher levels of education is associated to the fertility postponement leading to lower levels of period fertility (Basten et al., 2013). Table 4.4 summarises the mean age at first birth by educational level, country and cohorts, as well as the estimated differences between cohorts. Only Hungary and Portugal presented a decline at the mean age at some educational levels.

From 1950 to 1960 Hungary presented a decline in the higher educational levels, with a small decrease to mother with upper secondary education and a decline of about 1.2 years to mother with at least a university level completed. In Portugal, the decline occurs at the lower educational levels (as described with figure 4.5). Mothers with no educational level decreased their mean age by 0.3 years, and a decline of 1.2 years to those with primary educational level. From the older to the younger cohort, for Austria and Spain across all educational levels the mean age increased, remarkably at the university completed with an increase of 2.2 years in Austria and around 4 years to the Spanish women.

Table 4.4: Mean age at childbearing by educational level and the estimated changes for the selected countries in 1950 and 1960 cohorts (to women age 41 in the 1991 and 2001 census)

	1950 Cohort (1)	1960 Cohort (2)	Change 1950-1960 (3=2-1)
Austria			
Less than primary	-	-	-
Primary	23.5	25.1	1.6
Upper Secondary	24.7	26.1	1.4
University Completed	28.6	30.9	2.3
Hungary			
Less than primary	23.6	24.8	1.2
Primary	23.7	23.9	0.2
Upper Secondary	25.0	24.6	-0.4
University Completed	27.9	26.7	-1.2
Portugal			
Less than primary	24.8	24.5	-0.3
Primary	26.0	24.8	-1.2
Upper Secondary	26.1	27.0	0.9
University Completed	27.3	29.3	2.0
Spain			
Less than primary	24.2	25.4	1.2
Primary	25.2	26.3	1.1
Upper Secondary	26.5	28.7	2.2
University Completed	27.6	31.4	3.8

Source: Own elaboration; IPUMS

The discussed changes across the two selected cohorts provide us more detailed information that the one discussed on the cohort fertility evolution at Chapter 2. Furthermore the observed changes are the result not only from the social transformations, but also at the micro levels (see Chapter 3). The systematic period and cohort fertility postponement is closely related to the *quantum* decline. Once more, lets use Portugal as an example. The social changes directly affect these two generations, yet at different moments of their lives.

When the democratic paradigm changed at the dictatorship end, women born in 1950 were 24 years old and those born at 1960 only 14 years. Even that in terms of age the difference was not significant, at that time for the country itself and for the population all the changes were massive. For those born in 1960 by the time that they had their first child, and if we consider the mean age as a benchmark point, by 1985 a high portion for first birth had born already and the socioeconomic changes were at the top. It was identified changes in the increasing importance of a woman career, in their economic independence, as well as their *massive* presence at the university. Not exclusively from Portugal, such differences arise from social transformations across time that could help to understand the intrinsic relationship between cohort fertility and period as some authors already identified in previous research (e.g., Goldstein and Cassidy, 2014).

4.5.3. Cohort fertility controlled by educational level, marital status, labour market participation and country

Most studies found not only *inverse relationship between educational attainment and the timing of first birth* (Ní Bhrolcháin and Beaujouan, 2012: 312), but also find a strong relationship between education, labour market participation and the occurrence of first birth (e.g., Rindfuss et al. 1980). The growth in the educational attainment is advocated having resulted in later fertility tempo via opportunity costs for a set of motivations. Also Bhrolcháin and Beaujouan (2012) identified that higher-educated women experience greater opportunity costs from leaving the labour force around the time of childbearing.

With the increase of educational levels and the mean age at childbearing we considered important to characterize our sample through other socio-demographic characteristics such as the marital and employment status. Table 4.5 summarizes the proportions of mothers by marital and employment status in the 1950 and 1960 cohorts. In the two cohorts across all countries, between 84 and 94 percent of mothers in our sample are married or live in union, yet at the same the proportion of mother divorced increased from the older to the younger cohort. Thus with the exception of Hungary the proportion of married mother declined between 6.5 percent in Austria and 3.3 percent in Portugal. At the same time in Portugal and Spain the proportion of single mothers increased by more that 1 percent. The social transformations reflected directly at the ages that the life course events occur.

From Austria to Portugal for the 1950 cohort, a high proportion of mothers were already at the labour market, with values higher than 50 percent. While for Spain in the same cohort the proportion of employed mothers was only 27 percent. Yet with the exception to Hungary, the observed countries increased even more the proportion of employed mothers.

The extremely high proportion of those who are homemakers can explain the low proportion of employed Spanish mothers. The low 27 percent employed mothers are compensated by the 65 percent of homemaker's. Yet at the younger cohort, the proportion of employed mother increased to 45 percent still lower than for the other three countries. Across other characteristics the neighbour countries Portugal and Spain dissimilarities are not so visible, yet already Bettio and Villa (1998) argue that with the exception to Portugal, the Southern family model inhibits female labour force participation. Such model is point out as the "root cause" to the low female employment rates in Spain, Greece and Italy.

Table 4.5: Proportion of mothers by marital and employment status the selected countries in 1950 and 1960 cohorts (to women aged 41 in the 1991 and 2001 census)

	Austria		**Hungary**		**Portugal**		**Spain**	
	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort
Marital Status								
Single/never mar.	1,4	1,6	0,8	1,2	0,6	2,0	0,9	2,0
Married/in union	86,0	79,5	84,5	93,3	92,6	89,1	94,2	88,2
Separated/divorced	9,9	15,2	10,1	4,1	4,4	6,8	3,0	7,7
Widowed	2,7	3,7	4,5	1,4	2,4	2,0	1,9	2,0
Employment Status								
Employed	57,0	73,2	86,4	69,3	55,1	68,1	27,0	45,3
Unemployed	2,6	3,1	0,8	6,1	2,9	4,3	5,1	7,7
Homemakers	38,1	22,1	-	-	33,2	21,6	64,6	38,2
Others	2,3	1,6	12,8	24,6	8,8	5,9	3,3	8,8

Notes: 1) For the 1950 Cohort, it was considered women age 41 year old at the 1991 census, as for the 1960 cohort women age 41 years old at the 2001 census. 2)The Hungarian data had no information to the employment category *Homemakers*. 3) At the covariate employment status the category *Others* include students, pension or capital income recipients and unemployed that never worked before.
Source: Own elaboration; IPUMS

We have demonstrated that, in each country, mean and median age increased across the studied cohorts and also the fertility *quantum* is not equal across educational levels. With the highest fertility for Spain, is then expected that by marital or employment status the highest fertility *quantum* for Spanish mothers. Table 4.6 which illustrate the average number of children by marital and employment status controlled by the educational level, adding slightly more complexity to the analysis on the education influence at the fertility cohort. Across different marital status controlled by the educational levels, Spain has the highest average number of children per women, with the exception to Hungarian single mothers from the 1960 cohort with primary educational, and to married mothers with no educational level from the 1950 cohort. When controlled by the educational and marital status the lowest observed fertility levels were registered at the 1950 Portuguese single mothers with upper secondary education, as well as for Spanish and Hungarian single mothers with university completed.

Table 4.6: Average childbearing by marital status and educational level for the selected countries in 1950 and 1960 cohorts (to women aged 41 in the 1991 and 2001 census)

	Austria		**Hungary**		**Portugal**		**Spain**	
	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort
Less than Primary								
Single/never married	-	-	1.5	1.25	1.6	1.6	2.7	2.0
Married/in union	-	-	2.5	2.0	1.9	1.8	2.2	2.0
Separated/divorced/spouse absent/Widowed	-	-	2.3	2.4	1.9	1.8	2.4	1.8
Primary								
Single/never married	1.6	1.5	1.8	2.2	1.3	1.9	1.6	1.5
Married/in union	1.9	1.8	1.7	1.7	1.7	1.6	1.9	1.7
Separated/divorced/spouse absent/Widowed	1.6	1.5	1.6	1.7	1.6	1.6	1.8	1.6
Upper Secondary								
Single/never married	1.2	1.3	1.2	1.25	1.0	1.3	1.4	1.4
Married/in union	1.8	1.7	1.5	1.5	1.6	1.5	1.9	1.6
Separated/divorced/spouse absent/Widowed	1.5	1.6	1.4	1.5	1.6	1.7	1.7	1.5
University completed								
Single/never married	1.0	1.3	1.0	1.1		1.4	1.0	1.0
Married/in union	1.8	1.7	1.6	1.6	1.6	1.6	1.8	1.6
Separated/divorced/spouse absent/Widowed	1.5	1.3	1.3	1.4	1.4	1.3	1.7	2.1

Notes: 1) For the 1950 Cohort, it was considered women age 41 year old at the 1991 census, as for the 1960 cohort women age 41 years old at the 2001 census. 2) For Austria there is no data for the educational level *less than primary*
Source: Own elaboration; IPUMS

Also well defined are the differences on the average number of children controlled by the employment status and educational level. Side by side to Austria, Portugal had the lowest fertility rate by educational level, and when to educational characteristics we added the employment status, Portugal presents the lowest values, especially to mother from 1960 cohorts. On the opposite position we identify Spain with the highest values across all educational levels and employment status particularly at 1950 cohort. The small proportion of women with a university level completed from the 1950 cohort could explained the high average number of children observed in Austria, Portugal and Spain to the homemakers mothers.

Table 4.7: Average childbearing by employment status and educational level for the selected countries in 1950 and 1960 cohorts (to women aged 41 in the 1991 and 2001 census)

	Austria		**Hungary**		**Portugal**		**Spain**	
	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort
Less than Primary								
Employed	-	-	2.5	1.7	1.8	1.6	2.1	1.9
Unemployed	-	-	-	1.9	1.8	1.7	2.3	1.8
Homemakers	-	-	-	-	2.0	1.9	2.3	2.1
Others	-	-	2.2	2.1	2.0	1.8	2.5	2.0
Primary								
Employed	1.8	1.7	1.6	1.5	1.6	1.6	1.8	1.6
Unemployed	1.6	1.8	1.6	1.8	1.2	1. 6	1.8	1.6
Homemakers	2.0	2.0	-	-	1.9	1.7	2.0	1.7
Others	1.8	1.6	1.9	2.0	1.6	1.7	2.0	1.6
Upper Secondary								
Employed	1.7	1.6	1.5	1.5	1.6	1.5	1.8	1.5
Unemployed	1.6	1.8	1.5	1.6	1.6	1.6	1.7	1.7
Homemakers	1.9	1.9	-	-	2.1	2.0	2.0	1.6
Others	1.5	1.6	1.7	1.8	1.6	1.5	1.9	1.6
University Completed								
Employed	1.6	1.6	1.5	1.5	1.6	1.5	1.8	1.6
Unemployed	1.8	1.3	-	1.3	-	1.3	1.6	1.7
Homemakers	2.1	1.8	-	-	2.2	1.5	2.0	1.7
Others	1.4	1.3	1.3	1.9	1.0	1.4	2.1	1.6

Notes: 1) For the 1950 Cohort, it was considered women age 41 year old at the 1991 census, as for the 1960 cohort women age 41 years old at the 2001 census. 2)For Austria there is no data for the educational level *less than primary*. *3) T*he Hungarian data had no information to the employment category *Homemakers*. 4) At the covariate employment status the category *Others* include students, pension or capital income recipients and unemployed that never worked before.
Source: Own elaboration; IPUMS

Generally, for Austria, Hungary and Portugal the lowest *quantum* was observed to unemployed mothers with university completed (1.3 children per women) born at the 1960 cohort. While for Spain the estimated lowest value of 1.5 correspond to employed mothers with upper secondary education. Yet, for both cohorts the lowest value of 1.2 children per women concerns to Portuguese mothers with primary education and unemployed. The high fertility rates observed especially in Spain correspond to mothers at the higher educational levels, while for Austria the high fertility was observed for homemaker’s mothers. For Spain no changes in differences at the 1960 cohort are observed between unemployed and homemaker mothers.

The changes on the female social position and participation; the increasing importance of a women career; the economic independence via higher participation at the labour market and the individualized or post-materialist values, changed the fertility trends within the two cohorts under analysis. Furthermore the observed differences provide us more detailed information on the motherhood transition.

4.6. Discussion and concluding remarks

4.6.1. Discussion

This chapter has described and discussed the cohort transition to motherhood by educational level of mothers born on the 1950 and 1960 cohorts, across four European countries. Identified previously in Chapter 2 such cohorts were characterized by fundamental changes in the fertility tempo (postponement) and in the consequent decreasing fertility level (*quantum*). Similarly to the analysis of mortality, using probabilities or survival curves allow us to observe the actual behaviour of a given population in a given year. In this case the use of such descriptive approach allowed identify changes across countries and cohorts.

Basten et al. (2013) identified a strong association between family size, low fertility patterns and high childlessness among women with higher education. Additionally Sobotka (2015: 19) acknowledged that Austrian women *born in the late 1950s show a negative education-fertility gradient with respect to their completed fertility and a positive education gradient in childlessness*. Our analysis in the transition to motherhood by country and cohorts, allowed, identify the postponement trend across the four countries. We identified higher propensity in the transition to motherhood for Spain and Austria.

For the four countries under analysis, the fertility *quantum* declined from the older to the younger cohort. Spain, besides the higher mean median age the country, had, apart from Austria, the highest heterogeneous fertility trends across ages, and when fertility patterns tend to be more homogenous, Spain registered and increase from 1950 to the 1960 cohort.

Within the two cohorts, the highest probabilities of becoming a mother were related to those with no education or just primary level. Lower educational levels are often linked to unstable family transitions and to single parenthood (Sobotka, 2015). Moreover a lower rate of childbearing among more highly educated women is in part attributed to their longer stay in education (Hoem et al., 2006). Additionally changes on the social sphere and changes on the individual values, suggests that the *association between enrolment and a slower transition to adulthood remains strong, net of family background and parents' characteristics* (Ní Bhrolcháin and Beaujouan, 2012: 322).

Some authors defend that there is a strong relationship between the social contexts, the educational level and the number of children, as a result from least developed family and employment institutional support (Basten et al., 2013). Unstable economic conditions and low social family support may encourage young adults to postpone family formation and childbearing, until rational stability is achieved (Castro-Martin, 1992). In our sample no significant differences were identified between unemployed mothers and employed ones, yet higher fertility levels were registered among homemakers mothers.

In modern societies, transition to motherhood and the increase of women educational levels are evolving very alike. The new social paradigms spread around Europe in recent past give the possibility for women to decide their fertility level and timing. Still it was the contraceptive revolution, namely the pill use that gave the possibility to women to control their own fertility (Almeida and Lalanda, 2002; Cunha, 2002; Rallu and Toulemon, 1994; Ní Bhrolchain, 1992). In response to that structural society changes and women control of their fertility *quantum* and tempo the definition of an appropriated time for childbearing has vanished (Castro-Martin, 1992).

The educational transformations across time influenced directly simultaneous cohorts. The relationship between education and cohort fertility has in itself the direct influence from the period strong social transformations, e.g. the end of Portuguese and Spanish dictatorships in 1974 and 1976, respectively; the Hungarian Revolution in 1955 and later the communism collapse by 1989; or the Austria geopolitical reference post-second world war, are some of the social significant changes across the selected countries that directly or indirectly influenced the fertility transition and patterns.

4.6.2. Concluding remarks

Traditionally, the demographic analysis is undertaken to the momentum perspective, yet in this chapter and due to the cohort postponement direct effect in the period fertility postponement and *quantum*, we considered the cohort analysis. This cohort relationship between education and transition to motherhood is also related to the importance of the individual's mother education level, identified in the previous chapter as one of the fertility determinants in the Portuguese context.

On this work our main focus were the reason for the non-fertility replacement for the Portuguese mothers based on a cross-sectional comparison. Thus, this chapter contributed to our analysis by contextualize the motherhood transition controlled by the educational level and in comparison to other European fertility patterns. Therefore, if we focus our attention in the Portuguese transition to motherhood, in comparison to the other countries, it is possible to identify an extraordinary proportion of unschooled mothers, mainly for mothers born in 1950. From the older cohort to the most recent one of 1960, there was, in Portugal, a significant decrease in women without any education level, keeping still, higher values than all other countries.

With the educational improvements, the Portuguese fertility *quantum* declined between cohorts. At the same time the mean age increased, as well as the interquartile range, resulting from more heterogeneous behaviours. Such heterogeneity can be interpreted as the result of social and economic changes and as well as new demographic paradigms that *arrived* to Portugal after the revolution and haven't affect so directly the older cohort. Nonetheless it is expected that the heterogeneous postponement transition trends understood through of larger inter-quartile range, at the different educational levels, expected to be more homogenous at younger cohorts. We found that postponement recuperation will be higher at older ages, were mothers with higher educational levels are expected to have more children.

CHAPTER 5

THE INTERPLAY OF EMPLOYMENT AND ECONOMIC INSTABILITY AND ITS IMPACT ON FERTILITY DECLINE

5.1. Introduction

The relationship between fertility, economic conditions and women participation in the labour market is one of the most classic research discussions about family occurring into the light of demography and sociology. Since Malthus that *much of the empirical literature on the determinants of fertility dynamics has been motivated by the idea that economic hardship and labour market uncertain will* cause the couples fertility postponement (Goldstein et al., 2013: 86).

Today more women than ever are participating and competing with men at the labour market; the majority of couples use contraception what facilitates then the postponement of their childbearing; the welfare systems are getting increasingly more and more dependent of the social security and health costs related to the rapidly increasing number of elderly.

In many European countries the actual crisis coincide with pension system reforms which in fact increase the age of retirement, implying that fewer older workers are leaving the labour market and the younger have to compete for less jobs and accept inferior earnings (Sobotka et al. 2011).

Rydel (2002: 3) defined Portugal and Spain as countries with strong traditional families, but also as countries with *high levels of income inequality, poverty and class inequality, but low levels of generational inequality (…)*. In the southern European context, Portugal is not a conventional familiastic model country. The country traditional low employment rates aren't typical in the Portuguese context and Tavora (2012) identified no negative relationship between motherhood and women's high employment rates. Still, as well as Spain, Portugal dramatically experienced the 2008 economical crisis shock.

Therefore, this chapter examines, since 1960, and with special interest in the years after the new economic crises (2008 onwards), the relationship between the economical crises, the female labour force, unemployment and fertility *tempo* and *quantum*.

The main goals of this chapter are the following:

1. To review and discuss the relationship between economical changes and fertility;
2. Evaluate the arguments on the relationship between labour market participation, un/employment and fertility postponement, making use of Portugal as an example;
3. Describe and discuss the fertility and GDP trends from since 1960 with special attention to the expected impact from the 2008 economical crises;
4. Give a comprehensive overview of the expected main driving factors behind specific fertility trends and the current situation in the labour market participation.

As in the previous chapters our analysis is centred on fertility trends for Austria, Hungary, France, Portugal, Spain and Sweden. Thus, this chapter is divided into six sections. The introduction is followed by a theoretical discussion on the relationship between economical trends and fertility reactions to the economic shock (section 5.2). In section 5.3 a review on the relationship between labour market participation and employment is extensively discussed. Here, we make use of Portuguese as an atypical example in the context of the southern European countries. The following section (5.4) presents the data selection and methodological considerations, while section 5.5 presents the main results of our investigation. Subsequently, this section is divided in two other sections. Section 5.5.1 describes the fertility and economical evolution since 1960 with a special focus between 2008 and 2012. The following subsection (5.5.2) discusses empirically about the relationship between women employment uncertainty and instability and the impact on fertility trends. The subsequent section (5.6) concludes this chapter.

5.2. Previous empirical findings on the relationship between fertility decline and economic recession

Becker in 1993 interpreted the fertility reduction as a rational behaviour of individuals by explaining that the impact of an increase in individual income on fertility is subject to a quality-quantity trade-off. The low level of fertility in Europe is leading to important changes in age structure and is slowing or even repressing population growth. In fact, it is also known that fertility strongly affects population growth and the age structure of the population in general (e.g., Tomé et al., 2014). The evolution of fertility in the nearest future has extensive consequences on the economic development, productivity growth and several aspects of the welfare systems (Prskawetz et al., 2008). Fertility responses to economic development are not always the same, and many factors shape the relation behind and above the economic (Lesthaeghe and Surykin, 1988).

A qualitative change in the context of economic growth changes the environment of its influences on fertility rates. These changes occur because economic development and fertility are linked in a two-way relationship. In one hand, changes in population composition caused by the fertility variations, affect the level of investments in education, and in the long run the economic growth. On the other hand, the economic growth affects the fertility behaviour itself (Luci and Thévenon, 2010).

The immediate impact of low fertility is the reduction of the number of children in the total population and the increase in the share of population concentrated at working ages, raising the support ratio and raising, consequently, the per capita income (Tomé et al., 2014). This phenomenon is identified as the first demographic dividend. Afterwards, as the smaller cohorts of children reach the working ages, the share of working age population declines, the share of older adults increases and the total population ages. So, in a general way the support ratio falls, reducing the per capita income.

Shifts on the population age distribution have significant macroeconomic consequences that feature prominently in the debate of the economic attitude in Europe. In the conventional literature, low fertility leads to higher capital consumption, because lower labour force growth leads to capital deepening. However, a lower population growth may reduce welfare because the workers have to support a larger number of elderly (Lee and Mason, 2010).

Nevertheless, the research on economic recessions shows that the economic crisis can affect the dynamics of migrations, mortality and fertility, and provides the support to the idea that fertility reacts negatively to the downturns of the economic cycle, existing a "pro-cyclical relation" between fertility and economic growth. The negative relationship between fertility and economic crises has also been observed in historical studies related to the 19th and beginning of the 20th century (e.g., Lee 1990; Bengtsson et al., 2004).

The idea that fertility reacts positively to economic prosperity and falls in times of crisis has been followed for centuries. *Adam Smith linked the economic development growth with the multiplication of the species (…).* Furthermore *Becker (1960: 231) compares children to durable goods demands for which would increase with a rise in family income with a decline in their price.* Easternin (1976) *emphasizes the role of income relative to economic aspirations of the couple/family. In this perspective the fertility varies with the relative affluence of the younger cohort, which is gauged against their childhood experiences from their parents' household. In contrast Butz and Ward (1979a and 1979b) suggested that with rising employment of women, fertility trends are likely to become counter-cyclical. For women, children would be most expensive to rise during times of economic prosperity, and such periods would therefore be associated with low fertility rates* (Sobotka et al., 2011: 271).

The actual economic crisis is in many ways different from previous ones. This economic recession raises interest on the effect of such variations in the economic context in demographic behaviour. As result of the recession, the economic growth slowed down and the unemployment levels have risen steeply. So, in a period of adverse economic conditions, it is plausible that the families put the decision to have a(nother) child in hold (Neels, 2010).

The institutional and cultural context in the developed countries is significantly different than at the time of precedent crises. More women than ever are participating and competing with men at the labour market; the majority of couples use contraception and that facilitates childbearing postponement; the welfare systems are getting increasingly more and more dependent of social security and health costs are now allied to the rapidly increasing number of elderly. In many European countries, the actual crisis coincides with pension system reforms, which in fact increases the age of retirement, implying that fewer older workers are leaving the labour market and younger have to compete for fewer jobs and accept mediocre earnings. Every one of these factors affects the reproductive decisions, potentially enhancing the negative effects of the recession on fertility.

Although most studies find that fertility tend to be pro-cyclical and react on the ups and downs of economic movements, the evidences are not unanimous. The fertility trends often show correlation with the gross domestic product (GDP) growth. The relationship for low-fertility countries after 1980 reveals that periods of economic recession or stagnation were frequently followed, within one or two years, by a turn down in period fertility rates. Nevertheless, the measures of unemployment and consumer reaction appear to be suitable indicators that reflect directly the impact of the crisis on individuals and that were repeatedly found related to fertility fluctuations (Sobotka et al., 2009). New patterns of fertility are marked by the end of postponement of childbearing, by new economic and social dimension, and by modern norms and attitudes towards the family, female education, and gender roles.

GDP is often the indicator employed to analyse the economic decline, and is frequently associated with a subsequent fall in fertility rate. In a study about 26 countries with low-fertility levels, Sobotka et al. (2011) identified that, on average, period TFR decline is more often registered than the increasing. However, this association dispersed in a multivariate model, when other indicators, capture better the pathway trough which economic recession affects fertility. Different from the changes in the GDP, the unemployment growth constitutes a more concrete indicator of the impact from economic crisis in the behaviour from women and men on their reproductive ages.

Persistent and high unemployment among young adults has become one of the most significant explanations for the low and delayed partnership and family formation in Southern Europe (Billari and Kohler, 2002). The rising unemployment contributes to the delay in partnership and marriage, which indirectly influences the decline of fertility rates. Delayed partnership formation has most salient effect on birth trend in countries where the traditional tie between marriage and childbearing remains strong. If until recent years this pattern was typical of Southern Europe, where the marriage was commonly seen as a precondition to childbearing (Castro-Martin, 1992) in recent years outside Europe, countries of East and South-Asia has experienced a remarkable postponement and decline in marriages, which explain the decline of fertility in the last decades (Kaneko at al., 2008).

In a relatively recent study (Luci and Thévenon, 2010) about the economic development and fertility in the OECD countries, the authors followed an econometric strategy, with linear, exponential and quadratic models. The aim of the proposed models was to observe the relationship between total fertility rate (TFR) and the GDP per capita (GDPpc). In a generic way, this study makes easy to understand that the influence of economic development in fertility changed radically in the last few years. In highest developed countries, economic evolutions and setbacks go *hand in hand* with rebound in fertility. The current recession is likely to have some depressive effect on the childbearing and period fertility rate that are already deemed too low to values even lower in the near future. In many countries where the TFR increased after 2000, the 2008 recession may lead to stronger declines in terms of fertility quantum. Nevertheless, the recession effects will not be *universal*, once that the institutional factors and policies will interfere in the relationship between economic depression and fertility behaviour.

The life event of unemployment and its timing (not only the moment, but also the duration) are determinants in the fertility *quantum*. *If unemployment is high and persistent, young women (with less labour market experience on average) may fear that time spent in childbearing (including any maternity leave they might be eligible to take) may harm their likelihood of re-employment or increase their risk of future unemployment, and, as a result, hurt their lifetime wage-growth and benefits* (Adsera, 2011: 518). Thus women choose many times to postpone maternity in order to secure their current employment situation.

5.3. The relationship between fertility and female participation at the labour market: Portugal as an example

When opportunities in education become more equal, inequalities in the job market lose their legitimacy, so that the expansion of female education has a politicizing effect in the employment system and career hierarchies (Beck and Beck-Gernsheim, 2002: 59). For the better educated women are, the greater chance they have to find an intrinsically satisfying activity from which the can earn their own living; whereas uneducated women trapped at the lower end of the labour market hierarchy often see family formation as the only possible escape from monotonous and wretchedly paid work.

Not only the current economic crises but other factor as the extraordinary increase of gender equity in individual-oriented institutions increased the women's roles as wives and mothers due to continuing low levels of equity in the family sphere (Prskawetz et al., 2009). In a recent work, Gaspar (2013) acknowledged that women's participation in the labour market and the amount of time they dedicate to their work are closely linked to the number and ages of their children. The author identified that the employment rate is higher among women ages 29-49 without children under age 6, while for males in the same age group and with children under age 6 the employment rate is higher.

Even that the economic context, labour market participation and educational levels, play major role in the evolution of fertility, the family context is also important. The central role of family in the organization of labour market and welfare is considered one of the key traits of a hypothetical Southern European model between and within countries.

Bettio and Villa (1998) argue that the Southern family model inhibits female labour force participation since most care services are performed within the family by women, instead of being externalised thereby both relieving women of excess work in the family and creating job opportunities. Such family model is presented as the "root cause" to the low female employment rates in Spain, Greece and Italy. Yet, Portugal is the exception with high rates of female employment, revealing an *apparent* inconsistencies of such rates with the familialistic features that are said to characterize the organization of welfare and employment in the four countries (Caldwell, 1980; Kohler et al., 2005;

Tavora, 2012; Oliveira, 2009). Besides those differences, Rydell (2002) also highlights the difference between Portugal and the neighbour countries in public childcare facilities along with more public aid to families with young children.

We can then argue that the erosion of the familialistic tradition in Portugal ended when in the 60's and 70's the female labour force participation increased and the female employment rates exceeded the ones registered in Span, Italy and Greece. This rapid and marked growth, results from a high male migration that is consequence of strong emigration to Europe and military recruitment of young men to the colonial war (1961-1974), which created severe labour shortages in a period of strong industrial development (Mendes and Rego, 2006). The weakness of wages in Portugal and the demand for better living conditions have long led the Portuguese women to abandon the concept of *housewives* or *homemakers* (see chapter 4).

The traditional low rate of female employment is not conventional for the Portuguese women, and even the erosion of familiastic model in a first moment showed *no negative impact of motherhood on women's employment, implying that mothers of young children are even more likely to be employed than non-mothers* (Tavora, 2012: 67). If Portugal had already in the 60’s and 70’s a extraordinary female employment rates and at that time fertility was still considerably high, it is expected that changes in fertility trends are due to other factors that not the increase participation in the labour market.

Within this framework, Portugal is an attention-grabbing case for analysis, since in one hand the country has a high percentage of working women (i.e., working mothers) and this element constitutes a distinctive and long-established feature of the Portuguese society. On the other hand, the general educational levels of population are considerably lower than in most European countries. Portugal is still subject to significant shortcomings in its education when set against other OECD countries (additional discussion in chapter 4).

Analyses on aggregate data from different countries show a negative association between fertility and women’s employment until the 1980s and the change of this relationship since the mid-1980s, when the correlation becomes positive. In other words, at the present it is in those countries with greater female participation in the labour force that fertility tends to be higher (Oliveira, 2009). The high rates of employment of

Portuguese women, which are rooted in the 1960 and 1970s when emigration and military recruitment of young men to the colonial wars created severe labour shortages in a period of strong industrial development led to an erosion of the familiastic tradition in this country.

Also, the increase in education could explain observed changes in women labour market participation. In the sense that educational attainment is intimately related to opportunities and positions on the labour market, individuals with different levels of education are likely to be differentially affected by variations in economic context (Neels, 2010). Furthermore, higher educated women *have more to lose by staying at home to provide childcare* (Basten et al., 2013). Still women bear many more responsibilities than men within the family and are much less protected in the labour market. These conditions generate numerous contradictions in women's lives, among others, the high level of work-family conflict its always there (Gaspar, 2013).

5.4. Data and Methodological considerations

5.4.1. Data

The period indicators were calculated or obtained directly from several data sources. The considered age groups are the ones traditionally used in the demographic fertility analysis related to the fertility window (20-24, 25-29, 30-34, 35-39, 40-44).

Human Fertility Database and EUROSTAT provided data on fertility evolution as total fertility rate, age-specific rates and mean age at childbearing, and later-on computed by us. GDP and GDP growth (%) indicators were provided by the World Bank database. Information about women labour market participation, unemployment rates by age and age groups, and education was provided by the OECD online database.

5.4.2. Methodological considerations

With the aim to describe trends in fertility and their relationship to the economic dynamic changes, we focus our attentions in two main fertility demographic indicators and four economic measures.

From the demographic perspective and widely discussed in the literature, besides its constraints, TFR (total fertility rate) is still the most common measure to analyse period fertility. Previously in Chapter 2 (in equation 2.3) we presented such measure as the result of the sum of age-specific fertility rates (that relate the number of births among women from a given age group to all women in that same age group). The total fertility rate is simply obtained by the sum of all age-specific fertility rates in a given year.

The second demographic measure used in this chapter, the mean age at childbearing, was also presented in Chapter 2 (in equation 2.4). However let us remember what we are discussing about. The mean age at childbearing (MAC), give us the perception on the fertility postponement and in some cases reflects better than TFR the direct effect of some individual characteristics. This measure is simply the mean age of mothers at the childbearing of their children.

To measure the economic growth, the gross domestic product is the most used method. By the OECD definition, we can say that the *Gross domestic product is an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs). The sum of the final uses of goods and services (all uses except intermediate consumption) measured in purchasers' prices, less the value of imports of goods and services, or the sum of primary incomes distributed by resident producer units* (2002).

If we assume that gross domestic product (GDP) can be considered as an aggregate measure of total economic production for a given country, we thus should consider other variables. Consequently, we included in our analysis the women labour force and as well as the employment rate by age groups and also by educational level.

Labour force participation corresponds to the population aged 15 and older that are economically active, *i.e.* all people who supply the labour system for the production of services in a given period. OECD also includes the information that the total labour force equals the civilian labour force plus the members of the armed forces (2002).

Unemployment rates were included in our analysis, not only to established comparisons between the countries under observation but also to understand the evolution across ages within each of the selected countries. Making use of the OECD definition at the online employment database (2015), we can defining employment as *all persons above a specified age, who during the reference period were: i) without work, i.e. were not in paid employment or self-employment during the reference period; ii) currently available for work, i.e. were available for paid employment or self-employment during the reference period; iii) seeking work, i.e. had taken specific steps in a specified recent period to seek paid employment or self-employment*.

For the employment designation, OECD (2015) define it as *persons in civilian employment include all those employed above a specified age who during a specified brief period, either one week or one day, were in the following categories: i) paid employment; ii) employers and self-employed; iii) unpaid family workers; unpaid family workers at work should be considered as being self-employed irrespective of the number of hours worked during the reference period. For operational purposes, the notion of some work may be interpreted as work for at least one hour. Total employment is defined as the sum of civilian employment and members of the armed forces*. We focus our attention in the harmonised OECD unemployed and employment rates.

5.5. Results

We do not aim to identify the precise relationship between a particular measure of recession and a specific indicator of fertility. Rather, we sketch a general picture of how the recession, broadly defined, affects fertility. For this purpose we subdivide our analysis in two main perspectives:

(1) The analysis about the evolution of fertility and GDP growth from 1960 until 2013, giving particular attention to developments that occurred in those two indicators

since 2008, the year identified as the starting point for most recent economic crisis in Europe (Billingsley, 2011; Reher, 2011).

(2) Latter on, we focus our analysis at the individual-level responses to the economical constrains measured by the female labour market participation, the unemployment rate by age groups, and employment rates by age groups and education, as well as the long duration (one year and over) unemployment rate between ages 25-54.

5.5.1. The fertility reaction to the economical crises

As previously discussed in chapter 2, one of the main distinctive characteristics from the demographic evolution across Europe since the 1960s, is the fertility decline. Figure 5.1 plots the average total fertility rate by decade (a); and as well, the change in the total fertility rate between decades (b).

The highest fertility levels measured by the TFR are observed in the 1960s and in the 1970s in Portugal - 3.2 and 2.7 children per woman, respectively - closely followed by Spain - 2.9 and 2.8 children per woman, respectively. Both countries experienced extreme high and low fertility compared to the other European countries. Yet, during the last decade, with the exception of France and Sweden, the average fertility levelled down varying nowadays from 1.4 for Austria and Portugal to 1.3 in Hungary and Spain.

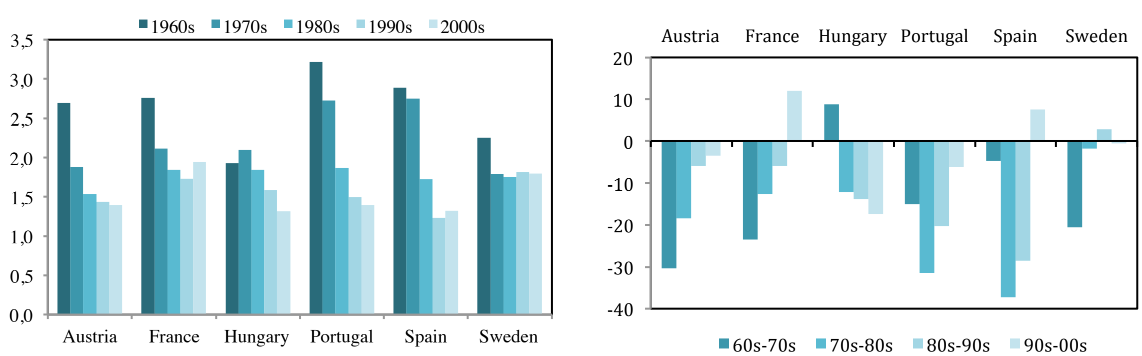
Furthermore, when we compare the changes in the TFR between decades (figure 5.1b), it's possible to identify straightforward that for Austria, France and Sweden the main changes on the fertility *quantum* occurred from 1960s to the 1970s. This decline was around 30 percent in Austria, 24 in France and 21 percent in Sweden. Focusing again our attention in Portugal and Spain, the highest lost in terms of fertility *quantum* was from the 1970s to the 1980s. From those two, Spain was the country with the highest decline, registering a 37 percent decline.

In Hungary the difference between the TFR from the 1960s and 1970s was positive, nevertheless, the increase was less than 10 percent. Still, Hungary presented a different pattern evolution, once that is the only country that goes from increasing fertility between the first decades to become the, in the last decade, the country with the highest lost. On the other hand, Sweden also registered a different trend when compared with the other countries under analysis. The Swedish *particular* case allows recognizing that a small increase in the TFR between 1980s and 1990s, as a reflection from faster recuperation at the fertility levels. Furthermore from 1990s to 2000s no relevant changes in the TFR were observed.

It was only between the last decades that some recuperation trends are observed across some European countries (e.g., Goldstein et al., 2009). In our analysis with the exception already observed for Hungary and Sweden, such possible recuperation, or increase in the TFR, was observed in France and Spain, while Portugal and Austria the tendency is a decline (less pronounced when compared to the previous ones but still is a decline trend). Yet, the recuperation change in the fertility trends was not even expected by some researchers, especially under an *atmosphere* of economic crisis (e.g., Billingsley, 2011; Sobotka et al., 2011).

Figure 5.1: Average total fertility rates by decades (a) and the change in the total fertility rate between decades (b), in the selected countries

(a) (b)



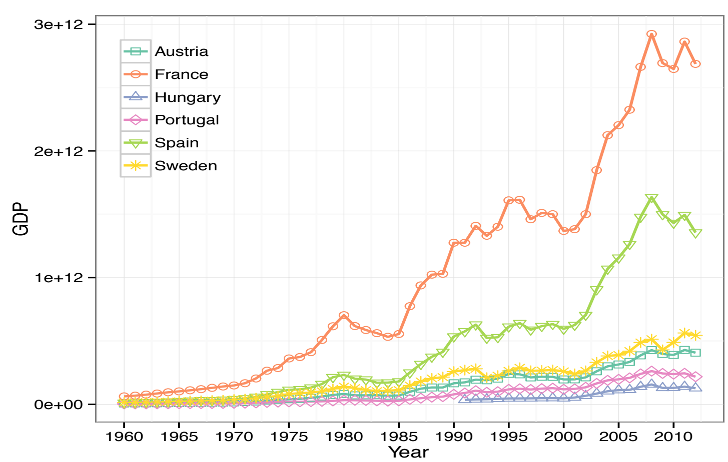
Notes: 1) The 2000s decade includes data for different periods that depends on the data availability. Hungary – until 2009; Austria – until 2010; Sweden – until 2011; and France Portugal and Spain – until 2012. 2) Detailed information in Appendix D, tables D.1 and D.2.
Source: Own elaboration; Human Fertility Database and Eurostat

The gross domestic product (GDP) can be considered as an aggregate measure of total economic production for a given country. It represents the market value of all services produced by a country economy during the period measured. Due to the identified correlation between fertility trends and GDP growth in the literature (e.g.

Billingsley, 2011; Reher, 2011; Sobotka et al., 2011), it is our intention to analyse briefly the GDP evolution since 1960 onwards to contextualize further the observed fertility patterns.

Figure 5.2 provides graphical illustration for the GDP evolution since 1960, where a constant growth can be observed even with some small fluctuations. From 1960 to 2013, it is possible to observe that across all countries under analysis, some trends are quite similar. The GDP increased to all countries from 1960 to 1980, but stagnating afterwards until 1984, followed by a decrease until around 1993. From there until the year 2000, GDP barely increased in all countries, even registering some fluctuations, but in the beginning of the new century a pronounced increase was observed with higher intensity in France and Spain, but repeated in all countries. Nevertheless, from 2008/2009 onwards, i.e. since the economic crisis begging perturbed European economic stability, a higher fluctuation and significant decrease was also registered.

Figure 5.2: Evolution of Gross Domestic Product (GDP) from 1960 to 2013, to the selected countries



Source: World Data Bank (2015).

We summarise in table 5.1 the annual GDP growth (%) between 2000 and 2013 to elaborate more accurately on the possible, direct or indirect, impact from the economical crises on fertility trends. Before 2008, only Portugal registered in 2003 a negative growth, in the same year that Austria and Hungary recorded their lowest growth (lower than one percent).

In the year of 2009, the annual GDP growth was negative across all countries. The observed changes in the years 2008 and 2009 values of GDP identified above in figure 5.2 are less pronounced to the French growth. While the higher impact was observed in Hungary and Sweden, on average the countries recorded a decline of about 2.9 percent on the GDP overall growth. Yet, in 2013 the greatest positive increase was observed for both countries.

Portugal and Spain are distinguishable under this analysis, not only for the negative growth registered in 2009, but also because within the countries under analysis, only the Southern European countries kept the negative GDP growth tendency since the beginning of the economic crisis in 2008. Mentioned several times in the literature (e.g., Billari and Kohler, 2004; Bettio and Villa, 1998) Portugal and Spain as well as the other Southern European countries – Italy and Greece – register across their evolution less economical stabilities.

Table 5.1: Annual GDP growth (%), between 2000 and 2013, to the selected countries

	Austria	France	Hungary	Portugal	Spain	Sweden
2000	3.4	3.9	4.2	3.8	5.3	4.7
2001	1.4	2.0	3.7	1.9	4.0	1.6
2002	1.7	1.1	4.5	0.8	2.9	2.1
2003	0.8	0.8	3.8	-0.9	3.2	2.4
2004	2.7	2.8	4.8	1.8	3.2	4.3
2005	2.1	1.6	4.3	0.8	3.7	2.8
2006	3,4	2.4	4.0	1.6	4.2	4.7
2007	3.6	2.4	0.5	2.5	3.8	3.4
2008	1.5	0.2	0.9	0.2	1.1	-0.6
2009	-3.8	-2.9	-6.6	-3.0	-3.6	-5.2
2010	1.9	2.0	0.8	1.9	0.0	6.0
2011	3.1	2.1	1.8	-1.8	-0.6	2.7
2012	0.9	0.3	-1.5	-3.3	-2.1	-0.3
2013	0.2	0.3	1.5	-1.4	-1.2	1.5

Source: World Data Bank (2015).

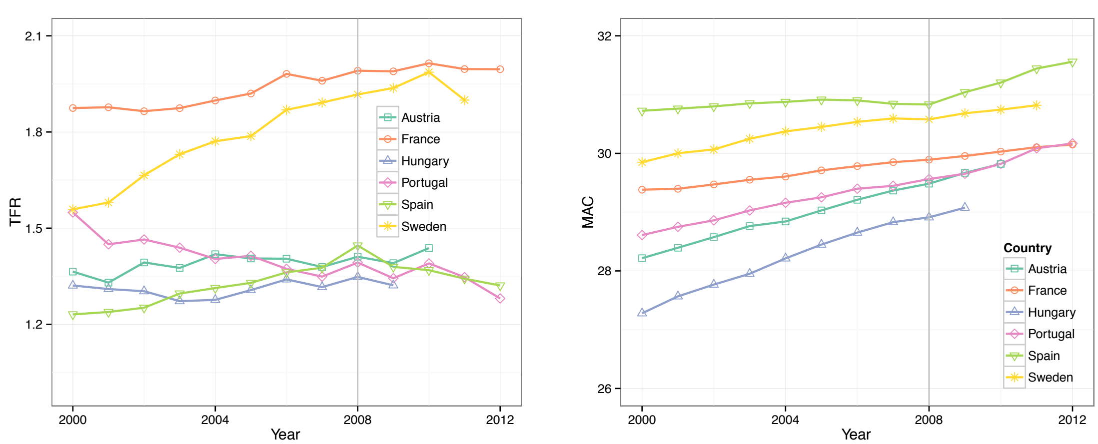
An economic recession may affect fertility because for many individuals it implies a bad economic situation, lower income, increased job demands, and related symptoms (Sobotka et al., 2011: 269). In that sense we include once more in our analysis the evolution the total fertility trend already discussed in chapter 2 and as well the mean age at childbearing (figure 5.3) from year 2000 onwards.

Let first focus our attention into the changes in the mean age at childbearing (figure 5.3b). The overall observed tendency indicates an increase in the mean age at childbearing with no direct impact from the economical crises directly observed. Yet, focusing further on the Austrian mean age at childbearing, it can be seen that immediately after the economic shock in 2008, subsequently to some light stabilization, the mean age increased continually.

Nevertheless, when we focus our analysis on the evolution of total fertility rate, it is for Portugal and Spain that the economical crises seem to have major impact. In both countries it seems to exist a negative relationship between fertility and negative growth rate. Already Tomé et al. (2014) identified that the economic collapse in Portugal had negative influence in the already low number of observed births as well as in the aging country problem. Also Sobotka et al. (2011: 288) suggested that Spain *was among the countries that have experienced a sharp reversal in fertility rates, with the period TFR falling from 1.46 to 1.40 between 2008 and 2009*.

Figure 5.3: Total fertility rates (a) and mean age at childbearing since 2000 (b), in the selected countries

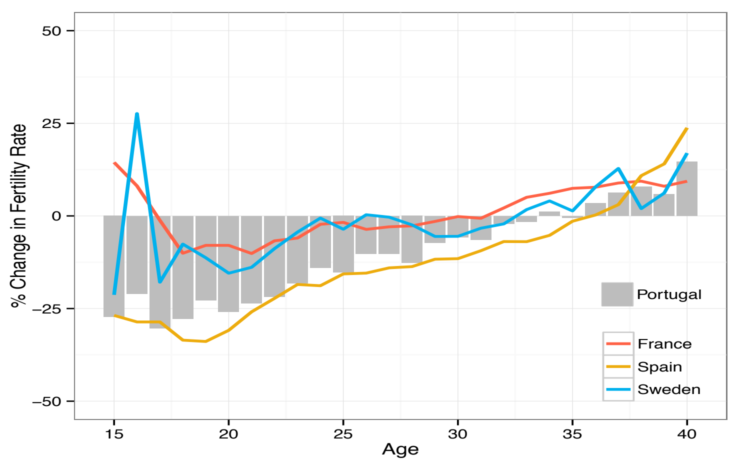
(a) (b)



Notes: For detailed data see Chapter 2, section 2.4.2 and table A.14 in Appendix A.
Source: Own elaboration; Human Fertility Database

If we *zoom out* the fertility evolution between 2008 and 2012, within that period we can observe more accurately the registered changes between years. For that, in figure 5.4[12] we use, in terms of comparison, Portugal as a benchmark country (grey bars in the plot). We definitely verify that besides Portugal, Spain registers the highest lost on the fertility *quantum*. While France and Sweden had higher lost between ages 18 and 23, for Portugal and Spain it is only after age 30 that the negative values are less significant. Also, it can be seen that for both southern European countries the recuperation on the fertility was only taking place after age 35, whereas for France and Sweden that positive evolution was observed already after age 30 and 33, respectively.

Figure 5.4: Change in the fertility rate by age between 2008 and 2012, in Portugal (as benchmark country), France, Spain and Sweden



Notes: 1) For this propose we excluded Austria and Hungary due to the short availability of data since 2008. 2) Detailed data in Appendix D, table D.3.
Source: Own elaboration; Human Fertility Database

The idea that a secure economic basis is a prerequisite for having children was severely challenged by the demographic developments in the context of the social and demographic evolution, when industrialization and economic growth was accompanied by rapid fertility decline and by changes in women's society role (Kreyenfeld et al., 2012).

---

[12] This figure was obtained by calculating the changes, in terms of percentage, registered in the age-specific fertility rates between 2008 and 2012.

If we consider the positive growth of GDP and the high fertility levels in France and Sweden there seems to be a positive relationship between economic growth and higher family sizes. Still, for both countries between 2008 and 2012 there are positive trends for higher ages, where in figure 5.4 were possible to observe a recuperation growth of lost fertility at younger ages. Portugal and Spain had a deep negative relationship with the GDP growth, particularly after 2008. From that year onwards the GDP growth reflected a negative trend accompanied by a decreasing on the total fertility rate.

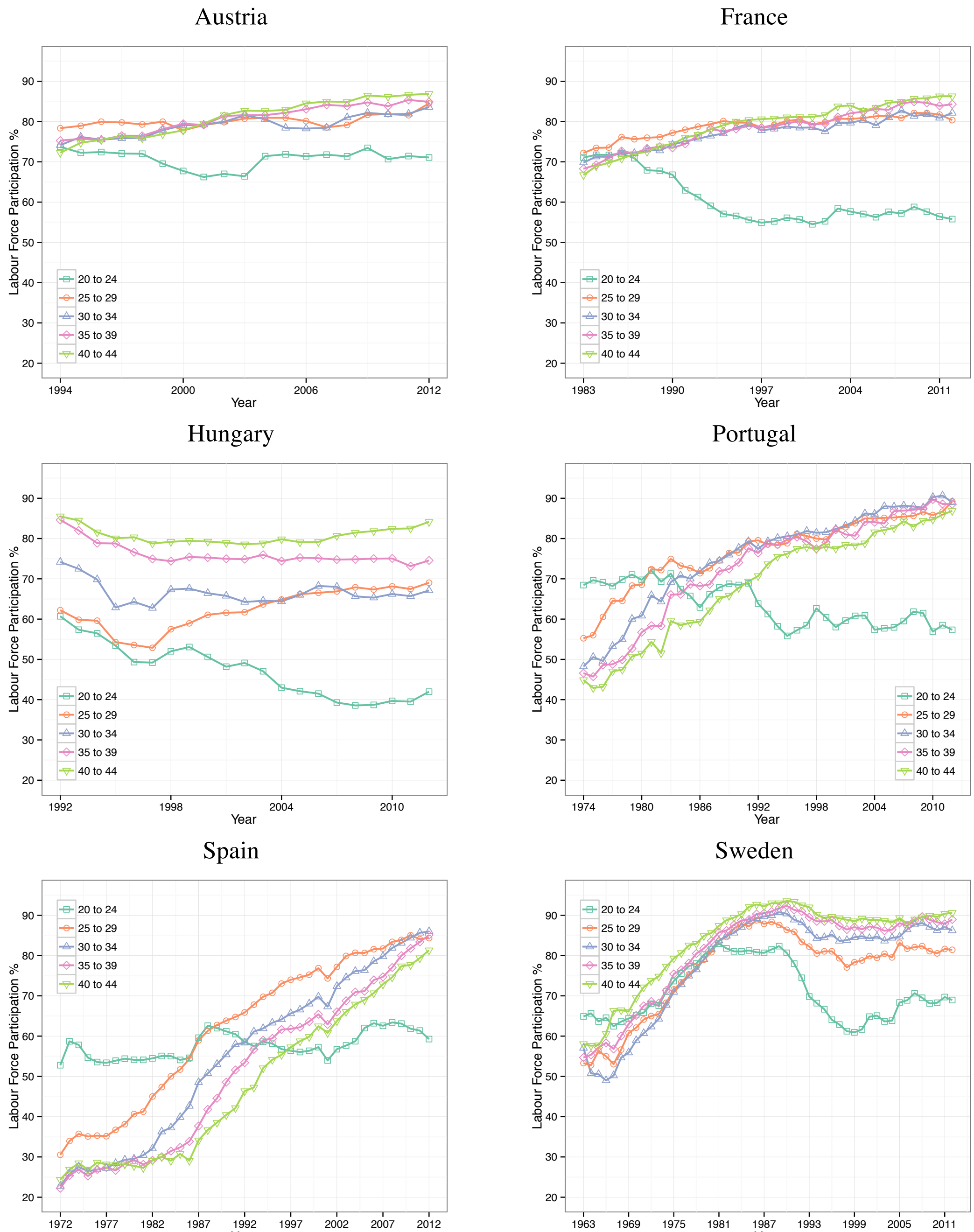
GDP as a macro level variable could have impact at the individual perspective, yet individual level variables such as unemployment, labour market participation or employment by educational level could better explained the fertility changes and the couple decisions. By *decomposing* the GDP into other social economical measures of familiar stability we can find higher relation to the fertility evolution across the recent decades.

5.5.2. Employment uncertain and the impact on fertility trends

In a broad perspective, the GDP growth is the most common measurement related to the need of define technically the economy evolution but also the economical recession. However, the GDP growth point out that in terms of household responses to economic conditions such fluctuations in GDP are not necessarily the best variables to employ (Testa and Basten, 2014; Sobotka et al., 2011). This led to several studies in relationship between unemployment, consumer confidence or even women labour market participation in the perspective to postpone or anticipate fertility (e.g. Fokkema et al., 2008).

Rindfuss et al. (2010) identified a reversal association between women's labour market participation and fertility levels from a negative to a positive correlation. And such change that initially produced disbelief. Women labour force participation side by side with the educational evolution lies on the heart of most explanations of fertility and family formation. Still, the effect of women employment or unemployment on fertility depends on the country circumstances. Still, in some countries the employment stability may be a prerequisite in the transition to parenthood (e.g., Ellingsæter and Pedersen, 2012; Kreyenfeld, 2010; Brewster and Rindfuss, 2000).

Figure 5.5:Women labour force participation rate by the age groups, 20-24, 25-29, 30-34, 35-39 and 40-44 to the selected countries



Notes: Due to data availability, the staring point analysis is different to all countries: 1994 to Austria; 1983 to France; 1992 to Hungary; 1974 to Portugal; 1972 to Spain; 1963 to Sweden.
Source: OECD (2015).

Figure 5.5 plots women labour force participation rate by age groups and countries. The first information that we highlight from the graphical representation is that for all countries except Portugal (in the last years) and Sweden (since the 1980s), in all countries the women participation in the labour market does not present in any of the other countries values in the order of 90 percent.

Across all countries as reflect from the increasing scholar age (Luci and Thévenon, 2010; Neels, 2010), the youngest age group (20-24) presented the lowest fertility rates. Yet, Spain had a particular evolution with constant values between 50 and 65 percent. It is also noteworthy that for Portugal, between 1974 and 1980 it was for this age group that the Portuguese women registered higher participation rates in the labour market.

A common trend observed to Austria, France, Hungary and Sweden was the high participation rates for the older age group (40-44). In Austria and France it was from the 2000s onwards that this group increased relatively to the younger ones. Still, in Hungary the values were already high by the 1990s, but for Sweden since 1969 this age group reflects the highest women participation rates. For Portugal and Spain the situation is some how different and for that reason we will focus now in both countries.

While for the other countries under analysis it was the oldest age group with the highest female participation at the labour market, for the southern countries the situation is the inverse. In both countries women at the age group 40-44 have, since the 1970s, the lowest labour participation (with the exception of the age group 20-24).

The Iberian countries had other similarities as e.g., the trend patterns across ages, already in the 1970s Spain had lower values than Portugal (identified also by Bettio and Villa, 1998), by that period of time the Spanish participation rates were between 20 and 40 percent, while already in Portugal were registered values between 40 and 70 percent (at the same level of Sweden).

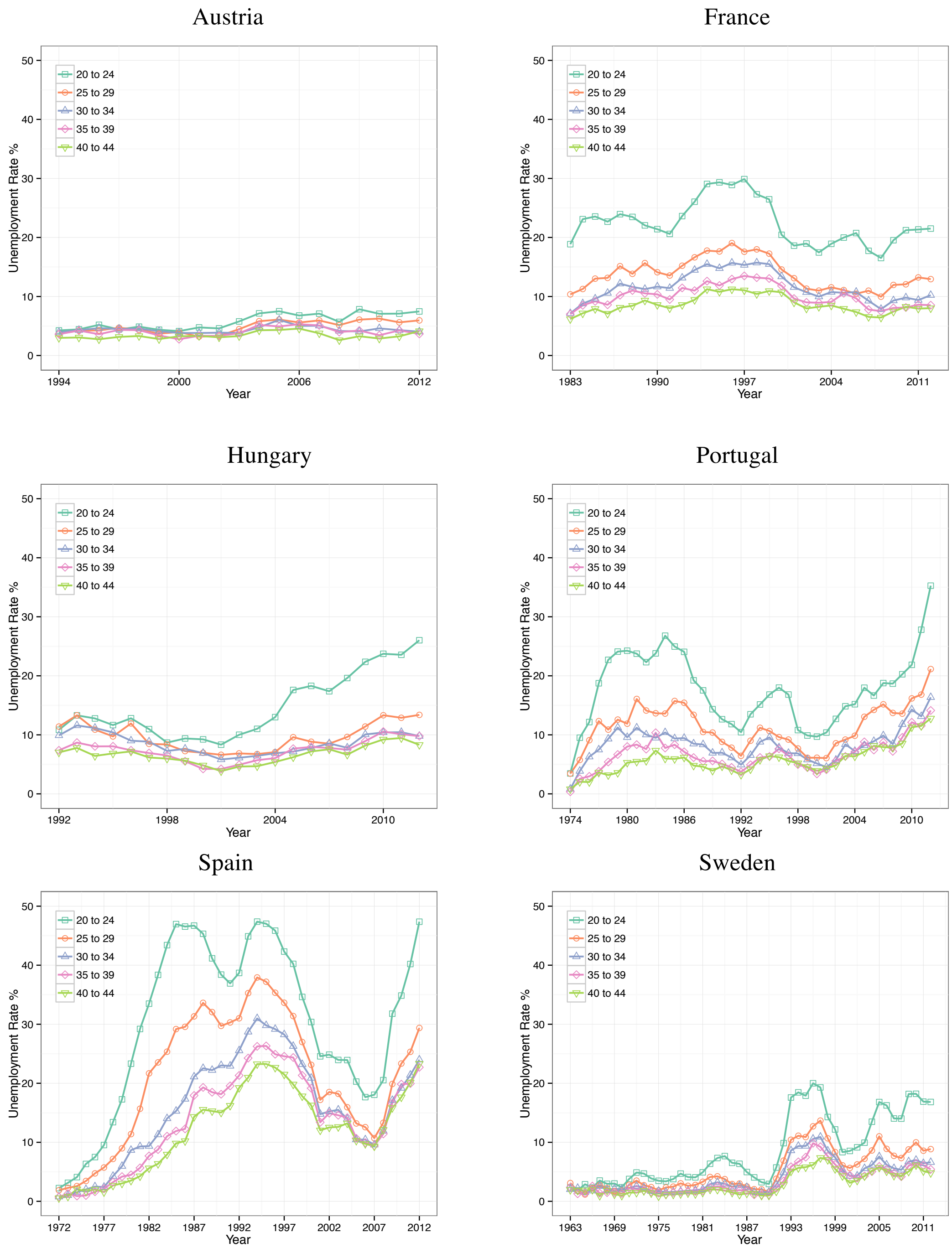
Rydel (2002: 8) identified that *the increasing risks of unemployment and flexibilisation are concentrated on young people and women, not only because they are the new entrants in the labour market, but mainly because of their weaker position in the household organisation/social policy link. As we have seen, this has the consequence of* *delaying the transition to adulthood*. Figure 5.6 allows understanding better this economic dynamic. As in the previous analysis on the women labour market participation, also for the employment rates, Austria, France, Hungary and Sweden had similar trends in the rate evolution.

Within the six countries, Austria stands out for their low unemployment (lower than 10 percent), whereas for France, Hungary and Sweden the unemployment rates are higher. Still across all countries the highest rates are observed in the age group 20-24 (the one with less labour market participation). In fact about France Rydel (2002: 3) states that *unemployment is lower and more women are economically independent, the family has transferred many of its obligations to society, and the family is now more de-institutionalised than in the south*.

So once more we focus our attention to the Iberian countries. Beside the differences observed in the previous analysis also in terms of unemployment rates the countries are some how different. If fact in terms of unemployment evolution, Portugal trends are similar to the ones experienced in France. Portugal fewer times used as an example from the Southern Europe patterns, was already point out as an outlier from the southern cluster with higher female employment as well as lower unemployment risk (Domínguez-Folgueras and Castro Martin, 2008; Rydel, 2002; Bettio and Villa, 1998).

In Spain the unemployment erratic growth is the result from increase participation at the labour market. Until 1997 the unemployment increased specially to the youngest age groups, 20-24 and 25-29. For 10 years that rate decreased and with such trend it was expected a continuum decline. Yet, by the year of 2008, more than for other countries rates, the Spanish unemployment regardless of age group, increased. Such increase is visible in the 2012 values. By that year the unemployment rate at the youngest age group was almost 50 percent.

Figure 5.6:Women unemployment rate by the age groups, 20-24, 25-29, 30-34, 35-39 and 40-44 to the selected countries



Notes: Due to data availability, the staring point analysis is different to all countries. 1994 to Austria; 1983 to France; 1992 to Hungary; 1974 to Portugal; 1972 to Spain; 1963 to Sweden.
Source: OECD

The long-term unemployment was identified in the literature as having a strong and negative effect for men and women, but affecting negatively women in the absence of strong welfare regimes and also depending of the labour market context (Adsera, 2011; Sobotka et al., 2011). In that context we considered vital in our analysis to discuss its impact on the family formation. Thus, we consider here women unemployment rates with the duration of one year and over.

Table 5.2 features the evolution since 1986 for France, Portugal, Spain and Sweden and later on for Austria (1994) and Hungary (1992). Our attention should be first focused in Austria and especially in Sweden, once that both countries register low levels of long-term unemployment rates. The highest values in both countries were observed by the mid 1990s, yet in 2013 their long-term unemployment was less than 25 percent in Austria and even less in Sweden (18.9 percent).

Already by 1986 France, Portugal and Spain had the highest unemployment rates, especially if compared to Sweden. More than 66 percent of Spanish unemployed women were in that condition for one year or more. Lower was the Portuguese level with a value of 62 percent, while in France the long-term female unemployment was less than 53%.

Even with different values, Portugal and France (Portugal had always higher long-term unemployment) presented the same evolution trend while for Spain the values and the evolution trend observed was different. From 1986 to 2006 the long-term unemployment decreased in Spain for about 40 percent, while in the same period France and Portugal decreased between 7 and 9 percent. In the beginning of the 21th century the lowest long-term unemployment rates within the Iberian Peninsula were registered in Spain, while for Portugal the values increase to more than 55 percent.

Most crucial decision about family formation and childbearing are made between ages 20 and 30, overlapping the rapid educational demand and the persistent young unemployment. Thus, we can expect to observe a rapid change in the family and reproductive evolution (Rydel, 2002; Adsera, 2011).

Previously, in chapter 4 we identified the relationship between fertility postponement and the increase at the educational level. Also the employment or unemployment effect can be different when controlled by the educational level (Sobotka et al., 2009).

Table 5.2: Women Unemployment rate with duration of 1 year and over (age 25 to 54), between 1986 and 2013, to the selected countries

	Austria	France	Hungary	Portugal	Spain	Sweden
1986	-	52.7	-	61.1	66.2	4.4
1987	-	52.9	-	60.6	68.7	17.2
1988	-	53.5	-	56.9	67.4	11.8
1989	-	51.2	-	55.0	65.4	10.7
1990	-	48.4	-	55.5	61.2	8.8
1991	-	45.9	-	45.9	60.9	10.2
1992	-	39.9	22.3	43.4	58.0	12.4
1993	-	38.9	40.1	52.1	60.9	13.8
1994	21.6	41.9	42.9	48.0	63.8	22.6
1995	35.7	45.3	51.8	58.6	64.6	24.1
1996	30.8	43.9	54.5	60.5	64.3	26.6
1997	31.7	44.5	51.8	65.4	62.2	32.8
1998	33.2	45.6	54.3	51.9	59.2	33.5
1999	33.8	43.4	52.9	47.7	56.1	27.0
2000	23.5	43.6	50.1	48.0	51.3	22.1
2001	22.4	39.8	47.0	49.5	46.0	19.6
2002	23.8	37.4	45.0	38.4	40.9	17.3
2003	27.9	41.9	44.5	41.0	40.1	15.7
2004	28.9	44.2	44.8	48.1	37.1	17.6
2005	27.0	46.0	46.5	51.7	30.5	-
2006	27.6	45.2	46.5	52.8	25.4	-
2007	30.8	44.0	50.1	49.1	24.0	14.0
2008	25.0	38.6	49.1	50.1	23.2	14.0
2009	23.5	37.5	45.1	49.5	27.4	15.3
2010	23.4	40.4	52.4	55.8	38.2	19.6
2011	25.9	42.7	50.6	52.1	43.7	19.8
2012	25.5	41.0	47.5	51.3	46.4	20.0
2013	24.6	41.3	51.4	57.6	51.4	18.9

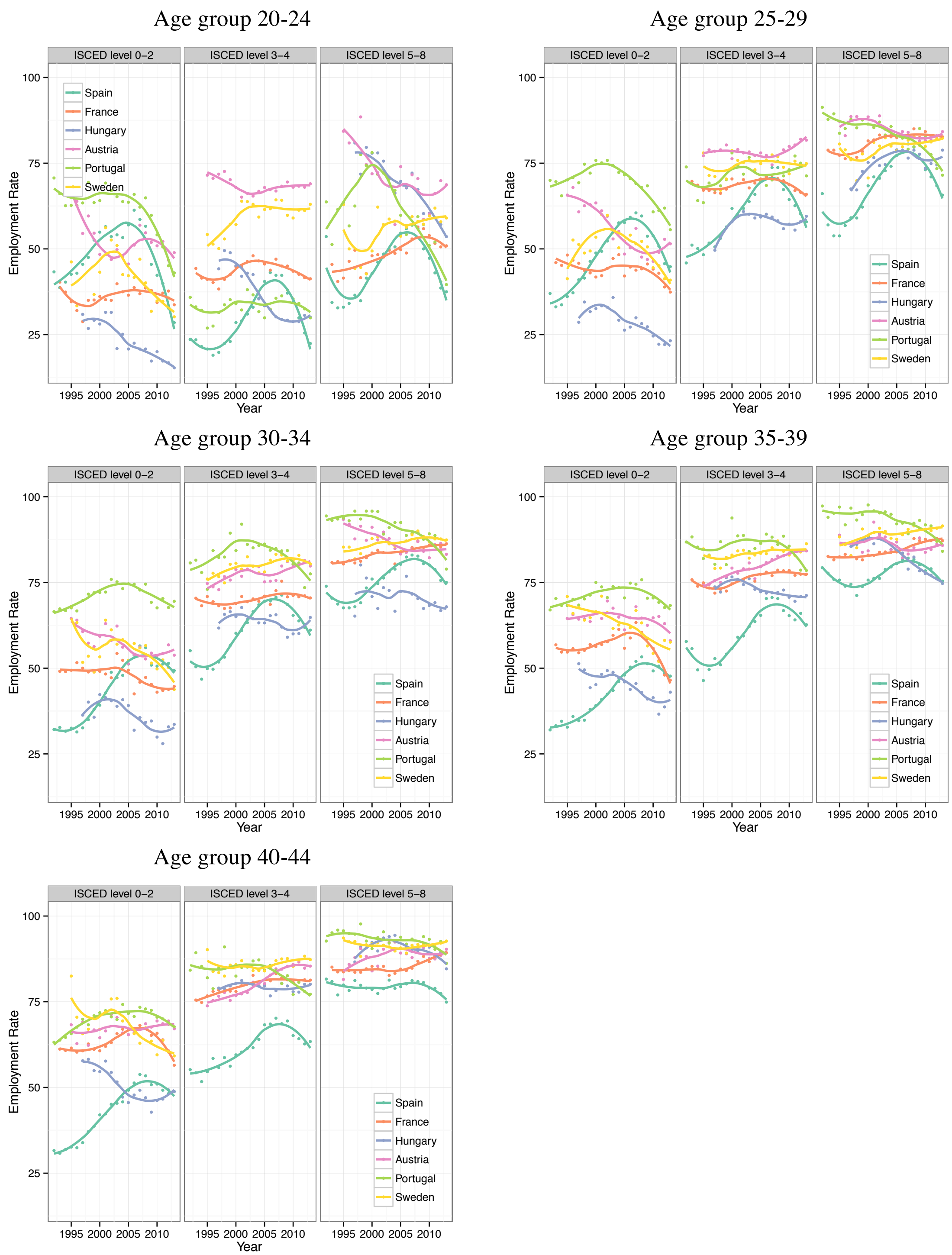
Source: OECD.

In that perspective figure 5.7 plots the (smoothed) women employment rates by age groups and educational level since 1992. Generally speaking, Austria, France and Sweden do not present any particular trend, therefore we focus our analysis in Portugal and Spain, but also in Hungary.

Between the women with less education, the Portuguese are the ones with higher employment rates between the ages 20 to 34, while Hungary had the lowest employment rates. Hungary side by side with Spain had across all age groups and educational levels employment quite similar trends.

Further analysis allows observing that the Spanish trends are the direct reflex from the economic recession. Lets take, as an example the ISCED level 3-4, across all ages it is possible to identify an increasing trend on the employment rates until 2008.

Figure 5.7:Women employment rate by educational level and age groups, for the selected countries, between 1992 and 2013



Notes: 1) The ISCED educational levels 0-2 refer to "*Less than primary, primary and lower secondary education*"; ISCED levels 3-4 refer to "*Upper secondary and post-secondary non-tertiary education*"; and ISCED levels 5-6 refer to "*Tertiary education*". 2) Detailed data from table D.4 to D.8 in Appendix D.
Source: Eurostat

From that year and until the most recent data (2013) the Spanish tendency is to decline as a consequence of the unemployment rate discussed above.

In the upper part from the each one of the plots across all ages we can find Portugal with the highest employment rates in contraposition to Spain at the bottom part. And even at the oldest age group (40-44) presented in figure 5.5 as the countries with the lowest labour market participation, Portugal present similar employment rates to all other countries with the exception to Spain.

5.6. Discussion and concluding remarks

5.6.1. Discussion

In this chapter we described and discussed the interplay of employment and economic instability and its impact on fertility decline. Our analysis across the six selected European countries allowed first to contextualize the fertility trends evolutions and second to focus our attention on the recent period of economic crises (since 2008). Since 1960 that fertility trends point out in the direction to postponement and decline, as result from the social transformations discussed through chapter 3.

Even that most researcher use gross domestic product as a valid reference to measure the living standards of a country, this variable has experienced a cyclical evolution in the Iberian countries. Such variation had significant increases during periods of economic expansion and sharp decreases during economic recessions (Royo, 2010).

In our analysis Portugal and Spain stand out from the group of countries under analysis as the ones that at the context of TFR react negatively to the decline in GDP growth. However in the light of recent reversal in fertility *quantum*, here exemplified by France, the relationship between GDP growth and fertility seems to be positive from a certain threshold level of economic development on.

Under the assumption that childrearing and employment were incompatible activities, not long time ago, female employment was considered in the literature as an obstacle to family formation. The increase of female education, increasing income and employment had as consequently lower fertility.

Across all European countries under analysis the increase on female labour market participation was also observed by the 1960s and 1970s, when fertility started to decline. The relation between fertility decline and the increase female labour market participation and high female employment rates, raised the hypothesis of the negative effect between such life course events become stronger (Anderson et al., 2014; Brewster and Rindfuss, 2000; Becker, 1993).

Yet, several studies showed that, since the late 1980s, countries with lower rates of female employment also experienced lower rates of fertility (Ozcan et al., 2010; Brewster and Rindfuss, 2000; Esping-Andersen, 1999). In fact, in our analysis Spain seem to be the perfect example for that case, where the increasing female participation at the labour market since the mid 1970s led to the decline in total fertility rates, followed by the increased in the unemployment rates at the mid 1990s.

On the other hand when women continue to enter the labour force and participation rates across Europe slowly converge to high levels, work and family can be compatible. Still, it is expected to be observed only in those countries where labour market systems are able to reduce the uncertainties connected with childbearing and allow couples to better decide on their family formation (Adsera, 2010).

More than the changes at the GDP growth are the labour market conditions, which are crucial for the economic risks, associated with parenthood (Ellingsæter and Pedersen, 2012). Also, *the positive cross-country correlation between fertility and female labour force participation was often attributed to extended durations of high unemployment* (Ozcan et al., 2010: 808).

Long-term unemployment is one of the main factors in the household formation postponement, in countries such as Spain were the values have been extremely high (Adsera, 2011). Upton our analysis the long-term unemployment has been particularly high not only in Spain but also in Portugal. Thus, if unemployment is high and persistent, young women may fear that time spend in childbearing may increase their likelihood of become unemployed. The persistent unemployment may adjust the childbearing timing and as consequence change the final fertility *quantum*.

Besides the economic influence on the fertility growth, directly measured by the own GDP growth observed particularly in Portugal and Spain, we observed across this chapter, mainly for these two countries the important relationship between fertility changes and economic stability. In Portugal, as for Spain and Sweden e.g., the educational system expanded rapidly and the number of young people enrolled at the universities increased by the time of economic instability in the 1980s and 1990s (Tesching, 2012; Sobotka et al., 2011; Hoem et al., 2006; Martín-García and Baizán, 2006).

In the relationship between education and employment González and Jurado-Guerrero (2006) identified a negative effect at all educational levels. The negative relationship between education and employment rates observed in Spain can explained the late transition to motherhood as a consequence from lower women autonomy and later transition to *a new family* (Dominguez-Folgueras and Castro-Martin, 2008).

For Portugal, the relationship between education, employment rates and fertility levels seems to be also negative, yet that relationship could be explained taking advantage from the older cohorts information. In the literature several are the references to the particular high Portuguese participation of women at the labour market already by 1960s (e.g., Billari and Kohler, 2004; Rydel, 2002). Yet, the increase at the educational levels changes the Portuguese employment structure. Figure 5.7 allowed verify that among all countries under analysis, Portugal had the highest female employment rates by educational level, especially between ages 30 to 39.

5.6.2. Concluding remarks

The labour market participation seems to increase the postponement effect, which indicates the *quantum* decline as result from the non-recuperation of older cohorts postponement. Still focusing our attention to the Portuguese relationship between labour market and fertility levels since the 1990s, we observe that at the same time that employment stabilities increases, the effect is positive in the fertility *quantum*. Even in the economic crises the Portuguese case has a positive relationship, as reflex from the previous consistent labour market participation.

In fact, it seems to exist a positive relationship between age, education and employment, increasing the fertility *quantum* when labour market participation stabilizes at older ages. Such positive effect increases the probabilities of a more educated woman recuperate the postponed childbearing earlier in their cohort. The 2008 economical shock seem to have a higher effect to women in the younger age group 20 to 29, the ones with the highest postponement effect.

More educated women and with a labour market stable participation have more capability to effectively materialize their *quantum* desired (Fahlén, 2013).

CHAPTER 6

PROSPECTIVE TOTAL FERTILITY RATES: A ROBUST FORECAST OF PAST TENDENCIES

6.1. Introduction

The demographic transition paradigm or the individualization theory (already discussed in Chapter 3) has been predominant in the elaboration about fertility patterns. By the end of the 1960 decade, *fertility had started to drop in 47 of 141 developing countries, although in many instances these changes were modest and unconfirmed for years. In the 1970s, another 32 countries and in the 1980s another 25 countries began to experience declines in childbearing, leaving a residue of 23 countries with no evidence of change prior to 1995* (Bongaarts and Bulatao, 2000: 54). Thereby, Basten et al. (2013: 72) stated that fertility decline from high and stable levels to low. And also this transition *was considered to be irreversible, so once a low enough level of fertility was achieved it would never increase*.

The observed decline in the period and cohort fertility (analysed in Chapter 2) to *austere* low values never observed before, changed fertility dynamics and the expected population changes. The fertility levels observed across the last decades are characterized essentially by low and lowest-low fertility levels, by a continuous postponement in the family formation and consequently at the age of the first child. Also, the tremendous educational changes (from 1960 onwards) transformed the fertility trends configurations, giving to women the possibility for a stable professional career, and therefore to postponement other life-events.

Still, the improvements in individuals life course were dramatically affected by the economic crisis. By the year of 2008 Europe economic stable trends were interrupted abruptly by a new economical crises. And countries such as Portugal or Spain were specially affected, shifting even later the fertility *timing* and decreasing the fertility *quantum*. All these social, economical and demographic changes are pushing modern civilizations towards aging and even that major changes in fertility occur in a short-term, i.e., major fertility increases, it might not be enough to avoid or counterbalance this tendency. Still and *once societies adapt to this new reality by, for instance, promoting gender equality and developing policies, institutions, and norms that allow easier combination of work and childrearing for couples, fertility rates may recover* (Basten et al., 2013: 72).

In this chapter, we evaluate possible future short-term fertility tendencies and elaborate on what can be expected in the absence of new family policies and government intervention. Therefore, we first contextualize the fertility trends across the countries under analysis (as a sort of a refresh summary of Chapter 2) and with the last total fertility break as baseline (identified in Chapter 2), we precede to the fertility forecast.

The main goals of this chapter are the following:

1. Based on period data, we elaborate robust short-term forecasts (no longer that the horizon of 2020);
2. Extrapolate recent fertility tendencies to the future, in order to predict if those are likely to be stretched;
3. Identify which countries are in better position (and worst) to attain again the replacing generation fertility levels;
4. Evaluate the rate of fertility recuperation (if it is the case);
5. Discuss the absence of family policies and how the reverse of this situation can help future parents to anticipate and increase the fertility *tempo* and *quantum*.

Similarly to previous chapters, our analysis is centred on fertility trends correspondent to Austria, Hungary, France, Portugal, Spain and Sweden. Thus, this chapter is divided in six sections. The introduction is followed by a theoretical discussion on the methodological overview on previous findings and also on the demographic approach to the fertility forecasting (section 6.2). The following section (6.3) presents the data selection and methods, subdivided in three main lines, the functional approach for robust forecast of fertility rates (6.3.2), followed by the question on the smoothing effect (6.3.3.), and finally 6.3.4 were the forecasting proceed is presented. Section 6.4

contains our research main results, namely the total fertility rate evolution in the lexis triangles perspective (6.4.1); the extrapolation into the future of the age-specific fertility trends (6.4.2); followed by a short range perspective on the possible trends for the total fertility rate (6.4.3). Furthermore we briefly discuss on the possible family/social policies that could change the future fertility trends, especially in a case as Portugal (section 6.5). Finally the subsequent section (6.6) concludes this chapter.

6.2. Evaluating prospective fertility tendencies: methodological overview

Demographers typically refer to information about the future as *projection* or *forecast*. If the outcome refers about a set of assumptions regarding future trends without referring to the most likely future development, we are in presence of a *projection*. On the other hand, a *forecast* refers to the most probable tendency to provide an accurate prediction of future patterns. Therefore, in agreement with Goldstein et al. (2011), if observed trends are assumed to continue, De Beer (2011) states that time-series models can be used to estimate the trend and to extrapolate the trend it into the future.

George at al. (2004) sustains that all forecasts are projections but not all projections are forecasts, what means that the term *projection* is more complete than *forecasting*. However, both are widely used in prospective analysis. Thus, in a broad sense, projections can be classified as: (1) the trend extrapolations that are based on the observable historical trends; (2) the cohort-component methods that divides the population into age, sex groups or birth cohorts, and accounts for the behavioural fertility, mortality or migrations in each cohort; and (3) the structural models that rely on observed relationship between demographic and the other variables.

In fertility forecasting many issues are raised. In opposition with mortality, where death is not a repeatable event, childbearing is, on the most part of times, optional and repeatable, being easily distinguishable: mortality rates change predictably in one direction over time, while fertility rates fluctuate (Schmertmann et al., 2014). Despite this additional difficulty in forecasting fertility trends, many studies were undertaken with this topic as main goal (see e.g. Hyndman and Ullah, 2007; Goldstein, 2008; Hyndman and

Booth, 2008; Sobotka et al., 2012; Goldstein et al., 2011; Myrskylä et al., 2013; or Schmertmann et al., 2014). Nevertheless, independently of the applied methodology, the use of age-specific fertility rates is essential to achieve accurate outcomes and depending on the forecast extent, input data should differ (De Beer, 1992).

Thus, following De Beer (1992), in order to preserve forecasts accuracy, if period data are used, the choice should fell on short-term forecasts, but in presence of cohort information, medium and long-term forecasts may be computed. Additionally, the simple extrapolation of total fertility rate patterns to the future is not considered the best approach once that changes in the fertility timing are temporary, being more useful to focus on age-specific patterns rather than in TFR levels (De Beer, 2011).

Likewise in fertility studies, there is a growing literature about forecasting mortality. However, societies influence strongly the aim of these distinct (but complementary) approaches. If in what concerns mortality, entire societies seek better health and wider lifespan, contributing together for the same goal, in fertility it is not easy to define a common objective. Thus, while in mortality *the question is not whether mortality will improve but rather how quickly this will happen* (Goldstein et al., 2011: 663), fertility prospective trends ensure many different possibilities. Most of the literature about mortality forecast derived from the work published by Lee and Carter in 1992. Since then, many variants were suggested with the intention of providing some model improvements (see e.g., Lee and Miller, 2001; Booth et al., 2002; Hyndman and Ullah, 2007).

Nevertheless, Lee also introduced the Lee-Carter method in fertility in 1993, and influenced others as e.g. Hyndman and Ullah (2007) to develop a generalization of the original methodology in means of a functional data approach to forecast both mortality and fertility patterns. Similarly to the Lee-Carter approach, the method involves using the first principal component of log-patterns and makes use of time-series models to forecast into the future, what is in agreement with De Beer (2011: 213): *time-series models seem the most appropriate instrument to calculate projections* once that *they identify past trends and show the effects of continuation of this trends in the future*.

Goldstein et al. (2011: 663) stated that *demographers failed to predict the baby boom, and also failed to predict the baby bust. No one saw the onset of postponement and* *the dramatic effect it would have on period fertility. Although some predicted that postponement would slow someday, no one knew when.* Yet, predictions, forecasts and projections are needed to improve the responsiveness of family policies systems.

Given the review on the fertility forecasting methods, our aim by using this approach is to estimate how fertility will evolve in the near future. And this will depend on a different number of factors, such as the country determinants and developments identified in the previous chapters. In overall, with the countries under analysis across this thesis, we can say that from the late 1990s and beginning 2000s fertility had fewer changes and for the majority of them an increase was observed.

Basten et al. (2013: 73) stated that there are *general arguments and mechanisms that explain why fertility may rise, including long-term fertility cycles, changes in population composition through migration or fertility differentials and the concept of homeostasis, which suggests that 'demographic systems' tend to converge in the long run towards an equilibrium that assures their maintenance and survival.* Yet our previous analysis allows speculating that in a near future e.g. Portugal could be a country where fertility will maintain the *quantum* decline.

The low fertility values discussed in Chapter 2 are the evidence that for countries as Portugal fertility recuperation is still far, and for even for those as Spain with signs of recuperation a specific event as the 2008 economic crises could invert the tendency. Across the last decades the observed fertility trends were characterized by low and lowest-low values, hand in hand with the consecutive postponement.

The process in the transition to motherhood is, among other factors, the result from the social and individual values and norms changes (Beck and Beck-Gernsheim 2002), from the educational intrinsically relationship to fertility postponement (Bhrolcháin and Beaujouan, 2012; Tesching, 2012) as well as the deep impact from economic shocks and employment instability identified in Chapter 5 (Gaspar, 2013; Tavora, 2012; Neels, 2010). Therefore, low fertility rates may be seen as a transitory stage during which society adjusts to the host of factors associated with the individualization theory or to the second demographic transition (Basten et al., 2013).

6.3. Data and Methods

In the previous subsection, we provided a short but substantiated overview about fertility forecasts. Consequently, from this theoretical framework, our choice fell on the reproduction of the functional data approach developed by Hyndman and Ullah (2007), once that not only gathers together the necessary requirements to elaborate accurate forecasts, but also fits perfectly to our data and the goals identified in the introductory section.

6.3.1. Data

Data source for the calculation of the age-specific fertility rates, basis information required for the implementation of the methodological procedure explained in the subsequent subsection, comes from the vital statistics data on the total of births by mother's age and female population exposures to the risk of becoming a mother (also by age) available on the Human Fertility Database (HFD). From HFD we selected data available since 1960 to the most recent available year, depending on the study country. Additionally, in order to avoid characteristic fluctuations in the number of births across time associated to younger and older ages, we focus on the age range 15-49.

Selected countries, in order to acknowledge a comparison with the results obtained in previous chapters, correspond to Austria, France, Hungary, Portugal, Spain and Sweden.

6.3.2. A functional approach for robust forecast of fertility rates

The need to provide coherent and robust information for government policy and planning resulted in the development of different approaches to forecast demographic trends. One of the most widely used method concerns the one developed by Lee and Carter in 1992 originally used to forecast mortality patterns over age and over time but not rarely used to forecast fertility patterns (see e.g. Lee, 1993). Intending to extrapolate for the future previous fertility patterns and to evaluate what will happen in the absence changes in public intervention, our choice fell on the functional data approach developed by Hyndman and Ullah (2007). Despite that this method may be applied to fertility and mortality in our study it is applied to forecast fertility trends. This approach is a generalization of the Lee-Carter model and *combines ideas from functional data analysis, nonparametric smoothing and robust statistics* (Hyndman and Ullah, 2007: 4942). Similarly to the Lee-Carter approach, the method involves using the first principal component of log-fertility.

Additionally, this methodology also follows the methods proposed by Bozik and Bell (1987) and Bell and Monsell (1991), but following Hyndman and Ullah (2007), two main points of distinction can be enumerated: a) the Ramsay and Silverman (2005) functional paradigm is included, leading therefore, to the use of non-parametric smoothing that not only reduces data fluctuation and possible problems connected with data grouped into age intervals; and b) it is used a robust version in what concerns to principal components.

Generally speaking, functional data analysis may be defined as the study of information that varies over a continuum (Ramsay and Silverman, 2005). Therefore, once that we are dealing with discrete values (fertility rates over age) we need to convert these values into a function by smoothing them. Nevertheless, *not all data subject to a functional data analysis are themselves functional* (Ramsay and Silverman, 2005: 5), but consequently nothing much of improvement is gained when compared to a multivariate approach. Once that data cannot be directly considered of functional nature, an underlying smooth function $f_t(x)$ is used, adding to the observed discrete points of x a certain amount of error. Letting $y_t(x)$ correspond to the log-fertility rate registered at age x in year t we have:

$$y_t(x) = f_t(x) + \sigma_t(x)\varepsilon_{t,x}, \qquad [6.1]$$

where $\sigma_t(x)$ corresponds to the amount of noise that varies with x and $\varepsilon_{t,x}$ is an iid standard normal random variable (Hyndman and Ullah, 2007). Generally, the approach can be summarized as follow:

i. Data is smoothed by applying a non-parametric smoothing procedure;
ii. The fitted curves are decomposed by applying a function expansion:

$$f_t(x) = \mu(x) \sum_{k=1}^{k} \beta_{t,k}\, \phi_k(x) + e_t(x), \qquad [6.2]$$

iii. where $\mu(x)$ is the location measure of $f_t(x)$, $\phi_k(x)$ is a set of orthonormal basis functions and $e_t(x) \sim N(0, v(x))$;

iv. Univariate time series models are fitted to each of $\beta_{t,k}$;

v. $\beta_{t,k}$ coefficients are forecasted using the fitted time series models for $t = n + 1, \ldots, n + h$;

vi. Forecasting $f_t(x)$ for $t = n + 1, \ldots, n + h$ making use of the forecasted coefficients;

vii. And, use the estimated variance of the error terms to compute the forecast associated confidence intervals.

6.3.3. The smoothing effect

Data overdispersion is considered characteristic of countries with relatively poor data or with distinctive historical data trends and is generally caused by the tendency to round counts or measurements to pleasant digits (Camarda, 2008). Smoothing is the most used procedure to stabilize the high variance observed. On the other hand, as it was explained in the preceding subsection, it can also be used to transform discrete into functional data.

Let $p_t(x)$ denote the observed fertility rate at age x in year t per thousand women and $N_t(x)$ the female population exposures by age x in year t, we have the variance of $y_t(x) = \log[p_t(x)]$ given by (Hyndman and Ullah, 2007):

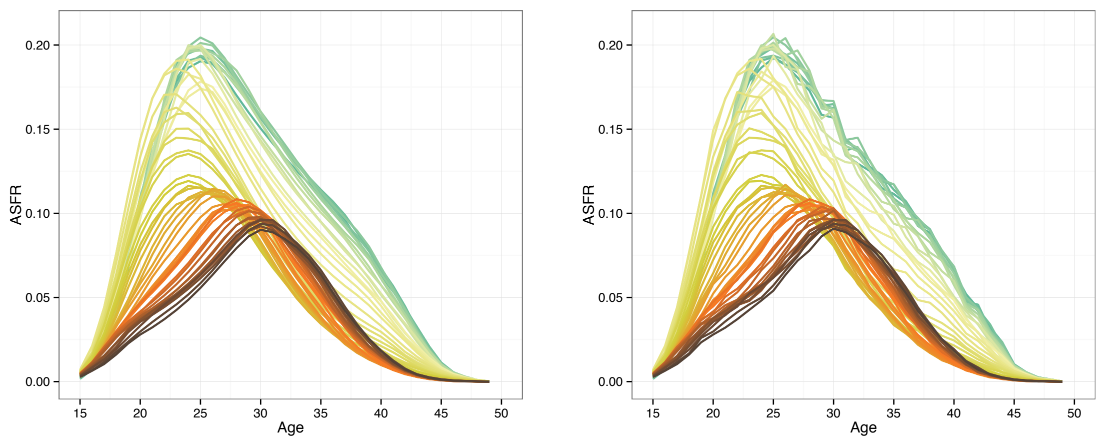
$$\hat{\sigma}_t^2(x) \approx [1000 - p_t(x)] N_t^{-1}(x) p_t^{-1}(x). \qquad [6.3]$$

In order to obtain better results for $f_t(x)$, highly affected in presence of larger variance $\sigma_t(x)$, for fertility, data it is qualitatively constrained fitted curves to be concave.

Exemplifying what has just exposed, Figure 6.1 presents the smoothing effect in the age-specific fertility curves, i.e., the transformation of discrete age-specific fertility rates into functional data. We do not present the obtained results to all countries but instead the specific example for Portugal. As it can be observed, smoothed (a) and non-smoothed (b) data by age are very similar, the main difference corresponds to the wrinkle elimination, consequence of transforming discrete data into functional.

Figure 6.1: Age-specific fertility rates smoothed (a) and non-smoothed (b) from 1960 to 2012 in Portugal

(a) (b)



Notes: Lighter green and yellow lines correspond to ancient years while brown lines reflect more recent patterns.
Source: Human Fertility Database. Own elaboration.

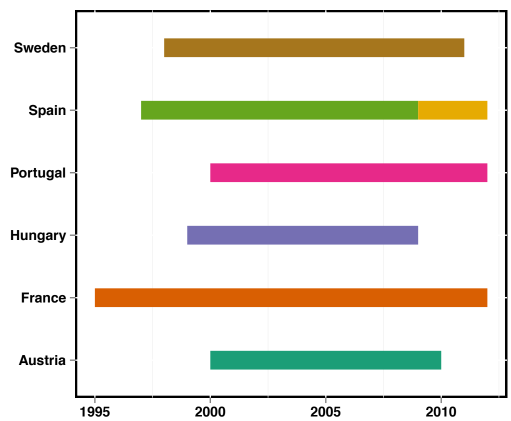
6.3.4. Forecasting procedure

In opposition with the approaches followed by Lee and Carter (1992) or Hyndman and Ullah (2007), where the entire available year range in the study was included in the forecasting procedure, in our approach, and once that we intend to realize a short-term extrapolation of recent trends, we decided to depart from the last identified and statistically significant break for each country (Figure 6.2) acknowledged in Chapter 2. Nevertheless, Spain is an exception. The last and most recent statistically identified segment break solely corresponds to four years: 2009-2012, being an extremely short period for any plausible extrapolation. Consequently, the period taken into account for

Spain corresponds to the last two breaks that proved to be statistically sensitive to changes on the total fertility rate.

Thus, with the intention of evaluating, which are in a short range the future fertility tendencies if recent patterns are simply extrapolated for a near future, with no influence of new possible government policies and stimulant planning, we elaborate fertility forecasts till 2020, independently of the time segment size and starting year.

Figure 6.2: Years in the last statistically significant segment identified by country



Notes: 1) Due to the short size of the last segment identified in Spain, we present here, instead the last, the two last segments. 2) For more detailed information, see chapter 2, section 2.4.3.
Source: Human Fertility Database. Own elaboration.

6.4. Results

In the following subsections we will present first a brief overview from the six European countries under analysis related to their fertility trends using for that the lexis surface, not often used in the study of fertility patterns. Followed by the evolution of age-specific fertility rates since 1960, where we include the forecasted patterns to all countries until 2020. Here the fertility patterns will reflect the trends without any significant changes on the *quantum* level.

Latter we discuses the age-specific fertility rates by age groups and later on we decompose them by each age group to focus on the Portuguese example in order to identify the ages that contributes more to the total fertility rate. Finally, we present the possible TFR in the absence of significant structural and social or political changes that could influence new fertility patterns.

6.4.1. Evolutionary fertility trends from a Lexis triangles perspective

In previous chapters, fertility trends were fully explained and exhaustively analysed. Nevertheless, in order to understand the prospective fertility trends extrapolated until 2020, it is imperative to go through a mind refresh about those fertility patterns.

Normally, fertility patterns are analysed by focusing on the age-specific fertility patterns (single or aggregated age groups) or by presenting complementary but dissimilar summary indicators as, e.g., the total fertility rate or the mean age at childbearing (e. g., Kohler and Ortega, 2004; Sobotka, 2004).

In Chapter 2 the discussion on fertility trends was already made with the use of the traditional methods mentioned above. However, in this chapter we made use of the Lexis diagram and we present the age-specific fertility rates by Lexis triangles, what can result in a more intuitive perspective. *Vital statistics often provide a decomposition of births according to age and a number of characteristics including birth order or education. A connected choice is what kind of rate to calculate within the Lexis diagram: age-period, age-cohort, or cohort-period* (Ortega and Kohler, 2002: 5). However not all countries provide the Lexis diagram triangles information (age-cohort-period) in their vital statistics, so this is not always a matter of choice.

A quick research in the literature allowed identifying few research studies with direct reference to the use of lexis diagram triangles or age-cohort-period analysis, e.g., Zeng et al., (1985) made use of lexis triangles to the analysis of marriage and fertility in China, Campbell and Robards (2014) compared the changing age-specific fertility across the UK, and also to the fertility forecasting by Schmertmann et al., (2014) used Bayesian methods to extrapolate trends with the age-cohort-period component.

If plotting the age-specific fertility rate curves is very revealing, when those same rates are presented in a surface plot, the analysis becomes even more straightforward.

From the figure 6.3 we can then depict a very generalist perspective about the evolution of fertility patterns since the 1960s for the countries under analysis.

Previous analysis and discussion on the fertility trends indicates that for all countries 1960s fertility *quantum* started to decline, featuring later on in 1970s and 1980s an even sharper decline with a change in the fertility *tempo* and *quantum* (Frejka and Zakharov, 2012; Andersson et al., 2009; Sobotka, 2004). Such trend can be simplified by using the Lexis diagram, and Austria is a good example to understand the usefulness of age-cohort-period approach to describe fertility trends.

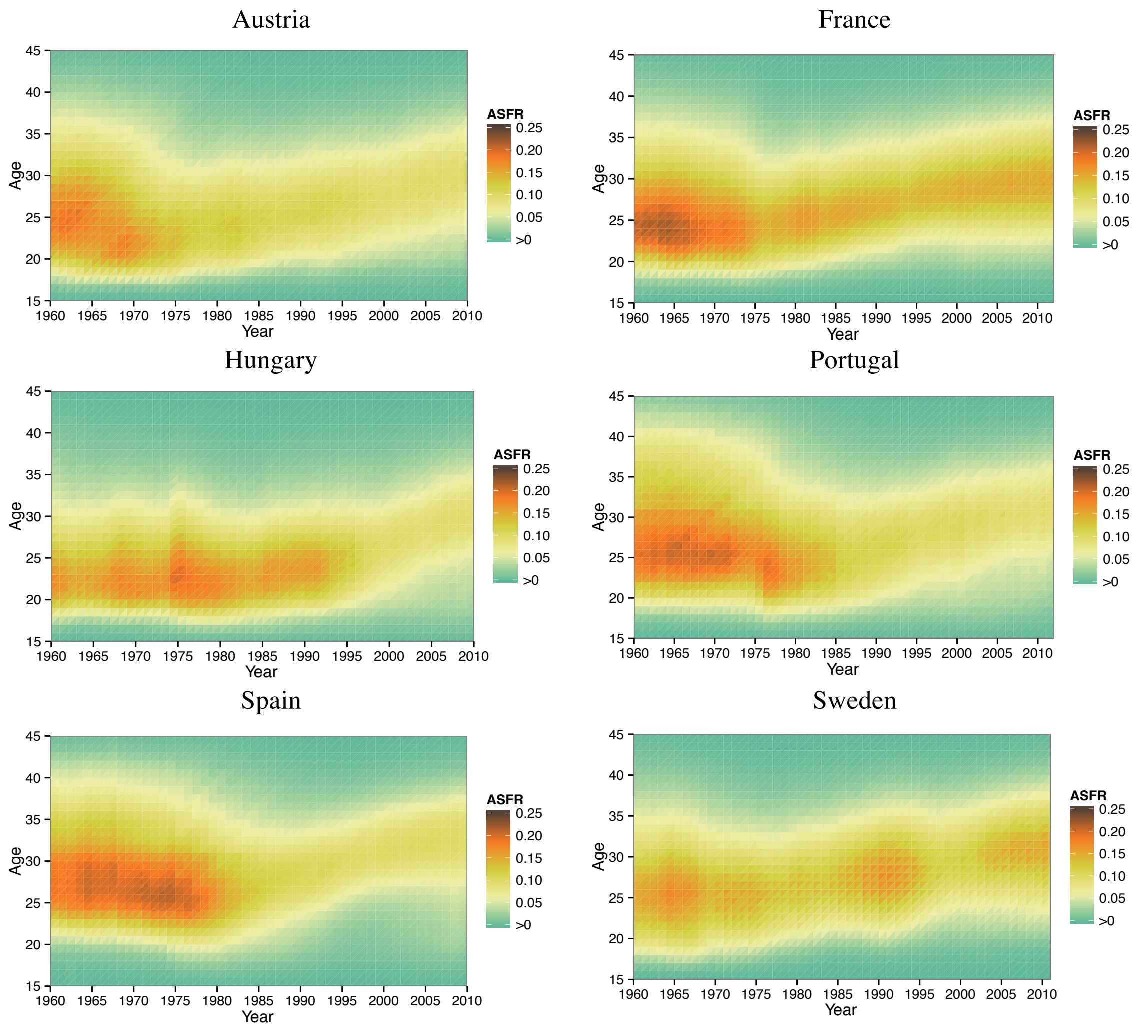
Austria is a country with fundamental changes in the fertility *quantum* that occurred by the 1960s with an intensive decline (observed in the lexis surface with the darker colours). By the 1970s, as for Portugal and Spain, in Austrian fertility patterns we observe a slight increase in fertility registered at younger ages (around age 20). In all period under analysis, France and Sweden present the highest fertility values. For Sweden, in 1960 the age range corresponding to more expressive values varies between ages 19 and 34, but in the most recent available year (2011) the range is now 23 - 37 (approximately), resulting from a shift in opposition with a fertility compression.

With less intensive colours, mainly at the last years under analysis, Austria, Hungary, Portugal, Spain present tighter age range in which women effectively use their fertility window to become a mother. Yet, such range allowed identifying stronger shifts at the childbearing age for Spain.

Broadly, fertility rates are decreasing with time and the (new) high values registered in more recent years are now experienced at older ages than in older cohorts. From here it can also be described that fertility is not only shifting towards older ages, but becoming concentrated in a shorter age range in almost all countries. Nowadays, from the six countries, France and Sweden present not only the highest rates of fertility, but also a wider distribution of those rates by age, i.e., fertility in those countries is less concentrated in a shorter age range than it is observed on the other four.

Summarizing, with the exception of Sweden and France, fertility is not only shifting and therefore becoming concentrated at older ages, but it is also decreasing with time. In the absence of new encouragements, it is very difficult to individuals change their fertility behaviours, but what can we expect if recent patterns keep constant for the next years? We'll answer that in the following subsection.

Figure 6.3: Age-specific fertility rates by Lexis triangles for study countries



Source: Human Fertility Database.

6.4.2. Extrapolating future age-specific fertility trends

As it as previously said, plotting the age-specific fertility rates against age presents a complementary perspective not only about the evolution of fertility with age, but in a presence of a matrix surface (with multiple years), also the evolution of across different years. Figure 6.6 is one example, where in grey we can have an overall perception about the evolution of fertility patterns over age and over time (described with more detail in chapter 2, section 2.4.3).

Similarly to what can be seen observing figure 6.5, in figure 6.6, a strong decline in fertility rates can be observed across almost all countries over time accompanied by a shift to the right, i.e., a shift in the maximum values to older ages. Sweden is the only exception in this group, once that it seems that the fertility rates, despite some perceptible fluctuation, are nowadays very close (across age) to the patterns registered in 1960 (for further discussion on this patterns see Chapter 2).

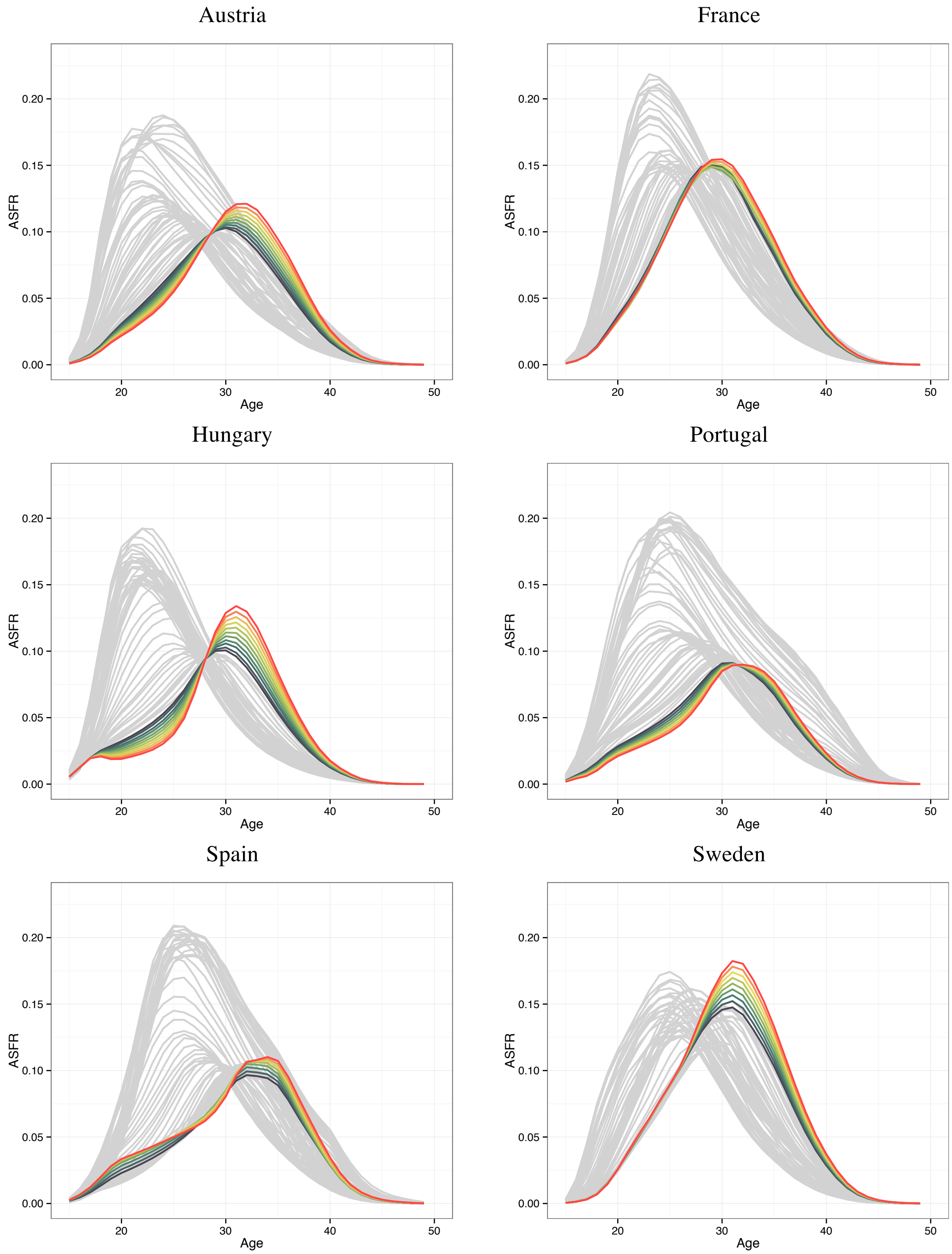
Forecasted trends over age were also included in figure 6.4 with the intention of creating a continuum effect and to provide a more accurate prospective analysis. The forecasts correspond to the coloured curves in the plots (figure 6.4) where dark blue corresponds to the beginning of forecasted period and red to the end. From the extrapolated trends we can realize that, if past tendencies keep throughout the future, the shift tendency will also becoming more expressive (Alkema et al., 2011).

France and Sweden seemed to present very unexpected trends. If nothing changes in the French fertility patterns the model expect a small increase in the fertility rates around age 30 consequence of a slight dislocation to the older ages of those higher values (Booth et al., 2009). Nevertheless, it seems that the overall contribution to the TFR will be minor.

The model also predicted for the Swedish case, that if the fertility tendency identified in the last time segment (Chapter 2) continues, the shift will be higher than the one identified for France and the increase in the fertility rates will be also more distinctive. Likewise the French case, it seems that Swedish fertility will be mainly concentrated around age 30 (Lesthaeghe and Willems, 1999).

Analysing the other four countries, one can realize that it is expectable the shift to the right continues but accompanied by a correspondent increase in the same ages. From here we can realize that on those specific cases it seems that increases are at least compensating the decreases in some specific ages (Bermúdez et al., 2012).

Figure 6.4: Observed and forecasted age-specific fertility rates by study country



Notes: 1) Grey curves depict previously observed values while in colours, from dark blue to red as time advances, correspond to forecasted patterns. 2) Despite that we focused on less observed information for forecasting, we present entire time range to provide a better perspective. For a recall on the used timeline for forecasting procedure, please see figure 6.2. 3) Detailed information in Appendix E, tables E.1 to E.6.
Source: Human Fertility Database. Own elaboration.

The tendency of fertility increase around age 20 in Spain is also corroborated by the forecasted trends: it is also expected to increase. Nevertheless, in what concerns to the other Iberian country, Portugal, it appears that the shift is not expected to counterbalance the decline in fertility rates at younger ages (before age 30). This situation may negatively influence overall fertility levels for Portugal (Tomé et al., 2014; Mendes and Tomé, 2014b).

Aggregating data in five-year age groups results in Figure 6.5. This figure, presents again, a different perspective about the obtained results across the study countries (observed and forecasted). Within the observed countries, since the beginning of the analysed period we can summarize five main ideas:

(1) In a first phase of the overall timeline, in Austria, France and Hungary, higher fertility rates where an outcome of fertility patterns registered in the age group 20 - 24;

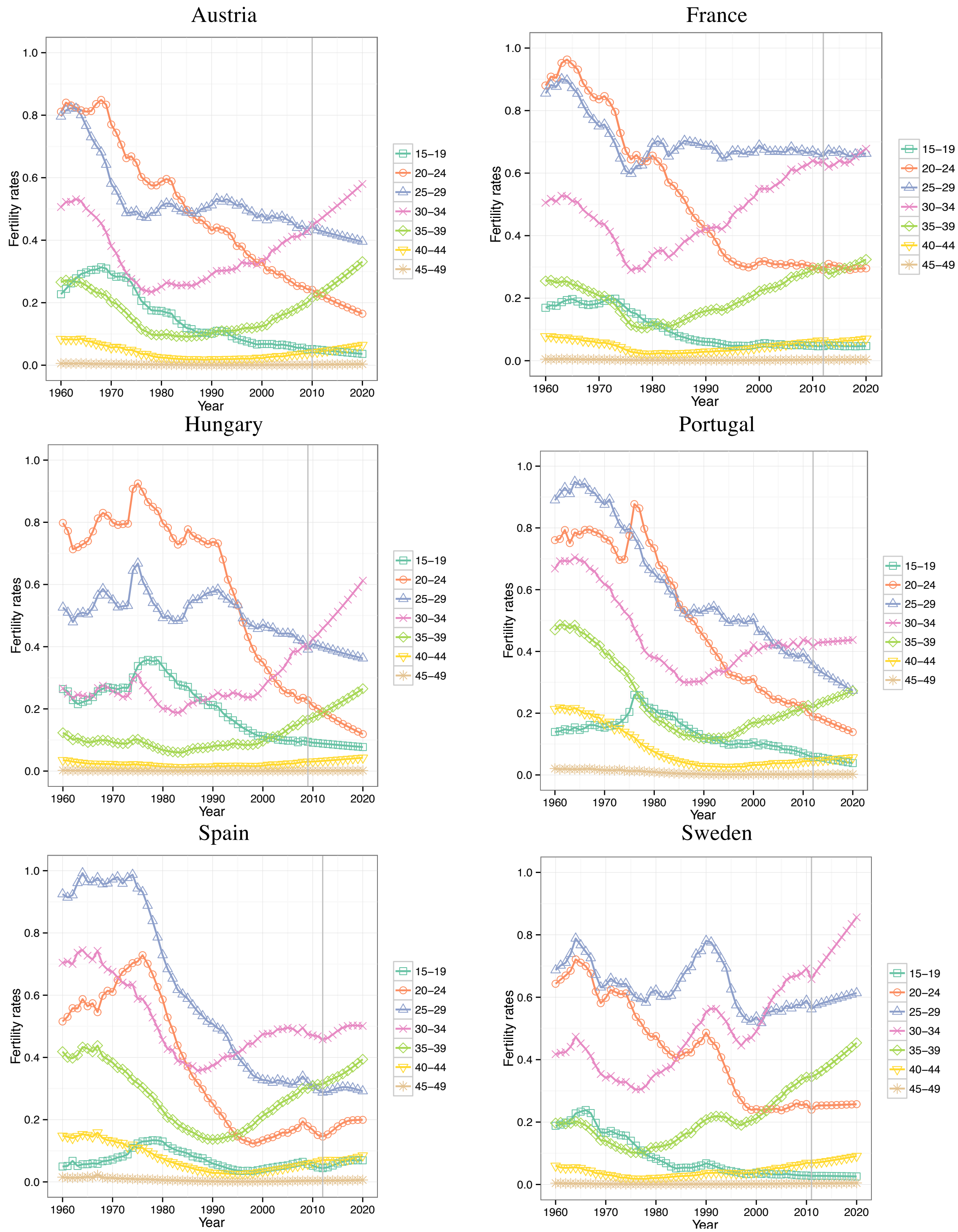
(2) In a second phase, for those same countries it was registered a shift in high values to the next age group (25 - 29);

(3) In Portugal, Spain and Sweden, higher fertility rates are associated to the age group 25 - 29 in almost the entire observed period;

(4) Roughly since middle 1990s fertility associated with the age group 30 - 34 surpassed the values associated with ages between 20 and 24;

(5) Lastly, it appears very likely that fertility will become concentrated between ages 30 - 34 in a near future, accompanied by an increase in the values associated with the age groups 35 - 39 and 40 - 44.

Figure 6.5: Observed and forecasted fertility rates for age groups by study country



Source: Human Fertility Database. Own elaboration.

Additionally, if in Sweden and France fertility declines in some age groups appear to be compensated (or even surpassed) by increases on others, in Austria, Hungary, Spain and Portugal, we are not so certain about that. Consequently a better perspective is presented in the subsequent subsection (tables 6.1 and 6.2).

In Portugal, between 1960 and 1970 have been observed high fertility rates across all ages, in such time period the highest values were observed for the age group 25-29 with almost one child, as in fact was also observed to France and Spain. In the Portuguese case immediately after the 1974 revolution the young fertility (from 15 to 24) increased to very high values.

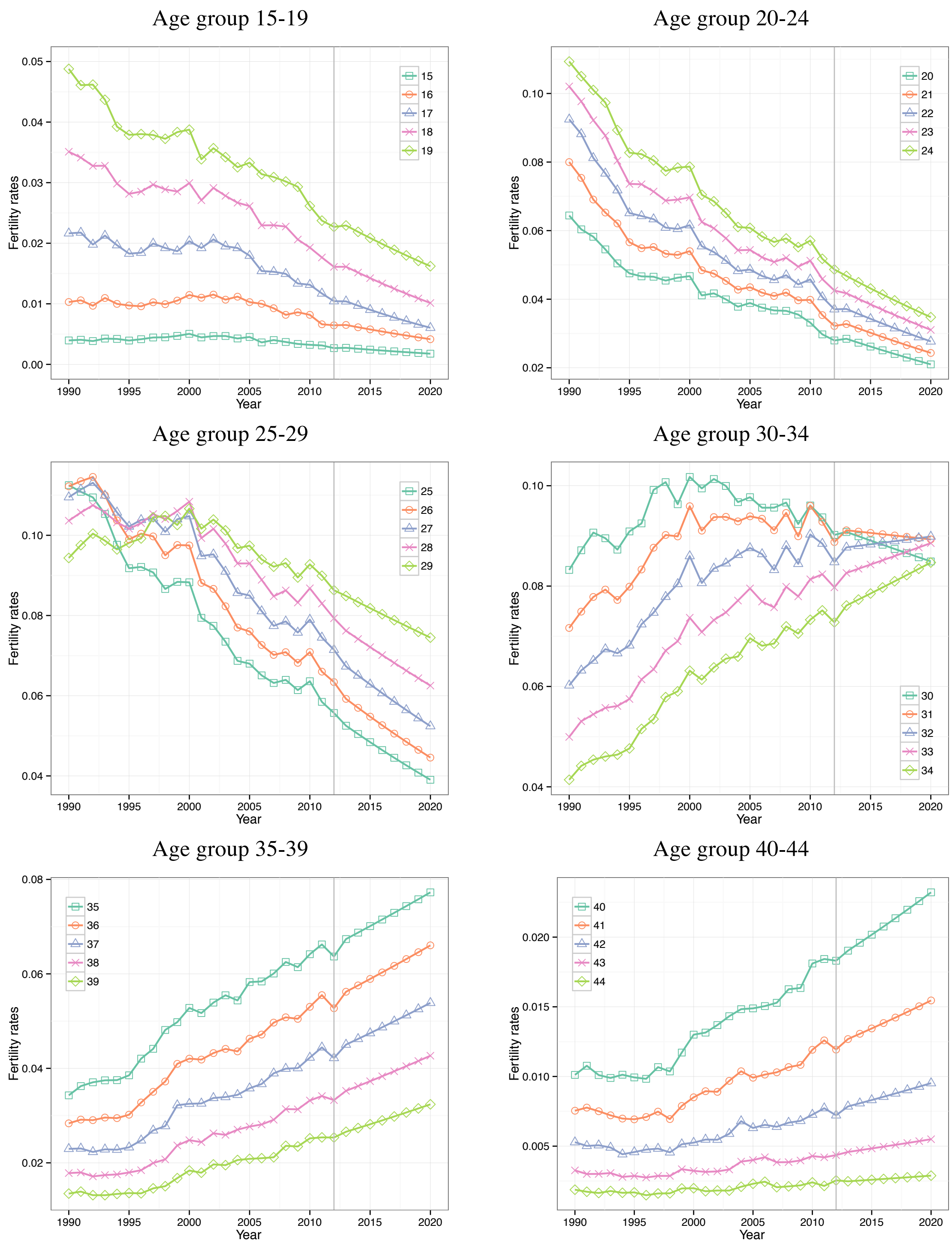
It was after the revolution, with the new social context, that Portuguese fertility values started to change to the European standard trends. The more extreme change in the Portuguese context occurred at the age group 20-24 with the supreme lost in terms of age-specify fertility rates (as observed in other countries under analysis). At the same time that this age group lost the important contribution to the total fertility rate, the older ages increased the fertility rates as a consequence for the postponement. Yet we should keep in mind that the restrictions related to the later age at the first child.

With the aim to understand why Portugal is not recuperating generations, i.e., why Portugal, as other European countries is registering fertility levels lower than 2.1 children per women, we established across all chapters a comparative analysis across six European countries since the 1960s. In the most recent decades Portugal increased substantially the mean age at childbearing, but nowadays the difference between the total mean age at childbearing and at the mean age at first child is minimal.

For that reasons we consider extremely useful to provide a deeper knowledge on the age-specific fertility trends, and within each age group understand with age presents the highest contribute. Figure 6.6 plots the age-specific fertility rates by single ages within each age group focusing our attention since 1990.

With a past of high teenager fertility, we considerer still in this analysis the age group 15-19, where we observe that the highest contribution to the fertility rates within this group corresponds to the older age (19 years). Yet, outlined already before, the young fertility contribution is under decline and it is expected to keep like that until 2020. In the age group 20-24 no significant differences are observed among all ages contributions, yet the decline in the rate are higher as higher is the age. This means that are those with 20 years who have more children.

Figure 6.6: Observed and forecasted fertility rates by single ages for Portugal



Source: Human Fertility Database. Own elaboration.

As in the previous age groups, also for ages 25-29 we can observe a decrease in the fertility rates. We identify a postponement until age 29, the age that less contributed for the fertility rates since the beginning of 1990s. Yet, in 2012 and further in 2020 this is the age with leading contribution to the fertility rates of this age group.

If the first three age groups present a trend of fertility towards decline and postponement, fertility recuperation seems to be occurring only after age 30. Still, in the context of all age groups particularly this one (30-34) registers, since year 2000, a more stable trend (figure 6.8), which expected to be still in the future. Within this group we can observe a postponement from 30 to 31 and 32 years, being the ages with highest fertility rates.

Since 1990, is the age group 35-39 that presents higher improvements in the contribution to the overall fertility rates. With an increasing tendency, in this age group the age 35 is the one with higher positively contributes to the overall age group fertility rates. Following the trends observed for the other countries in figure 6.7, this age group seems to be pointed out for most women's choice to effectively become a mother. On the other hand, the effect from the age group 40-44 is residual, yet within that group those with 40 years register higher fertility rates than the others and seems that will keep the trend in the future.

6.4.3. Total fertility rates for a short-term range

Exclusively by themselves, changes in the age-specific fertility rates may not produce a necessary negative impact on the total fertility rate, i.e., if at the same time that the high fertility rates are sifting to older ages were complemented by an increase, at this stage, one could observe a fertility recuperation.

Table 6.1 presents the TFRs observed in the last segment statistically identified and the forecasted years until 2020. Our graduation colours directs us to two main trends, with green colour we have countries will higher fertility rates and *less fertility problems*, while, as a sign of social alert, the orange and read pallet reflects lower average childbearing per women.

Nevertheless, despite the forecasted TFR increase, only France and Sweden are expected to attain values that allow generations to be replaced (2.1) in a very near future. In 2020, if past fertility tendencies keep being registered in the future, the average number of children per woman might attain 2.20 in France and 2.30 in Sweden. On the other hand, it is expected that the forecasted fertility recuperation in Austria, Hungary and Spain, do not attain values high enough to replace previous generations.

Thus from the graduation colours, we identify straightaway that in all analysed countries but Portugal (and partially Spain) presented recuperation trends until the beginning of the forecasted years. Additionally, the overall picture from the obtained results indicates that in our short-term forecast is very likely that only Portugal keeps registering a TFR declining in the next years.

Table 6.1: Observed and forecasted total fertility rate by study country

Year	Austria	France	Hungary	Portugal	Spain	Sweden
1995	—	1.71	—	—	—	—
1996	—	1.73	—	—	—	—
1997	—	1.73	—	—	1.17	—
1998	—	1.76	—	—	1.15	1.52
1999	—	1.79	1.28	—	1.19	1.51
2000	1.36	1.87	1.32	1.55	1.23	1.56
2001	1.33	1.88	1.31	1.45	1.24	1.58
2002	1.39	1.86	1.30	1.46	1.25	1.66
2003	1.38	1.87	1.27	1.44	1.30	1.73
2004	1.42	1.90	1.27	1.40	1.31	1.77
2005	1.41	1.92	1.30	1.41	1.33	1.79
2006	1.40	1.98	1.34	1.37	1.36	1.87
2007	1.38	1.96	1.31	1.35	1.38	1.89
2008	1.41	1.99	1.35	1.39	1.44	1.92
2009	1.39	1.99	1.32	1.34	1.38	1.94
2010	1.44	2.01	**1.34**	1.39	1.37	1.99
2011	**1.44**	2.00	**1.35**	1.35	1.34	1.90
2012	**1.45**	2.00	**1.36**	1.28	1.32	1.97
2013	**1.46**	**2.03**	**1.37**	**1.29**	**1.35**	**2.01**
2014	**1.48**	**2.05**	**1.38**	**1.28**	**1.39**	**2.05**
2015	**1.49**	**2.08**	**1.39**	**1.27**	**1.44**	**2.09**
2016	**1.51**	**2.11**	**1.41**	**1.26**	**1.48**	**2.13**
2017	**1.52**	**2.13**	**1.43**	**1.25**	**1.50**	**2.17**
2018	**1.54**	**2.15**	**1.44**	**1.24**	**1.52**	**2.22**
2019	**1.56**	**2.18**	**1.46**	**1.23**	**1.53**	**2.26**
2020	**1.58**	**2.20**	**1.48**	**1.22**	**1.55**	**2.30**

Notes: bold values correspond to forecasted years; green colours depict higher values while red ones match lower TFRs
Source: Human Fertility Database. Own elaboration.

The Portuguese fertility trends highlighted through all our analysis as a country without low fertility levels, with relevant postponement trend an incident birth rate significantly dependent from the first childbearing. If the negative relationship between education, labour market and mean age at birth counties to increase, Portugal will in the next years decline even more their fertility. More than numbers our forecasting results allows us to ponder on the fertility decline trend and how that can be reversed. For that in Chapter 7 a discussion on political measures will be provided.

As referred in subsection 6.2.3 smoothing previously the input data not only stabilizes the observed variance, but also transforms discrete data into functional. Consequently, obtained estimates are also themselves more stable. With the analysis of the Table 6.2, where one can found the estimated TFRs and associated 95% confidence intervals, it can be identified what it has been said. The obtained confidence intervals are not extremely wide, as would happen in presence of higher turbulence.

Therefore, and despite that future observed TFRs do not exactly correspond to our extrapolation, stable results like the ones the were here obtained indicate that the overall estimated patterns seem highly accurate in the case of any policy or outside factors that strongly affect fertility decisions.

Table 6.2: Forecasted total fertility rates by study country and correspondent 95% confidence intervals

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
	Low	—	1.41	1.42	1.44	1.45	1.46	1.48	1.50	1.51	1.53	1.55
Austria		—	1.44	1.45	1.46	1.48	1.49	1.51	1.52	1.54	1.56	1.58
	High	—	1.47	1.48	1.49	1.51	1.52	1.53	1.55	1.56	1.59	1.60
	Low	—	—	—	2.00	2.02	2.05	2.07	2.09	2.12	2.13	2.16
France		—	—	—	2.03	2.05	2.08	2.11	2.13	2.15	2.18	2.20
	High	—	—	—	2.05	2.09	2.11	2.14	2.17	2.20	2.22	2.25
	Low	1.28	1.28	1.30	1.29	1.32	1.32	1.33	1.35	1.36	1.38	1.39
Hungary		1.34	1.35	1.36	1.37	1.38	1.39	1.41	1.43	1.44	1.46	1.48
	High	1.37	1.38	1.39	1.41	1.42	1.44	1.46	1.48	1.50	1.52	1.54
	Low	—	—	—	1.26	1.25	1.23	1.23	1.21	1.20	1.19	1.19
Portugal		—	—	—	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.22
	High	—	—	—	1.33	1.32	1.30	1.29	1.29	1.28	1.27	1.26
	Low	—	—	—	1.32	1.35	1.38	1.41	1.42	1.44	1.46	1.47
Spain		—	—	—	1.35	1.39	1.44	1.48	1.50	1.52	1.53	1.55
	High	—	—	—	1.38	1.44	1.50	1.55	1.57	1.60	1.61	1.63
	Low	—	—	1.92	1.95	1.98	2.01	2.06	2.09	2.12	2.14	2.19
Sweden		—	—	1.97	2.01	2.05	2.09	2.13	2.17	2.22	2.26	2.30
	High	—	—	2.01	2.06	2.12	2.17	2.22	2.27	2.33	2.38	2.43

Notes: Due to the short size of the last segment identified in Spain, we present here instead the last two segments.
Source: Human Fertility Database. Own elaboration.

6.5. The government as parents *little helper*

Until now, with the analysed information on previous chapters, it was identified the double postponement as a main reason to explain the low fertility levels and the persistent non-population replacement (2.1 children per women). Thus, it is imperative to develop efficient policies that contribute for the fertility *quantum* increase. With the obtained results we are in position to provide useful and contributory insights to delineate new social policies. Nevertheless, it is also critical that those policies do not strictly focus on the *quantum* itself, but rather on the reasons that contribute for its reduction, as e.g., postponement. Next, we briefly discuss on different family policies and their aims to enlighten possible approaches for the welfare systems encourage women from older cohorts to fulfil their desired fertility.

The public policies have undeniable effects on the societies and families. In a general way, policies regulate the conditions of employment, define the dimensions of welfare benefits, provide education and health services and define the rights and responsibilities of parents. Yet, in some cases public policies have been claimed to have a perverse effect on families. The relation between public policies and demographic behaviour, are however, especially complex. Its relation depends on the type of policies, the level of benefits, conditions of eligibility, and the income and opportunity sets to individuals (Gauthier, 2007).

The population policy includes measures that are designed to have a positive impact on population structure, of which the fertility rate is the most relevant indicator. The term "family policies" is used to emphasize that government policies frequently do not aim specific goals in terms of the population size and structure, but are only concerned with family wellbeing and resultant activities that are directed towards families with children. Nevertheless, in the majority of the countries, family policies usually do not constitute a distinct policy area.

Once that family policy is a fundamental part of welfare-state policies, it is useful to draw, on the European context, an appropriated classification to each type of society. This classification has been identified by Esping-Andersen (1999) and defends that the

European countries can be clustered into four different regimes according to their social policies: (1) the Nordic countries, the called universalistic welfare states; (2) the Continental European countries where the prevalence was to conservative welfare states; (3) the Anglo-Saxon countries, typically liberal welfare states; and (4) the Mediterranean countries, identified as the Southern European welfare states.

The universalistic welfare states are characterized by welfare-states policies that are targeted at individual independence and social equality between all the individuals. The conservative welfare states direct their policies in the direction of status preservation and the protection of traditional family forms, and they often rely heavily on the family as a provider of welfare. The liberal welfare states encourage market-based individualism trough minimal social benefits and trough subsidizing private, but where the social benefits are frequently related with poverty. On the other hand, the Southern European welfare states are often considered as part of the conservative regime, but because of their stronger familial merits they are viewed as a separated welfare-state regime.

This classification of the family policies reflects on the number of births that have occurred over the past decades in European countries. The Nordic countries with their social security systems tend to have a universal relatively high fertility in contrast to Southern Europe where the welfare regimes are associated with very low fertility values, and in-between are the West European countries with a moderately high fertility.

Even though that family policy is part of the welfare state, they are spread in a different number of political fields and one of them characterized by a different historical and development path. This enormous diversity has made hard for researchers the task to arrive at a common definition. Among the different attempts to conceptualize family policies, Neyer and Andersson (2008) highlighted three contributions that seem to be the most relevant in demographic research:

(1) Kamerman and Kahn (1978) defined family policies as all the actions that the government does to and for the family (e.g., day care, child welfare, tax benefits). They interpreted the family policies as the sum of all state activities directed to the family core.. (2) On the other side Bourdieu (1996) indicates that if family policies are directed to the family, in the end they also construct the family. He considers family policies as

state measures to assemble and institutionalize a particular form of family as the established form of private relationships in a society.

However fertility effects can be frail or insignificant if policies do not correspond to the social life that the majority of the people in a country want to lead or if the family policies oppose the norms that conduct most people's lives. In these context Neyer and Andersson (2008: 703) present an example about Germany and Austria, where both countries *have been among the countries with the lowest total fertility rate, yet the highest expenditures on family policies in Europe may be attributed to discrepancies between social developments and the orientation of the policies on one hand and the perception of the family policies on the other*.

(3) Finally the feminist welfare-state researchers and following the ideas of Esping-Andersen (1990) add two additional aspects. First, they give emphasis to that family policies constitute a central part of the welfare-state context in a country. They focus their attention in family policies by taking into account the effects that family policies have on gender, class, race, and other social, economic, and private affiliation in society. Second, these researchers underline the need to decompose the family concept. These feminist welfare-state approaches stress that family policies my not necessarily influence directly the fertility, can be an effect mediated through other social institutions.

One of the most defended family policies are the maternity and parental-leave, however this regulation seems to be accepted across all the European countries as a measure to regulate the female labour participation and as a resource to organize employment and care along gender lines. The Nordic countries policies have been oriented to support women's employment, however many continental European countries purpose the opposite goal, and many of those enclose indirect restrictions on father's absorption of parental leave (e.g., low benefit levels or impractical rules regarding parent-leave).

In many countries, the family policies differentiate between social groups, between public and private sector (e.g., Portugal), married and non-married, or national and foreigners. To the demographic research these examples illustrate that whichever analysis of policy effects should be based on careful study of policy system, of their range, and their potential impact on family, social and economic relationships.

Demeny (1986: 476) argue that fertility behaviour was *a legitimate object of attention for collective and, in particular, governmental action*. On the other hand, to Chesnais (1996) the gap between the ideal and the reality (in terms of number of children) demonstrates that public policies have failed to remove the obstacles to realization of fertility desires. Although leadership come inevitably from governments, the ideal arrangement should be a partnership between families, governments and employers promoting the existence of friendly family policies.

Generous social policies could create a socioeconomic environment that provides increased incentives for having children, including child-care provision, better access to labour markets for women with children, and government transfers for families with children. Due to the relatively low levels of childlessness, these policies in lowest-low fertility countries should be targeted in particular towards the realization of delayed first births at higher ages and the progression from the first to the second child (Kohler et al. 2002).

McDonald (2000: 16) suggests five financial incentives to help increasing fertility, (1) periodic *cash payments;* (2) *lump sum payment* or *loan;* (3) *taxes rebates, credits or reductions;* (4) *free or subsided services or goods for children;* (5) *housing subsidies*. The author suggests also measures related to work and family initiatives, and broad social change supportive for children and parenting. With respect to the suggestion about strategies related to the work and family initiatives, is easy to identify the universalistic welfare states from the Nordic European countries, where we observe the maternity and paternity leave; a higher support in child care; the flexible working hours and short-term leave for family purposes; or the anti discrimination legislation and gender equity in employment.

On the other hand and with respect to the broad social change supportive of children and parenting, we identify the Southern European countries where exists employment initiatives or marriage and relationship supports. In Spain, e.g., in 2007 to encourage families having more children the government created new measures that included 2,500€ for each new-born (Goldstein et al. 2009). The "supposed" effect was felt in 2008 with an increased value of 5 percent in total fertility rate.

The total fertility rate is sensitive to the birth timing, so if a woman decides to postpone childbearing to a later time in their life, then it decreases regardless of changes in family policies or unemployment. In this perspective the higher pressure to respond with policy changes to the low fertility exist in the Southern European and conservative welfare regimes. In this context, Grant et al. (2004) proposed: (1) reformer's policies that aimed to accommodating and improving the consequences of low fertility, population decline and population aging; (2) preventive policies, which can be direct such as migration policies, family support, reproductive health and family-friendly employment policies, or indirect, such as economic, gender and educational policies.

In contemporary Europe, the explicit pro-natalistic policies have met pronounced public resistance. Family policies in the European context tend to be based on an equal-opportunity rationale and aim to help women combining childbearing with employment opportunities. *What public policies could help stop the increase in the mean age at childbearing or even lead to a decrease in the near term?* (Lutz and Skirbekk, 2005: 709).

All the studies produced in the last decade suggest some levels of success for a particular policy measure in a particular country and year. It's difficult from the point of view of the literature review to present an accurate political measure and an adequate model to the impact of the policies in the fertility behaviour. The measurement of policies success is the major challenge in all studies, which tend to be restricted to only one type of policies (Neyer and Andersson, 2008).

6.6. Discussion and concluding remarks

6.6.1. Discussion

The total fertility rate is not the only key component in the analysis of period fertility and the interest in understanding age-specific fertility curves is always present. Among other reasons, the age-specific fertility curves as well as the total fertility in the context of population *projections*, are crucial for government planning activities (Bermúdez et al., 2012; Alkema et al., 2011; De Beer, 2011).

Even that actual low fertility patterns provide future low fertility levels estimates, we believe that they will not continue for the next years or decades and need to be accurately measured. Thus, demographers keep seeking for period and cohort measures that more accurately as possible predict future trends (e.g., Schmertmann et al., 2014; Myrskylä et al., 2013; Goldstein et al., 2011; Sobotka et al., 2011; Goldstein, 2008; Bell and Monsell, 1991).

Instead of improving techniques to extrapolate age specific fertility rates, demographers should include other factors affecting fertility in the analysis (Goldstein et al., 2011). Yet, we consider that in all fertility trends it is implicit the direct impact from the external constrains and enhancers on the *tempo* and *quantum* components. Consequently, our choice to forecast future fertility trends fell on the functional data forecasting methodology developed by Hyndman and Ullah (2007).

By using this approach it was our aim to estimate how fertility will evolve in the near future by extrapolating past tendencies, evaluating simultaneously, what can be expected for countries as Portugal and Spain where the economical crises is a dominant characteristic as well as the lack of family support (e.g., Guerreiro, 2014; Wall, 2004). Despite that an analysis focused on the total fertility rate may provide important information, new insights and deep knowledge arrives from the identification of possible changes in the age-specific fertility rates across time. Nevertheless, while period observations can be distorted by the changes in the timing of fertility, for a given total fertility rate in a specific year, it is included the contribution from different cohorts. Therefore, age-specific rates provide us a new perspective on the fertility growth.

Across all countries we observed a generalized increase in fertility postponement, with a significant decline in the contribution to the total fertility rate from the age group 20-24. Yet, it is with the age group 25-29 that Portugal and Spain started to differentiate their fertility patterns from other countries, showing a high decline in the fertility rates for this group of women. Such decline was less pronounced for Austria and Hungary. For France and Sweden the fertility trends kept stable or with a slight increase, however the model results to both countries are somehow extremely different and they assume a complete change in the fertility evolution of such countries.

In the age group 30-34 fertility rates increased in almost all countries with exception to Portugal and Spain, in which since the year 2000, fertility at that ages almost stagnated. It is only at age group 35-39 that the contributions are similar across all countries, with an increase in the most recent years and that is expected to maintain until 2020. Finally, in age group 40-44, after the decline for Portuguese and Spanish fertility trends in the 1960s, most recently and to all countries, the fertility rates at this age are increasing and expected to continue.

In the particular case of the Iberian countries, the expected changes in their women's fertility behavior, like it was identified in past chapters, can be explained by the negative impact from the 2008 economic crises, as well as the increasing unemployment rate or the changes in the social and individual patterns. Also, in the aging scenario that most European countries are facing nowadays, despite not enough to produce major changes in a short term, fertility increase/recuperation becomes imperative. Portugal, like Spain, is still dealing with an economic crisis that pushes young individuals in the labour ages to search for better living conditions abroad and that later on will leave their parents household (Tomé et al., 2014; Bettio and Villa, 1998).

Still, Basten and colleagues (2013) pointed out some arguments suggesting that fertility rates may eventually increase in countries with low fertility rates (e.g., Austria, Portugal and Spain): (1) Period fertility rate decline was due to the large extent on the postponement of childbearing to higher ages. Still such postponement will eventualy come to an end or eventually recuperates as already observed in many European countries. (2) Cohort fertility will never decline to such low levels as the ones observed in the period. (3) Desired family size across Europe "remains remarkably stable at or slightly above two children".

The obtained results from our estimates indicate that all countries but Portugal will present some TFR positive improvements. The model also predicted that the lowest TFR value observed in 2020 would be, as expected, registered in Portugal, attaining the 1.22 average children per woman. Nevertheless, recently, Statistics Portugal indicated that in 2013 the total fertility rate observed was 1.21. This value is even lower than the one predicted for the end of the forecasting period, what can indicate that migration, i.e., out migration flows are having a new high negative impact in Portuguese fertility.

6.6.2. Concluding remarks

From the analysis undergone in this chapter, we can conclude that from the six countries under analysis, Portugal is the one with lower chances to present any kind of fertility recuperation in the near future. As pointed out several times across this thesis, TFR values under 1.3 are designated as lowest-low fertility, and if nothing changes till 2020, Portugal might become the only country among the ones under study, that can be labelled by this designation.

Again, likewise it was identified throughout the entire research, is the cohort postponement that influences the most period fertility rates, despite these might be influenced by different shocks registered in a period basis. Thus, it is imperative to the government and decision-makers to elaborate new and innovative polices that help possible parents to entry in parenthood.

Lastly, it was also identified that, more than mortality, emigration flows are influencing very negatively fertility outcomes. Thus, despite these urgent changes needed at the individual level, it is also urgent that the country (Portugal) becomes attractive again, in order to at least, bring back its own emigrants.

Despite all previous presented and discussed results further research in terms of fertility trends need to be improved including in such models the cohort effect in terms of postponement, and we identify also the need to include the double postponement effect as a result from the period shocks identified in chapter 2 and 5.

CHAPTER 7

WHY PORTUGAL IS NOT REPLACING GENERATIONS? – SUMMARY AND CONCLUSIONS

7.1. Introduction

The aim of this study was to investigate the relationship between cohort and period fertility postponement and the effect of this double postponement on the final period *quantum*. Across Europe the transition into family formation and to parenthood has been taking place over the past decades in older ages. Becoming a parent is no longer a *social duty* but a personal postponed decision. Both processes of postponement and free choice in terms of *tempo* and *quantum* have important consequences not only in the period fertility trends, but also in the cohort fertility levels.

Additionally, the deep impact from the period and cohort postponement has a societal impact, conditioned by the social conditions and the economic and labour market instability. The negative *recipe* between these *ingredients* can, in the future, result in even higher negative reactions from the individual perspective.

7.2. Period fertility patterns and the double postponement

Firstly we identify as one of our goals to improve the understanding of a particular demographic process – fertility – in order to formulate theoretical and empirical informed scenarios of future developments in European countries, particularly in Portugal. We provided an extensive analysis from the demographic perspective on the transition to motherhood through the empirical demographic results to test our first hypothesis: if there is *the period and cohort fertility level strongly affected by the double postponement*.

The most used indicator on fertility analysis – the TFR – is directly influenced by period changes, yet, the contribution from each real cohort to the period fertility should be considered as an inter-dependency between synthetic and real cohorts. Furthermore such relationships between real and synthetic cohorts allowed identify a double effect on the period fertility trends. The decline observed in both period and cohort fertility trends, was followed by a continuous postponement that increased substantially the mean ages at childbearing.

In the context of the six countries under analysis, Portugal highlighted with the smaller difference between the mean ages at birth (for total births and first child) in the most recent decades, as result from the extreme high contribution to the total number of births *absorbed* by the first child; consequently, lower period total fertility rates were observed specially since the mid 2000s; but also a recuperation at older ages in the recent years has been registered.

However, when we focus our analysis in the cohort perspective, we observe that already by the 1952 cohort, Portuguese mothers were not replacing generations. Still and among the six countries under analysis was Portugal that later stopped to replace cohorts. Nonetheless, between the 1960 and 1970 cohorts, within Hungary and Sweden, Portugal had the highest lost in terms of final fertility decline (table 2.2). Indeed, the highest postponement and decline was observed in Portugal, and particularly for the Portuguese transition to motherhood the double postponement seemed to have a strong effect in the final period fertility level.

7.3. Parenthood and fertility determinants, are they the same?

The postponement in both period and cohort fertility has been discussed into the light of the individualization theory. We intended to identify if - *into the light of the individualization theory can the familiar background, the social norms and individual values, explain the strong parenthood postponement, i.e., explain the late fertility transition*.

The analysis regarding Portuguese individuals in their transition to parenthood give new empirical perspectives were the family formation decision is influenced by the background variables given by birth (age, sex, family, social condition) and in which a strong influence correspond to personal choice variables (personal effort, education) with more predictive capability.

The heterogeneous individual path but homogenous in the latte transition to parenthood is particularly explained via the higher educational level (from the individuals and from their mothers); the late transition to first cohabitation; the lower number of siblings (maximum of one); the desired number of two children (maximum); the possibility of maternal conciliation between family and labour market; the perspective that a child doesn't need the presence both mother and father to grow balanced; as well as no need to have a child as personal fulfilment; and finally the idea that it is preferable to have only a child with more economic and social stability.

Within the lowest-low fertility Portuguese, values observed since 2012 (1.28) question as, – "What determines Fertility? And What determines the transition to motherhood?" – can be consider as only one. If we consider the fundamental contribution from the first births identified across our research to the total fertility rates we can indeed assume that parenthood transition and fertility transition are nowadays explained by the same factors.

7.4. Consequences from the increasing education level and the fertility postponement

The heterogeneous individual decisions lead to homogenous patterns across countries, where low fertility levels are the main characteristic as well as the constant postponement. Those countries homogenous trends are explained by the social transformations, particularly by the strong female participation at the educational system. The literature review identified a positive and a negative relationship between fertility and the female educational level. Such deep relationship identified between education and fertility trends, as well as the importance of the individual's mother education level, lead us to hypothesize that, *individual's education as well as their mother education be understood as "the key" factor for the period and cohort fertility postponement*.

Our research contributed with new insights in the contextualization of motherhood transition from the cohort perspective in the relationship to the educational level. The Portuguese educational improvements follow the fertility decline between older and younger cohorts. The fertility decline in the first moment was followed by the rise in the mean age at childbearing increasing the individual heterogeneous decisions. The social, economical and educational transformations haven't affected so directly the older cohort, but younger cohorts reflected new behaviour paradigms.

The relationship between fertility and educational increasing levels had a direct effect on the fertility *quantum* decline followed by an effect on the timing decisions. Still, the postponement recuperation at older ages, where mothers with higher educational levels are expected to have more children, can be understood as the fertility shift into later ages.

7.5. The positive relationship between high education, employment and fertility levels

The relationship between education, family formation and labour market participation stability, is different between countries. The later transition to parenthood is the result from higher levels of education, later transitions into the labour market and consequently later family formation. Such fertility shifts into later ages have as main consequence the decrease in the total fertility rate and major changes in the fertility dynamics.

The social dynamic between family and labour market participations presented a positive relationship for Portugal while, e.g., for Spain the relationship seems to be negative. Still, even that employment has different relationships with the fertility trends, in the case of employment uncertainty we could expect a homogenous reaction in all countries.

Due to the strong relationship between fertility, education and female labour market participation we thus hypothesize that *the traditional relationship between education and fertility postponement can, change from negative to positive in terms of fertility quantum, mainly at later ages*.

Considering Portugal as our main focus, the labour market participation increased the fertility postponement effect, but still, the relationship between employment and fertility was positive in terms of *quantum*. In the most recent year as a reflected reaction to the cohort changes the *quantum* decline indicates as result the non-recuperation of older cohorts fertility postponement.

Nevertheless, in a global perspective, for Portugal the positive relationship was preserved even with the 2008 strong economic shock. We identified a positive relationship between age, education and employment. Such positive effect increases the probabilities of more educated and older women recuperate the postponed childbearing earlier in their cohort.

7.6. The fertility compression at age 30 and the changes between fertility, education level and employment

Government action planning in terms of family policies need to be informed by the evolution of demographic trends. The social care supplies should be in concordance with the population necessities and in that context the better way to provide efficient answers to the population need is to proceed to demographic projection or forecasts. In terms of fertility analysis and population *projections*, are crucial for government planning activities the analysis of period fertility rates as well as the age-specific fertility rates.

From the analysis undergone across this research, we can conclude that Portugal is one of the countries in Europe, with lower chances to present any signs of fertility recuperation in the near future.

Furthermore, even with a positive relationship between education, high employment rates and fertility trends, the recuperation levels at older ages are not compensating the extraordinary postponement and decline at younger ages. Still, it is at older ages that the mentioned relationship between education level, fertility and employment is more positive, and by that time women that with higher educational levels increased the number of births.

We proposed to test if, *with all the changes observed in the relationship between fertility level, education and employment, will childbearing compress around age 30*. The forecasting proposed model identified, indeed, that the positive relationship between education, employment rates and fertility trends compressed the mean age at childbearing between ages 29 to 35. Furthermore, it's expected in the future a higher compression around age 30.

It was identified throughout our research, that it is the cohort postponement that influences the most period fertility rates, but this might be influenced by different shocks registered in the period basis. The recent economic crisis/shock (2008) can be considered the perfect example to this situation and beside the low fertility levels observed by that time in Portugal or in Spain the economical instability was immediately reflected in terms of fertility *tempo* and *quantum*. Our work allowed not only to predict the decline trends on the Portuguese fertility levels, but also to give some highlights to policy makers in particular for the Portuguese context.

7.7. Concluding remarks

The fertility shift to later ages and the compression around age 30 of the majority of births are the result from the relationship between cohort fertility postponement and period fertility postponement, as well as, from the joint and separated effects of this double postponement on the final period *quantum* in Portugal.

If in one side no reversals into younger ages are expected, on the other side it's expected that the educational levels improvements and the employment stability improve the recuperations index at later ages. Still, the recuperation at older ages will not be enough to overcome the losses in the younger ages.

The postponement effect on the fertility decline over the past years can be understood as a direct consequence from each individual decision in terms of their effective fertility desire. The double effect from period and cohort postponement has been identified across this research as main explanation to the fertility decline. Such double postponement effect it is heightened in the Portuguese case, by a high first-birth rates observed in the recent years (figure 2.6).

REFERENCES

Aalen, O.O., Borgan, O. and Gjessing, H.K. (2008). Survival and event history analysis: a process point of view. Springer Series Book: Statistics for biology and health, New York Springer.

Aassve A., Sironi M. and Bassi V., (2011). Explaining attitudes towards demographic behaviour. European Sociological Review, Volume 29 nº2: 316-333.

Adsera, A. (2011). The interplay of employment uncertainty and education in explaining second births in Europe. Demographic Research, Vol. 25, Article 16: 513–544.

Adsera, A. (2010). Where Are the Babies? Labour Market Conditions and Fertility in Europe. European Journal of Population, *27*(1): 1–32.

Alich, D. (2009). Fatherhood in Russia between 1970 and 2005: the male perspective of family and fertility behaviour in a changing society. Doctoral Thesis. Rostock University.

Almeida, A. N. De and Vieira, M. M. (2012). From University to Diversity: The Making of Portuguese Higher Education. G. Neave & A. Amaral (Eds.), Higher Education in Portugal 1974–2009: A Nation, a Generation. Dordrecht: Springer Netherlands.

Almeida, A. N. De, André, I. M. and Lalanda, P. (2002). Novos padrões e outros cenários para a fecundidade em Portugal. Análise Social, XXXVII: 371–409.

Alkema, L., Raftery, A. E., Gerland, P., Clark, S. J., Pelletier, F., Buettner, T. and Heilig, G. K. (2011). Probabilistic projections of the total fertility rate for all countries. Demography, 48(3): 815–839

Amaral, L. (2003). How a Country Catches-Up: Economic Growth in Portugal in the Postwar Period (1950-1973) In G. Neave & A. Amaral (Eds.), Higher Education in Portugal 1974–2009: A Nation, a Generation. Dordrecht: Springer Netherlands.

Anderson. G., Kreyenfeld, M. and Mika, T., (2014). Welfare state context, female labour-market attachment and childbearing in Germany and Denmark. Journal of Population Research: 287-316.

Andersson, G., Ronsen, M., Knudsen, L.B., Lappegård, T., Neyer, G., Skrede, K. and Vikat, A. (2009). Cohort Fertility Patterns in the Nordic Countries. Demographic Research, 14: 313–352.

Bagavos, C. (2010). Education and childlessness: the relationship between educational field, educational level, employment and childlessness among Greek women born in 1955-1959. Vienna Yearbook of Population Research, 8: 51-75.

Baschieri, A. and Hinde, A. (2007). The proximate determinants of fertility and birth intervals in Egypt: An application of calendar data. Demographic Research, Volume 16, article 3: 59-96.

Basten, S., Sobotka, T. and Zeman, K. (2013). Future fertility in low fertility countries. Viena Institute of Demography Working Papers, nº3.

Beck U. (1992). Risk Society: Towards a New Modernity. Cambridge: Polity Press.

Beck U. and Beck-Gernsheim, E. (2002). Individualization. SAGE Publications, London.

Becker, G. S. (1993). A treatise on the family. Cambridge, MA: Harvard University Press.

Becker, G. S. (1960). An economic analysis of fertility. Demographic and Economic Change in Developed Countries, Universities-national Bureau, UMI: 225-256

Bell, W. R. and Monsell, B. C. (1991). Using principal components in time series modelling and forecasting of age-specific mortality rates. Paper presented at the American Statistical Association 1991 Proceedings of the Social Statistics Section.

Bengtsson, T., Campbell, C. and Lee J.Z., (eds.). (2004). Life Under Pressure: Mortality and Living Standards in Europe and Asia, 1700–1900. Cambridge, MA: MIT Press.

Bermúdez, S., Blanquero, R., Hernández, J. A. and Planelles, J. (2012). A new parametric model for fitting fertility curves. Population Studies: A journal of Demography, Vol.66, nº3: 297-310.

Bettio F. and Villa P., (1998), A Mediterranean perspective on the breakdown of the relationship between participation and fertility. Cambridge Journal of Economics, 21: 137-171.

Billari F. C. and Wilson, C, (2001) Convergence towards diversity? Cohort dynamics in the transition to adulthood in contemporary Western Europe. MPIDR working paper WP 2001-039.

Billari, F. C. and Kohler H-P. , (2004). Patterns of low and very low fertility in Europe. Population Studies 58(2): 161–176.

Billari, F.C. and Kohler H-P. , (2002). Patterns of lowest-low fertility in Europe. in MPIDR Working Paper WP-2002-040.

Billari F.C. and Philipov D., (2004). Women’s education and entry into firth union. A simultaneous-hazard comparative analysis of Central and Eastern Europe. Viena Yearbook of Population Research, Vol. 1: 91-110.

Billingsley, S. (2011). Economic crisis and recovery: Changes in second birth rates within occupational classes and educational groups. Demographic Research 24: 375-406

Bongaarts, J., and Sobotka, (2012). A demographic explanation for the recent rise in European fertility. Population and Development Review 38(1): 83–120.

Bongaarts, J. and Feeney. G., (2008), The quantum and tempo of life-cycle events, in How Long Do We Live?, Springer Berlin, Berlin.

Bongaarts, J. and Feeney, G. (2006). The quantum and tempo of life-cycle events. in Viena Yearbook of Population Research, 115-151.

Bongaarts, J. and Feeney. G., (2002), How long do we live?. Population and Development Review, 28 (1): 13-29.

Bongaarts, J. and R. A. Bulatao (eds.) (2000). Beyond Six Billion: Forecasting the World’s Population. Washington, DC: National Academy Press.

Bongaarts, J. and G. Feeney, (1998). On the quantum and tempo of fertility, in Population and Development Review, 24: 271-291.

Booth, H., Pennec, S. and Hyndman, R. (2009). Stochastic population forecasting using functional data methods: The case of France. Presented at the annual meeting of the International Union for the Scientific Study of Population, Marrakech, Morocco.

Booth H., Maindonald J. and Smith L., (2002), Applying Lee-Carter under Conditions of Variable Mortality Decline. in Population Studies, 56: 325-336

Bourdieu, P. (1996). On the family as a realized category. Theory, Culture and Society 13(3): 19-26

Bozik, J. E. and Bell, W. R., (1987). Forecasting age-specific fertility using principal components. Proceedings of the American Statistical Association, Social Statistics Section. San Francisco, California, pp. 396–401

Brass, W. (1991). Cohort and time period measures of quantum fertility: Concepts and methodology. Life histories and generations. University of Utrecht, ISOR, pp. 455-476.

Bratti, M. (2003). Labour force participation and marital fertility of Italian women: The role of education. Journal of Population Economics, 16: 525-554.

Brewster, K. L. and Rindfuss, R. R. (2000). Fertility and women's employment in industrialized nations. Annual Review of Sociology, 26: 271-296.

Brostrom, G. (2012). Event History Analysis with R. Chapman & Hall/CRC the R series. Chapman & Hall/CRC Press, Boca Raton, FL,

Buchmann, M. (1989). The Script of Life in Modern Society: Entry into Adulthood in a Changing World. Chicago: Univ. Chicago Press. 249 pp.

Butz,W.P. and Ward, M.P., (1979a). The emergence of countercyclical U.S. fertility. In The American Economic Review 69(3): 318-328.

Butz,W.P. and Ward, M.P., (1979b). Will US fertility remain low? A new economic interpretation. In Population and Development Review 5(4): 663-688.

Caldwell, J. (1980). Mass education as a determinant of the timing of fertility decline. in Population and Development Review, *6*(2), 225–255. Retrieved from http://www.jstor.org/stable/10.2307/1972729

Camarda, C.G. (2008). Smoothing methods for the analysis of mortality development. Doctoral Thesis: Universidad Carlos III de Madrid, Department of Statistics.

Campbell, M. and Robards, J. (2014). Comparing changing age-specific fertility across the United Kingdom using Lexis diagrams. ESRC Center of Population Changes (CPC)

Castro Martin T. (1992). Delayed childbearing in contemporary Spain: trends and differentials. European Journal of Population 8: 217-246.

Chesnais, J-C. (1996). Fertility, family and social policy in contemporary Western Europe, Population and Development Review, 22(4): 729-739

Chiang, C. (1984), The life table and its applications, Robert E. Krieger Publishing Company, INC.

Cramer, J. (1992). Fertility and Female Employment: problems of causal direction. In American Sociological Review, Vol. 45: 167-190.

Cunha, V. (2002). O Filho Único na Sociedade Portuguesa Contemporânea: descendência ideal ou descendência possível? Colóquio Internacional «Família, Género e Sexualidade nas Sociedades Contemporâneas», Lisboa.

Cunha, V. (2004). A Fecundidade das Famílias. In Wall, Karin (Eds.), Famílias em Portugal - Percursos, Interacções, Redes Sociais (pp. 395-464). Lisboa: Imprensa de Ciências Sociais

De Beer, J. (2011). Transparency in population forecasting: Methods for fitting and projecting fertility, mortality and migration. Doctoral Thesis, Amsterdam: Amsterdam University Press.

De Beer, J. (1992). Methods of fertility projections and forecasts. National population forecasting in industrialized countries. Amsterdam: Swets & Zeitlinger: 27-59.

Demeny, P. (1986). Population and the invisible hand. Demography 23: 473-487.

Domínguez-Folgueras, M. and Castro-Martín, T. (2008). Women's changing socioeconomic position and union formation in Spain and Portugal. In Demographic Research, 19: 1513–1550.

Duncan S., and Smith, D.P., (2006). Individualisation versus the geography of "new" families. Families & Social Capital ESRC Research Group. London South Bank University.

Easterlin, R.A. (1976). The conflict between aspirations and resources. In Population and Development Review 2(3-4): 417-425.

Ehmer, J., Ehrhardt J. and Kohli M. (2011). Fertility in the History of the 20th Century: Trend, Theories, Policies, Discouses. Historical Social Research, Vol.36.

Ellingsæter, A. L. and Pedersen, E. (2012). Economic risk, fertility and the welfare state : understanding individual rationales. Paper presented in EPC (European population conference) in Stockholm (Sweden).

Eryurt, M.A. and Koc, I., (2012). Internal Migration and Fertility in Turkey: Kaplan-Meier Survival Analysis. International Journal of Population Research, Volume 2012.

Esping-Andersen, G. (1999) Social Foundations of Postindustrial Economies. Oxford: Oxford University Press.

Esping-Andersen, G. (1990). The three worlds of welfare capitalism. Oxford:Polity Press.

Fahlén, S. (2013). Capabilities and Childbearing Intentions in Europe. European Societies, 15(5): 639-662.

Feeney. G. (1983), Population dynamics based on birth intervals and parity progression. Population Studies, Vol. 37, No. 1: 75-89.

Fokkema, T., de Valk, H., de Beer, J. and Van Duin, C. (2008). The Netherlands: Childbearing within the context of a "Poldermodel" society. Demographic Research, 19: 743–794.

Frejka, T. (2010). Cohort overlays of evolving childbearing patterns: How postponement and recuperation are reflected in period fertility trends. MPIDR Working paper 2010-026.

Frejka, T. (2008). Parity distribution and completed fertility size in Europe: Incipient decline of two-child family model?. Demographic Research, 19(4): 47-72.

Frejka T. and Zakharov S. (2012): Comprehensive analyses of fertility trends in the Russian Federation during the past half century. MPIDR Working Paper 2012-27.

Frejka, T. and Calot. G. (2001). Cohort reproductive patterns in low fertility countries. Population and Development Review 27 (1): 103-132.

Frejka, T. and Sardon J-P. (2007). Cohort birth order, parity progression ratio and parity distribution trends in developed countries. Demographic Research, 16(11): 315-374.

Frejka, T., and Sardon, J-P. (2004). Childbearing trends and prospects in low-fertility countries: A cohort analysis. European Studies of Population, Vol. 13.

Gaspar, M. O. (2013). The Modernisation Process Through the Perceptions of Work–Family in Spain and Great Britain. European Societies, 15(5): 707–728.

Gauthier, A. H. (2007). The impact of family policies on fertility in industrialized countries: A review of the literature. Population Research and Policy Review 26(3): 323-346.

George, M. V., Smith, S.K., Swanson, D.A. and Tayman, F., (2004). Population Projections. The Methods and Materials of Demography, 2nd Edition. San Diego/Amsterdam, Academic Press/Elsevier.

Guerreiro, M. D. (2014), Family Policies in Portugal. Mihaela Robila (ed.), Handbook of Family Policies Across the Globe, New York, NY: Springer New York, pp. 195-210

Giddens, A. (1991). Modernity and Self-identity: Self and Society in the Late Modern Age. Cambridge: Blackwell

Goldstein, J. R. (2008). Found in translation? A cohort perspective on tempo-adjusted life expectancy. Demographic Research, Volume 14, Article 5: 71-84.

Goldstein, J.R. and Cassidy, T. (2014). A Cohort Model of fertility postponement. Demography 51: 1791-1819.

Goldstein, J. R., Kreyenfeld, M. (2011), Jasilioniene, A. and Orsal, D.K. (2013). Fertility reactions to the Great Recession in Europe: Recent evidence from order-specific data. Demographic Research, Volume 29, Article 4: 85-104.

Goldstein, J. R. and Kreyenfeld, M. (2011). Has East Germany overtaken West Germany? Recent trends in order-specific fertility. Population and Development Review, 37(3): 453–72.

Goldstein, J. R., Rößger, F., Jaschinski, I. and Prskawetz, A. (2011). Fertility forecasting in the German speaking world. Comparative Population Studies 36, 2-3: 661-692.

Goldstein, J. R., Sobotka T., and Jasilioniene A. (2009). The end of lowest-low fertility?. Population and Development Review 35(4): 663-700.

González, M-J. and Jurado-Guerrero, T. (2006). Remaining childless in affluent economies: a comparison of France, West Germany, Italy and Spain, 1994–2001. In European Journal of Population, 22(4): 317–352.

Gustafsson, S. (2001). Optimal age at motherhood. Theoretical and empirical considerations on postponement of maternity in Europe. Journal of Population Economics 14(2): 225-247.

Grant, J., Hoorens, S., et al. (2004). Low Fertility and Population Ageing: Causes, Consequences and Policy Options. MG205, Santa Monica, Calif.: RAND.

Henry, L. (1951). Étude statistique de l'espa§cement des naissances. Population 6(3): 425-444.

Hoem J.L. and Jalovaara M. (2013). Recent fertility patterns of Finnish women by union status: A descriptive account. Demographic Research, Volume 28, Article 14: 409-420.

Hoem, J., Neyer, G. and Andersson, G. (2006). Education and childlessness: The relationship between educational field, educational level, and childlessness among Swedish women born in 1955–59. Demographic Research 14(15): 331–380.

Human Fertility Database. Max Planck Institute for Demographic Research (Germany) and Vienna Institute of Demography (Austria). Available at www.humanfertility.org (data downloaded on [From September 2012 updated several times until February 2015])

Human Fertility Database method protocol Max Planck Institute for Demographic Research (Germany) and Vienna Institute of Demography (Austria). Available at www.humanfertility.org

Hyndman, R. J. and Booth, H. (2008). Stochastic population forecasts using functional data models for mortality, fertility and migration. International Journal of Forecasting, 24: 323–342

Hyndman, R. J. and M. S. Ullah. (2007). Robust forecasting of mortality and fertility rates: a functional data approach. Computational Statistics and Data Analysis 51(10).

Kamerman, S. and Kahn, A. (1978). Family Policy: Government and Families in fourteen countries. New York: Columbia University Press.

Kane, J. B. (2013). A Closer Look at the Second Demographic Transition in the U.S.: Evidence of Bidirectionality from a Cohort Perspective (1982-2006). Population Research and Policy Review, 32(1): 47–80.

Kaneko R., Ishikawa A., Ishii F., T. Sasai, Iwasawa M., Mita F., and Moriizumi. R., (2008). Population projections for Japan: 2006-2055. Outline of results, methods, and assumptions. In The Japanese Journal of Population 6(1): 76-114.

Kantorová, V. (2004). Family life transitions of young women in a changing society: first union formation and birth of first child in the Czech Republic, 1970-1997. Doctoral Thesis, Universite de Paris I – Sorbonne and Universite Charles de Prague.

Kertzer, D. I., White, M.J, Bernardi, L. and Gabirelli, G., (2009). Italy's path to very low fertility: the adequacy of Economic and Second Demographic Transition theories. European Journal of Population, 25: 89-115.

Kohler, H-P, Billari F. and Ortega J. (2005). Low and Lowest-Low Fertility in Europe: Causes, Implications and Policy options. F. R. Harris (Ed.), The Baby Bust: Who will do the Work? Who Will Pay the Taxes? Lanham, MD: Rowman & Littlefield Publishers, 48-109.

Kohler, H-P. and Ortega, J. A. (2004). Old Insights and New Approaches: Fertility Analysis and Tempo Adjustment in the Age-Parity Model. Vienna Yearbook of Population Research, 1: 57–90.

Kohler, H-P., Billari, F. C. and J. A. Ortega (2002). The emergence of lowest-low fertility in Europe during the 1990s. Population and Development Review 28(4): 641–681.

Kohler, H-P. and Ortega, J.A., (2002). Tempo-Adjusted Period Parity Progression Measures, Fertility Postponement and Completed Cohort Fertility. Demographic Research, 6: 91–144.

Kohler, H-P., Philipov, D. (2001). Variance effects in the Bongaarts-Feeney formula. Demography 38(1): 1-16.

Kravdal, O. (2007). Effects of current education on second- and third-birth rates among Norwegian women and men born 1964: Substantive interpretations and methodological issues, Demographic Research Vol 17, Article 9: 211–246.

Kravdal, O. and Rindfuss, R.R, (2008). Changing relationship between education and fertility – a study of women and men born 1940-64. American Sociological Review 73: 854-873.

Kreyenfeld, M. (2010) Uncertainties in female employment careers and the postponement of parenthood in Germany. In European Sociological Review 26

Kreyenfeld M., (2004). Fertility decisions in the FRG and GDR. Demographic Research (Special Collection) 3: 276-318.

Kreyenfeld, M. (2002). Time-squeeze, partner effect of self-selection? An investigation into the positive effect of women's education on second birth risk in West Germany. Demographic Research, Volume 7, article 2: 15-48.

Kreyenfeld, M., Andersson, G. and Pailhé, A. (2012). Economic Uncertainty and Family Dynamics in Europe. MPIDR Working Paper, 49.

Lappegard, T. e Ronsen, M., (2005). The Multifaceted impact of education on entry into motherhood. European Journal of population, Vol.21, nº1: 31-49.

Lee, R. D. (1993). Modeling and forecasting the time series of U.S. fertility: age distribution, range, and ultimate level. In International Journal of Forecasting 9: 187–202.

Lee, R. D., (1990). The demographic response to economic crisis in historical and contemporary populations. Population Bulletin of the United Nations 1990 (29):1-15.

Lee, R. D. and Miller, T. (2001). Evaluating the performance of the Lee-Carter method for forecasting mortality. Demography 38(4): 537-549.

Lee, R. D. and Mason, A., (2010). Fertility, Human capital, and economic growth over the demographic transition. European Journal of population, 26: 159-182.

Lee, R.D. and Carter, L.R. (1992). Modeling and forecasting U.S. Mortality. Journal of the American Statistical Association 87(419): 659-671.

Lesthaeghe, R. (2001). Postponement and recuperation: Recent fertility trends and forecasts in six Western European countries. Paper presented at the IUSSP Seminar International perspectives on low fertility: Trends, theories and policies, Tokyo, 21-23 March 2001.

Lesthaeghe, R. and Willems., P. (1999). Is low fertility a temporary phenomenon in the European Union?. Population and Development Review 25(2): 211-228.

Lesthaeghe, R. and Surkyn., J. (1988). Cultural dynamics and economic theories of fertility change. Population and Development Review 14 (1): 1-45.

Lesthaeghe, R. and van de Kaa., D. (1986). Twee demografische transities? In Groei en Krimp, Mens en Maatschappij, Deventer: 9–24.

Liefbroer, A. and Corijin, M. (1999). Who, what, and when? Specifying the impact of educational attainment and labour force participation on family formation, European Journal of Population 15: 45–75.

Luci, A. and Thévenon, O., (2010). Does economic development drive the fertility rebound in OECD countries?. paper presented in EPC (European population conference) in Vienna (Austria).

Lutz, W. and Skirbekk, V. (2005) Policies addressing the tempo effect in low-fertility countries. Population and Development Review *31(4): 699-720*.

Magalhães, M. G., (2013). Migrações e fecundidade: o papel dos fluxos migratórios na previsão de fecundidade. Doctoral Thesis. Universidade de Évora.

Martin, S.P., (2006). Trends in marital dissolution by women's education in the United States. in Demographic Research, Volume 15, Article 20: 537-560.

Martín-García, T. and Baizan, P. (2006). The Impact of the Type of Education and of Educational Enrolment on First Births. European Sociological Review 22 (3): 259-276.

Mayer, K. and Schulze, E., (2013). Delaying Parenthood in East and West Germany: A Mixed-Methods Study of the Onset of Childbirth and the Vocabulary of Motives of Women of the Birth Cohort of 1971. The Demography of Europe. New York Springer.

McDonald, P. (2000). The "toolbox" of public policies to impact on fertility – a global view. Paper presented at Low Fertility, Families and Public Policies, Annual Seminar of the European Observatory on Family Matters.

Mendes, M.F. and Tomé, L.P. (2014a). Natalidade, Nupcialidade e Divorcialidade em Portugal. In Dinâmicas demográficas e envelhecimento da populace portuguesa, 1950-2011 Evoluação e Perspectivas. Direcção Mário Leston Bandeira. Estudos da Fundação Francisco Manuel dos Santos, pp. 169-225.

Mendes, M.F. and Tomé, L.P. (2014b). Projecções: Resultados e Interpretação. In Dinâmicas demográficas e envelhecimento da populace portuguesa, 1950-2011 Evoluação e Perspectivas. Direcção Mário Leston Bandeira. Estudos da Fundação Francisco Manuel dos Santos, pp 451-490.

Mendes, M. and Rego, C. (2006). Baixa fecundidade nos países do Sul da Europa: a importância das desigualdades na educação e na participação no mercado de trabalho, ao nível regional. Estudo em elaboração no âmbito do projecto Fertility in Portugal: a macro/micro economic perspective, financiado pela Fundação para a Ciência e Tecnologia. http://www.cidehus.uevora.pt/textos/artigos/baixa_fecundidade.pdf

Micheli G. and Bernardi L. (2012). Two theoretical interpretations of the dissonance fertility intentions and behaviour. in MPIDR Working paper, WP 2003-009.

Mills, M. (2011).Introducing Survival and Event History Analysis. (in R)Thousand Oaks, CA/London: Sage. (279 pages).

Morgan, S. P. and Taylor, M. G. (2006). Low Fertility at the Turn of the Twenty-First Century. Annual Review of Sociology, 32: 375–399.

Morgan, S. P. and Hagewen, K. J. (2005). Fertility. Handbooks of Sociology and Social Research, pp. 229–249.

Muggeo, V. (2003). Estimating regression models with unknown break-points. Statistics in Medicine 22: 3055-3071.

Myers, G. C. and Gibson, J. R. (1961). Cohort disaggregation analysis of fertility data from a sample survey. Demography, Vol.6, nº1: 17-26.

Mynarska, M. (2009). Individual Fertility Choices in Poland. Doctoral Thesis. Rostock University.

Myrskylä, M., Goldstein, J. R. and Cheng, Y. A. (2013). New Cohort Fertility Forecasts for the Developed World : Rises , Falls , and Reversals. Population and Development Review 39: 31–56.

Neave, G. and Amaral, A. (2012). Introduction. On Exceptionalism: The Nation, a Generation and Higher Education, Portugal 1974–2009. In G. Neave & A. Amaral (Eds.), Higher Education in Portugal 1974-2009 (pp. 1–46). Dordrecht: Springer Netherlands.

Neels, K. (2010). Economic context and fertility outcomes. Exploring educational differentials in postponement and recuperation of first births in Belgium, France, and the Netherlands. Paper presented at the European Population Conference, Vienna.

Neyer, G. and Andersson, G. (2008). Consequences of family policies on childbearing behavior: effects or artifacts?. Population and Development Review. 34: 699-724.

Neyer, G. and Andersson, G. (2004). Contemporary Research on European Fertility: Introduction. Demographic Research, Special Collection 3, Article 1: 1-14.

Ní Bhrolcháin, M. (1996). Time period versus generation: how should trends in fertility be measured. Journal of the Statistical and Social Inquiry Society of Ireland, Vol. XXVII: 235-290

Ní Bhrolcháin, M. (1992). Period paramount? A critique of the cohort approach to fertility. Population and Development Review, 18(4): 599–629.

Ní Bhrolcháin, M. and Beaujouan, E. (2012). Fertility postponement is largely due to rising education enrolment. Population Studies: A Journal of demography, Vol.66, nº3: 311-327.

OECD Glossary of Statistical Terms (2002), accessed March 15, 2015 https://stats.oecd.org/glossary/detail.asp?ID=1163

OECD Life Index - http://www.oecdbetterlifeindex.org/topics/education/ accessed March 15, 2015

OECD Online Employment database (2015), accessed March 15, 2015 http://www.oecd.org/employment/emp/onlineoecdemploymentdatabase.htm

Oliveira, I. T. (2009). Fertility differentials and educational attainment in Portugal: A non-linear relationship. Canadian Studies in Population 36(3–4): 347–362.

Oliveira, I. T. (2007). A transição da fecundidade e o sistema de respostas múltiplas em Portugal. Análise Social, 183: 471 - 484.

Ortega, J. A. and Kohler, H. P. (2002). Measuring low fertility: Rethinking demographic methods. Hommage à Gérad Calot – Profession: Démographe pp. 141–181.

Okun, B., (2013). Fertility and marriage behaviour in Israel: Diversity, change and stability. Demographic Research, Volume 28, Article 17: 457-504.

Ozcan B., Mayer, K. U. and Luedicke, J.J. (2010). The impact of unemployment on the transition to parenthood. Demographic Research, Volume 23, article 29: 807-846.

Pereira, Á. S. and Lains, P. (2012). From an Agrarian Society to a Knowledge Economy? The Rising Importance of Education to the Portuguese Economy, 1950–2009. In G. Neave & A. Amaral (Eds.), Higher Education in Portugal 1974–2009: A Nation, a Generation. Dordrecht: Springer Netherlands.

Preston, S.H. Heuveline, P. and Guillot, M., (2001). Demography: Measuring and Modeling Population Processes, Oxford: Blackwell Publishers Ltd.

Prskawetz, A., Sobotka, T., Buber, I., Gisser, R. and Engelhardt, H. (2008). Austria: persistent low fertility since the mid-1980s. T. Frejka et al. (Eds.), Childbearing trends and policies in Europe. Demographic Research, Special collection 7, (Vol. 19): 293-360.

Prskawetz, A., Mamolo, M. and Engelhardt, H. (2009). On the Relation Between Fertility, Natality, and Nuptiality. European Sociological Review, 26(6): 675–689.

Rallu, L. and L. Toulemon. (1994). Period fertility measures. The construction of different indices and their application to France, 1946-89. Population: An English Selection, Vol. 6: 59-93.

Ramsay, J. O. and Silverman, B.W. (2005). Functional data analysis, 2nd Edition. Springer-Verlag, New York.

Reher, D. (2011). Economic and social implications of the demographic transition. Population and Development Review, 7: 11–33.

Riffe, T. (2012).Net Total fertility. In Demoblogs. Available at: https://sites.google.com/site/timriffepersonal/DemogBlog/nettotalfertility

Rindfuss, R. R., Bumpass, L. and St John, C. (1980). Education and fertility: implications for the roles women occupy, American Sociological Review 45(3): 431-447.

Rindfuss, R.R., Guilkey, D., Morgan, S.P. and Kravdal, O. (2010) Child-Care Availability and fertility in Norway. Population and Development Review 36(4): 725-748.

Rodriguez, G. (2006). Demographic translation and tempo effects: An accelerated failure time perspective. Demographic Research 14(6): 85-110.

Rowland, D. (2003). Demographic Methods and concepts. Oxford. Oxford University Press.

Rydell, I. (2002). Demographic patterns from the 1960s in France, Italy, Spain and Portugal. Presented at Semninar at institute for Future Studies.

Ryder, N. (1964). The process of demographic translation. Demography 1

Royo, S. (2010). Portugal and Spain in the EU:Paths of economic divergence (2000-2007). Análise Social, vol. XLV (195): 209-254

Schmertmann, C.; Zagheni, E.; Goldstein, J. and Myrskylä, M. (2014). Bayesian forecasting of cohort fertility. Journal of the American Statistical Association 109, 506: 500-513.

Shanahan, M. J. (2000). Pathaways to adulthood in chanching societies: Variability and Mechanisms in Life Course Perspective. Annual Review of Sociology, 26: 667–692.

Sobotka, T. (2015). Low fertility in Austria and the Czech republic: gradual policy adjustments. Viena Institute of Demography Working Papers 2/2015.

Sobotka, T. (2012). Fertility in Austria, Germany and Switzerland: is there a common pattern?. Comparative Population Studies, Vo.36: 236-304.

Sobotka T. (2004), Postponement of childbearing and low fertility in Europe. Doctoral thesis, University of Groningen. Dutch University Press, Amsterdam.

Sobotka, T. (2003). Tempo-Quantum and Period-Cohort Interplay in Fertility Changes in Europe. Evidence from the Czech Republic, Italy , the Netherlands and Sweden. Demographic Research Vol. 8, Article 6: 151-214.

Sobotka T. and Beaujouan É., (2014). Two is best? The persistence of a two-child family ideal in Europe. Population and Development Review 40 (3): 391-419.

Sobotka, T., Zeman K., Lesthaeghe R. and Frejka T., (2012). Postponement and recuperation in cohort fertility: New methods and their application to European countries and the United States. Vienna Institute of Demography European Demographic Research Papers.

Sobotka, T., Skirbekk, V. and Philipov, D. (2011). Economic recession and fertility in the developed world. In Population and Development Review, 37(2): 267–306.

Sobotka, T., Skirbekk., V. and Philipov, D. (2009). Economic recession and fertility in the developed world: A literature review. Research note produced for the European Commission (Demography Network of the European Observatory on the Social Situation and Demography).

Spéder, Z. and Kamarás, F. (2008). Hungary: Secular fertility decline with distinct period fluctuations. Demographic Research, Vol. 19, Article 18: 599–664.

Surkyn, J. and Lesthaeghe, R. (2004). Value Orientations and the Second Demographic Transition (SDT) in Northern , Western and Southern Europe: an update. Demographic Research, special collection 3, Article 3: 47-86.

Tavares, L., (2010). Who delays childbearing? The relationships between fertility, education and personality traits. ISER Working Paper series.

Tavora, I. (2012). The southern European social model: familialism and the high rates of female employment in Portugal. Journal of European Social Policy, 22(1): 63–76.

Tesching, K. (2012). Education and Fertility: Dynamic Interrelations Between Women's Educational Level, Educational Field and Fertility in Sweden. Stockholm University Demography Unit - Dissertation series 6.

Testa, M. R and Basten, S. (2014). Certainty of meeting fertility intentions declines in Europe during the "Great Recession". Demographic Research, Volume 31, Article 23: 687-734.

Tomé, L.P., Ribeiro, F. and Mendes, M.F. (2014). Ageing alone? The future of the Portuguese Population in discussion. In proceedings of the six Eurostat/UNECE Work Session in Demographic Projections. Rome Italy, pp. 287-298.

van Bavel, J. (2006). The effect of fertility limitation on intergenerational social mobility: The quality-quantity trade-off during the demographic transition. Journal of Biosocial Science 38(4): 553–569.

van Bavel, J. Kok, I., (2004). Birth spacing in the Netherlands. The effects of family composition, occupation and religion on births intervals, 1820-1885, European Journal of Population 20: 119-140.
van de Kaa, D. J., (2002). The Idea of a Second Demographic Transition in Industrialized Countries. in Sixth Welfare Policy Seminar, Tokyo: National Institute of Population and Social security.
van de Kaa, D. J., (1987). Europe's second demographic transition. Population Bulletin 42, 1. Washington, DC: Population Reference Bureau.
Wall, K. (2004). Developments in family policy in Portugal in 2003. European Observatory on the Social Situation, Demography and the Family, Lisboa: ICS
Willekens, F. (2006). Multistate model for biographic analysis and projection. Woking paper NIDI nº 2007/1.
Willekens F. (2014). Multistate analysis of Life history with R. Springer Serie Book: Use R!, New York Springer.
Wood, J., Neels, K. and Kil, T. (2014). The educational gradient of childlessness and cohort parity progression in 14 low fertility countries. Demographic Research, Volume 31, Article 46: 1365-1416.
Yavuz, S. 2008. Fertility Decline in Turkey from the 1980s Onwards: Patterns by Main Language Groups. Ankara: HUIPS. Doctoral Thesis. Hacettepe University Institute of Population Studies.
Zhang L. (2008). Male Fertility Patterns and Determinants. Springer Series on Demographic Methods and Population Analysis 27. Nova York, Springer.
Zeng Yi ,Land, K. C. (2002). Adjusting period tempo changes with an extension of Ryder's basic translation equation. Demography, 39(2): 269–285.
Zeng, Y., Vaupel, J. W., and Yashin, A.,I., (1985). Marriage and fertility in China: a graphical analysis. Population and Development Review, No. 4: 721-736.

APPENDIX

Appendix A

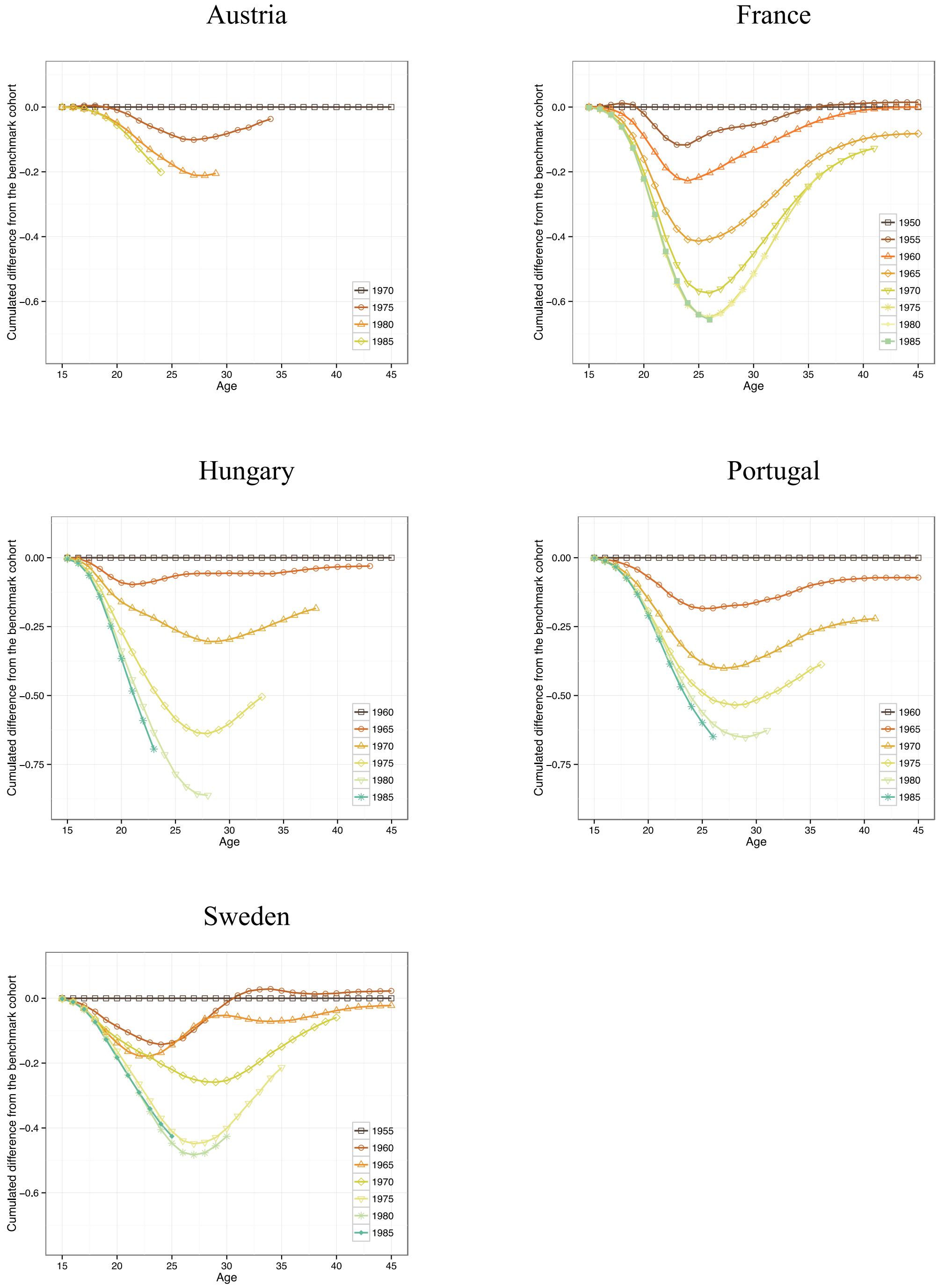
To Chapter 2 - A retrospective overview of period and cohort fertility patterns: Evidence of six European countries

Table A.1: Cohort total fertility rate (CTFR) and Cohort mean age at childbearing (MAC) evolution for selected countries

	Austria		France		Hungary		Portugal		Sweden	
	CTFR	**CMAC**	**CTFR**	**CMAC**	**CTFR**	**CMAC**	**CTFR**	**CMAC**	**CTFR**	**CMAC**
1940	2.13	25.85	2.42	26.28	1.92	25.26	2.66	27.52	2.05	26.23
1941	2.07	25.68	2.37	26.05	1.93	25.28	2.61	27.32	2.03	26.19
1942	2.04	25.58	2.31	25.93	1.90	25.31	2.55	27.15	2.00	26.21
1943	1.98	25.37	2.29	25.83	1.92	25.31	2.53	27.04	1.99	26.18
1944	1.95	25.19	2.27	25.79	1.92	25.25	2.50	26.93	1.99	26.17
1945	1.94	25.07	2.23	25.76	1.91	25.23	2.41	26.84	1.97	26.18
1946	1.99	24.95	2.17	25.80	1.91	25.18	2.35	26.75	1.99	26.25
1947	1.93	24.95	2.14	25.93	1.93	25.07	2.26	26.59	2.00	26.36
1948	1.92	25.00	2.12	26.04	1.95	24.97	2.20	26.60	1.99	26.48
1949	1.91	25.09	2.11	26.11	1.97	24.90	2.13	26.53	2.00	26.66
1950	1.86	25.20	2.12	26.27	1.96	24.84	2.09	26.51	2.01	26.86
1951	1.84	25.25	2.11	26.35	1.97	24.82	2.07	26.44	2.00	27.05
1952	1.81	25.42	2.12	26.48	1.96	24.83	2.06	26.35	2.01	27.22
1953	1.82	25.48	2.12	26.59	1.93	24.88	2.04	26.20	2.03	27.41
1954	1.78	25.55	2.12	26.70	1.94	24.82	2.03	26.05	2.02	27.57
1955	1.77	25.68	2.13	26.77	1.95	24.81	2.04	25.91	2.04	27.72
1956	1.75	25.78	2.14	26.87	1.97	24.80	2.03	25.86	2.04	27.87
1957	1.73	25.96	2.14	26.98	2.02	24.80	1.99	25.81	2.05	28.07
1958	1.71	26.13	2.14	27.10	2.02	24.85	1.99	25.91	2.06	28.18
1959	1.71	26.23	2.12	27.26	2.03	24.86	1.95	26.04	2.05	28.31
1960	1.70	26.32	2.12	27.39	2.02	24.90	1.91	26.22	2.06	28.32
1961	1.68	26.46	2.09	27.56	2.04	24.99	1.88	26.45	2.03	28.38
1962	1.68	26.55	2.08	27.72	2.04	25.06	1.90	26.59	2.04	28.40
1963	1.67	26.73	2.07	27.94	2.02	25.12	1.85	26.81	2.03	28.41
1964	1.65	26.90	2.05	28.14	2.00	25.20	1.84	26.91	2.01	28.47
1965	1.65	27.13	2.04	28.34	1.99	25.31	1.84	27.13	2.01	28.51
1966	1.64	27.27	2.02	28.52	-	25.43	1.82	27.24	2.00	28.63
1967	-	27.48	2.01	28.68	-	25.56	1.80	27.44	1.99	28.68
1968	-	27.62	2.01	28.81	-	25.72	1.75	27.63	-	28.86

Source: Human Fertility Database. Own elaboration.

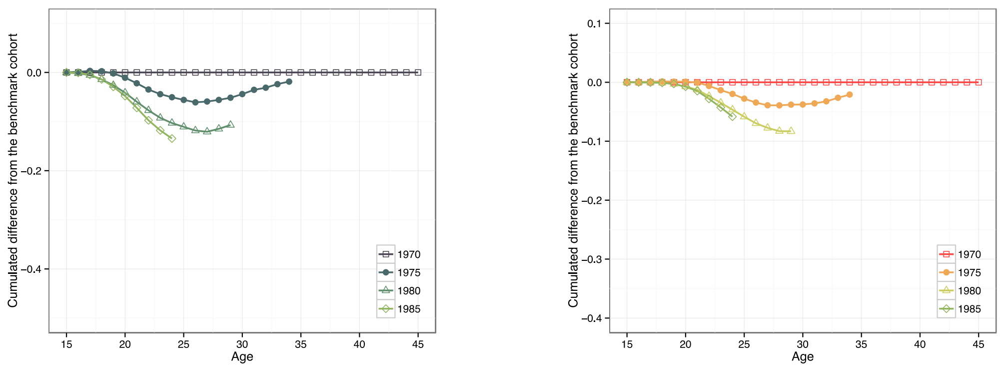
Figure A.1: Cumulative change total birth progression by age, birth cohorts, in Austria, France, Hungary, Portugal and Sweden.



Source: Human Fertility Database. Own elaboration.

Figure A.2: Cumulative change in first (a) and second (b) birth progression by age, birth cohorts 1970, 1975, 1980 and 1985 in Austria (benchmark cohort 1970)

(a) (b)



Source: Human Fertility Database. Own elaboration.

Table A.2: Cumulative change in total childbearing progression by age, birth cohorts 1955, 1960, 1965, 1970, 1975,1980 and 1985 in Austria (benchmark cohort 1955)

Age	1950	1955	1960	1965	1970	1975
15	0.00238	0.00024	-0.00019	-0.00063	-0.00110	-0.00133
16	0.01137	0.00150	-0.00110	-0.00412	-0.00626	-0.00684
17	0.03572	0.00693	-0.00600	-0.01535	-0.02198	-0.02382
18	0.08749	0.01239	-0.02010	-0.04186	-0.05580	-0.06102
19	0.17784	0.00737	-0.04620	-0.08885	-0.11454	-0.12650
20	0.30912	-0.02075	-0.08953	-0.16046	-0.20095	-0.22380
21	0.46747	-0.05894	-0.13909	-0.24184	-0.30034	-0.33718
22	0.64073	-0.09558	-0.18769	-0.32124	-0.40382	-0.45344
23	0.80599	-0.11634	-0.21787	-0.37630	-0.48633	-0.54648
24	0.96345	-0.11688	-0.22804	-0.40847	-0.54373	-0.61111
25	1.10647	-0.09812	-0.21745	-0.41396	-0.56836	-0.64007
26	1.24363	-0.08103	-0.20287	-0.40758	-0.57422	-0.64849
27	1.37156	-0.07080	-0.18584	-0.39735	-0.56115	-0.63521
28	1.48655	-0.06388	-0.16556	-0.37913	-0.53172	-0.60394
29	1.59420	-0.05960	-0.14854	-0.35646	-0.49358	-0.56260
30	1.69188	-0.05487	-0.13357	-0.32933	-0.45256	-0.51441
31	1.77490	-0.04840	-0.11864	-0.30012	-0.40982	-0.45966
32	1.84170	-0.03733	-0.10203	-0.26755	-0.36502	-0.40101
33	1.89577	-0.02385	-0.08478	-0.23359	-0.32084	-0.34422
34	1.94347	-0.01288	-0.06933	-0.20219	-0.28094	-0.29298
35	1.98412	-0.00393	-0.05421	-0.17462	-0.24418	-0.24636
36	2.01787	0.00196	-0.04149	-0.15228	-0.21215	-0.20813
37	2.04534	0.00583	-0.03129	-0.13409	-0.18659	—
38	2.06731	0.00785	-0.02281	-0.12023	-0.16603	—
39	2.08420	0.00988	-0.01529	-0.10832	-0.14918	—
40	2.09650	0.01169	-0.00969	-0.09854	-0.13634	—
41	2.10480	0.01298	-0.00557	-0.09164	-0.12719	—
42	2.11011	0.01379	-0.00300	-0.08728	—	—
43	2.11312	0.01446	-0.00115	-0.08435	—	—
44	2.11477	0.01484	-0.00012	-0.08274	—	—
45	2.11571	0.01482	0.00028	-0.08200	—	—

Table A.3: Cumulative change in total, first and second birth progression by age, birth cohorts 1970, 1975, 1980 and 1985 in Austria (benchmark cohort 1970)

	Total				1º Child				2º Child			
Age	**1970**	**1975**	**1980**	**1985**	**1970**	**1975**	**1980**	**1985**	**1970**	**1975**	**1980**	**1985**
15	0.00149	0.00038	-0.00036	-0.00010	0.00138	0.00040	-0.00030	-0.00002	0.00011	-0.00002	-0.00007	-0.00009
16	0.00730	0.00161	-0.00169	-0.00084	0.00700	0.00123	-0.00172	-0.00066	0.00029	0.00034	0.00001	-0.00018
17	0.02203	0.00441	-0.00567	-0.00534	0.02089	0.00327	-0.00551	-0.00486	0.00107	0.00105	-0.00019	-0.00042
18	0.05096	0.00457	-0.01496	-0.01515	0.04732	0.00268	-0.01417	-0.01413	0.00352	0.00145	-0.00090	-0.00097
19	0.09797	-0.00010	-0.02902	-0.03208	0.08800	-0.00186	-0.02591	-0.02917	0.00943	0.00115	-0.00298	-0.00275
20	0.16138	-0.00929	-0.04889	-0.05583	0.13891	-0.01075	-0.04128	-0.04807	0.02081	0.00097	-0.00722	-0.00751
21	0.23768	-0.02210	-0.07323	-0.08759	0.19531	-0.02198	-0.05964	-0.07200	0.03859	-0.00045	-0.01270	-0.01483
22	0.32717	-0.04161	-0.10319	-0.12843	0.25323	-0.03481	-0.07717	-0.09748	0.06574	-0.00621	-0.02356	-0.02807
23	0.42196	-0.05884	-0.13155	-0.16564	0.30976	-0.04408	-0.09247	-0.11788	0.09801	-0.01342	-0.03484	-0.04265
24	0.52147	-0.07208	-0.15520	-0.20090	0.36412	-0.05045	-0.10296	-0.13454	0.13507	-0.01975	-0.04654	-0.05832
25	0.62502	-0.08664	-0.17701	—	0.41714	-0.05582	-0.11067	—	0.17555	-0.02788	-0.05847	—
26	0.73081	-0.09862	-0.19788	—	0.46961	-0.06077	-0.11833	—	0.21615	-0.03438	-0.06964	—
27	0.83326	-0.10134	-0.21034	—	0.51712	-0.05917	-0.12070	—	0.25778	-0.03906	-0.07735	—
28	0.92905	-0.09723	-0.21164	—	0.55815	-0.05587	-0.11478	—	0.29758	-0.03914	-0.08294	—
29	1.02315	-0.09116	-0.20520	—	0.59713	-0.05148	-0.10711	—	0.33561	-0.03803	-0.08315	—
30	1.11054	-0.08258	—	—	0.63045	-0.04404	—	—	0.37207	-0.03766	—	—
31	1.19209	-0.07122	—	—	0.65998	-0.03549	—	—	0.40639	-0.03570	—	—
32	1.26841	-0.06314	—	—	0.68666	-0.03104	—	—	0.43733	-0.03236	—	—
33	1.33165	-0.04821	—	—	0.70699	-0.02379	—	—	0.46310	-0.02638	—	—
34	1.39126	-0.03672	—	—	0.72520	-0.01865	—	—	0.48728	-0.02086	—	—
35	1.44357	—	—	—	0.74140	—	—	—	0.50685	—	—	—
36	1.48721	—	—	—	0.75469	—	—	—	0.52279	—	—	—
37	1.52457	—	—	—	0.76545	—	—	—	0.53636	—	—	—
38	1.55416	—	—	—	0.77359	—	—	—	0.54673	—	—	—
39	1.57638	—	—	—	0.78034	—	—	—	0.55464	—	—	—
40	—	—	—	—	—	—	—	—	—	—	—	—
41	—	—	—	—	—	—	—	—	—	—	—	—
42	—	—	—	—	—	—	—	—	—	—	—	—
43	—	—	—	—	—	—	—	—	—	—	—	—
44	—	—	—	—	—	—	—	—	—	—	—	—

Source: Human Fertility Database. Own elaboration.

Table A.4: Cumulative change in total, first and second birth progression by age, birth cohorts 1960, 1965, 1970,1975, 1980 and 1985 in Hungary (benchmark cohort 1960)

	Total						1º Child						2º Child					
Age	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	1960	1965	1970	1975	1980	1985
15	0.00953	-0.00065	-0.00034	-0.00279	-0.00349	-0.00432	0.00903	-0.00072	-0.00042	-0.00265	-0.00349	-0.00415	0.00050	0.00006	0.00007	-0.00016	-0.00003	-0.00016
16	0.03727	-0.00259	-0.00744	-0.01503	-0.01725	-0.01978	0.03410	-0.00221	-0.00688	-0.01360	-0.01611	-0.01844	0.00302	-0.00040	-0.00050	-0.00132	-0.00121	-0.00125
17	0.10096	-0.01662	-0.03311	-0.05074	-0.05887	-0.06389	0.08941	-0.01411	-0.02942	-0.04494	-0.05340	-0.05761	0.01091	-0.00265	-0.00359	-0.00555	-0.00553	-0.00594
18	0.20578	-0.04061	-0.07833	-0.10973	-0.13090	-0.14146	0.17532	-0.03297	-0.06587	-0.09293	-0.11396	-0.12387	0.02758	-0.00719	-0.01143	-0.01542	-0.01590	-0.01625
19	0.34720	-0.06964	-0.12693	-0.18744	-0.22970	-0.24821	0.28260	-0.05280	-0.09882	-0.15039	-0.19045	-0.20691	0.05745	-0.01549	-0.02579	-0.03413	-0.03686	-0.03834
20	0.50352	-0.09087	-0.16039	-0.26721	-0.33812	-0.36601	0.38835	-0.05975	-0.11278	-0.20071	-0.26469	-0.28921	0.10033	-0.02788	-0.04280	-0.06056	-0.06817	-0.07106
21	0.66062	-0.09760	-0.18334	-0.34285	-0.44252	-0.48372	0.48431	-0.05590	-0.11922	-0.24309	-0.32740	-0.36231	0.15088	-0.03622	-0.05671	-0.09025	-0.10634	-0.11116
22	0.81391	-0.09327	-0.20165	-0.41421	-0.53921	-0.59103	0.56957	-0.04977	-0.12533	-0.27904	-0.37926	-0.42180	0.20576	-0.03709	-0.06693	-0.12082	-0.14588	-0.15397
23	0.96525	-0.08577	-0.21922	-0.48049	-0.63335	-0.69428	0.64532	-0.04350	-0.13466	-0.30761	-0.42167	-0.47082	0.26683	-0.03642	-0.07752	-0.15470	-0.19202	-0.20220
24	1.11144	-0.07519	-0.24161	-0.53741	-0.71416	—	0.71187	-0.04291	-0.14671	-0.32584	-0.45022	—	0.32990	-0.02974	-0.09073	-0.18966	-0.23761	—
25	1.25284	-0.06553	-0.26227	-0.58530	-0.78538	—	0.76461	-0.03899	-0.14881	-0.32989	-0.46258	—	0.39758	-0.02624	-0.10835	-0.22722	-0.28619	—
26	1.37789	-0.05932	-0.28065	-0.61680	-0.83068	—	0.80275	-0.03441	-0.14495	-0.32065	-0.45556	—	0.46185	-0.02663	-0.12897	-0.26044	-0.32726	—
27	1.49048	-0.05720	-0.29558	-0.63515	-0.85700	—	0.83209	-0.03248	-0.13858	-0.30491	-0.43589	—	0.52077	-0.02945	-0.14666	-0.28591	-0.36070	—
28	1.58753	-0.05692	-0.30449	-0.63807	-0.86229	—	0.85389	-0.03096	-0.12908	-0.28142	-0.40826	—	0.56920	-0.03247	-0.15886	-0.30100	-0.37992	—
29	1.66812	-0.05698	-0.30355	-0.62487	—	—	0.86908	-0.02850	-0.11675	-0.25390	—	—	0.60848	-0.03705	-0.16479	-0.30595	—	—
30	1.73791	-0.05627	-0.29644	-0.60227	—	—	0.88131	-0.02573	-0.10563	-0.22680	—	—	0.63969	-0.03877	-0.16523	-0.30089	—	—
31	1.79481	-0.05745	-0.28554	-0.56999	—	—	0.89008	-0.02332	-0.09456	-0.20123	—	—	0.66346	-0.04075	-0.16159	-0.28765	—	—
32	1.84064	-0.05647	-0.27132	-0.53559	—	—	0.89693	-0.02084	-0.08593	-0.17891	—	—	0.68025	-0.04051	-0.15404	-0.27129	—	—
33	1.88062	-0.05788	-0.25772	-0.50461	—	—	0.90289	-0.01901	-0.07798	-0.16117	—	—	0.69246	-0.03985	-0.14585	-0.25360	—	—
34	1.91360	-0.05798	-0.24101	—	—	—	0.90749	-0.01787	-0.07013	—	—	—	0.70216	-0.03840	-0.13642	—	—	—
35	1.94011	-0.05267	-0.22569	—	—	—	0.91122	-0.01642	-0.06338	—	—	—	0.70942	-0.03581	-0.12906	—	—	—
36	1.96123	-0.04833	-0.20923	—	—	—	0.91451	-0.01604	-0.05764	—	—	—	0.71494	-0.03413	-0.12133	—	—	—
37	1.97721	-0.04304	-0.19505	—	—	—	0.91668	-0.01441	-0.05291	—	—	—	0.71869	-0.03194	-0.11511	—	—	—
38	1.99026	-0.03915	-0.18381	—	—	—	0.91858	-0.01303	-0.04951	—	—	—	0.72168	-0.03058	-0.11005	—	—	—
39	1.99998	-0.03562	—	—	—	—	0.92003	-0.01218	—	—	—	—	0.72338	-0.02922	—	—	—	—
40	2.00790	-0.03309	—	—	—	—	0.92110	-0.01140	—	—	—	—	0.72511	-0.02871	—	—	—	—
41	2.01349	-0.03217	—	—	—	—	0.92181	-0.01123	—	—	—	—	0.72606	-0.02813	—	—	—	—
42	2.01717	-0.03103	—	—	—	—	0.92238	-0.01100	—	—	—	—	0.72655	-0.02759	—	—	—	—
43	2.01912	-0.03033	—	—	—	—	0.92260	-0.01071	—	—	—	—	0.72682	-0.02724	—	—	—	—
44	2.02015	—	—	—	—	—	0.92270	—	—	—	—	—	0.72703	—	—	—	—	—
45	2.02070	—	—	—	—	—	0.92274	—	—	—	—	—	0.72709	—	—	—	—	—

Source: Human Fertility Database. Own elaboration.

Table A.5: Cumulative change in total, first and second birth progression by age, birth cohorts 1960, 1965, 1970, 1975, 1980 and 1985 in Portugal (benchmark cohort 1960)

	Total						1º Child						2º Child					
Age	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	1960	1965	1970	1975	1980	1985
15	0.00614	-0.00044	-0.00153	-0.00192	-0.00201	-0.00162	0.00594	-0.00047	-0.00152	-0.00187	-0.00197	-0.00152	0.00019	0.00003	-0.00001	-0.00004	-0.00002	-0.00009
16	0.02699	-0.00544	-0.01082	-0.01281	-0.01306	-0.01129	0.02547	-0.00491	-0.01007	-0.01192	-0.01221	-0.01040	0.00145	-0.00054	-0.00070	-0.00084	-0.00077	-0.00084
17	0.06903	-0.01336	-0.02897	-0.03411	-0.03575	-0.03357	0.06337	-0.01170	-0.02593	-0.03023	-0.03206	-0.02993	0.00528	-0.00145	-0.00285	-0.00360	-0.00338	-0.00333
18	0.13569	-0.02565	-0.05672	-0.07048	-0.07364	-0.07376	0.11991	-0.02065	-0.04791	-0.05963	-0.06266	-0.06282	0.01447	-0.00455	-0.00809	-0.00987	-0.00998	-0.00983
19	0.22794	-0.04317	-0.09598	-0.12469	-0.12740	-0.13274	0.19357	-0.03322	-0.07601	-0.10047	-0.10280	-0.10843	0.03088	-0.00893	-0.01800	-0.02165	-0.02208	-0.02163
20	0.34260	-0.06970	-0.14902	-0.19313	-0.19863	-0.21022	0.27973	-0.04993	-0.11147	-0.14801	-0.15363	-0.16479	0.05440	-0.01714	-0.03221	-0.03864	-0.03872	-0.03885
21	0.46866	-0.09813	-0.20435	-0.26387	-0.27567	-0.29501	0.36654	-0.06464	-0.14247	-0.19103	-0.20225	-0.22034	0.08584	-0.02802	-0.05163	-0.06032	-0.06097	-0.06196
22	0.60618	-0.13375	-0.26218	-0.34025	-0.36138	-0.38593	0.45544	-0.08254	-0.17194	-0.23311	-0.25245	-0.27474	0.12315	-0.04092	-0.07252	-0.08630	-0.08779	-0.08925
23	0.73983	-0.15996	-0.31283	-0.40612	-0.44032	-0.46839	0.53486	-0.09065	-0.19188	-0.26255	-0.29297	-0.31781	0.16344	-0.05381	-0.09449	-0.11210	-0.11574	-0.11738
24	0.86777	-0.17849	-0.35440	-0.45499	-0.50859	-0.54016	0.60291	-0.08959	-0.20067	-0.27402	-0.31945	-0.34797	0.20618	-0.06605	-0.11601	-0.13677	-0.14417	-0.14609
25	0.98594	-0.18433	-0.38138	-0.48917	-0.56099	-0.59859	0.66126	-0.08148	-0.19967	-0.27550	-0.33299	-0.36724	0.24853	-0.07299	-0.13310	-0.15756	-0.16990	-0.17240
26	1.10023	-0.18359	-0.39679	-0.51777	-0.60355	-0.64941	0.71211	-0.06846	-0.18848	-0.27015	-0.33729	-0.37623	0.29342	-0.07869	-0.14928	-0.17924	-0.19474	-0.20062
27	1.20637	-0.17683	-0.40129	-0.52813	-0.63198	—	0.75620	-0.05473	-0.17395	-0.25329	-0.33100	—	0.33667	-0.07953	-0.15894	-0.19489	-0.21659	—
28	1.30726	-0.17282	-0.39697	-0.53488	-0.64653	—	0.79521	-0.04345	-0.15527	-0.23537	-0.31534	—	0.37992	-0.08142	-0.16457	-0.20814	-0.23493	—
29	1.40221	-0.17071	-0.38785	-0.53149	-0.65249	—	0.82883	-0.03599	-0.13554	-0.21205	-0.29306	—	0.42252	-0.08224	-0.16665	-0.21816	-0.25151	—
30	1.48744	-0.16195	-0.36932	-0.51627	-0.64158	—	0.85555	-0.02721	-0.11352	-0.18459	-0.26286	—	0.46277	-0.07938	-0.16298	-0.22137	-0.26055	—
31	1.56250	-0.15186	-0.35328	-0.49986	-0.62669	—	0.87661	-0.02043	-0.09581	-0.16024	-0.23347	—	0.49834	-0.07327	-0.15793	-0.22011	-0.26408	—
32	1.62929	-0.14406	-0.33408	-0.48250	—	—	0.89419	-0.01632	-0.07979	-0.14098	—	—	0.53062	-0.06744	-0.15027	-0.21496	—	—
33	1.68385	-0.13020	-0.31312	-0.45716	—	—	0.90834	-0.01155	-0.06796	-0.12269	—	—	0.55564	-0.05843	-0.13862	-0.20253	—	—
34	1.73034	-0.11487	-0.29026	-0.43387	—	—	0.91899	-0.00607	-0.05583	-0.10673	—	—	0.57654	-0.04820	-0.12521	-0.19029	—	—
35	1.76983	-0.10039	-0.27069	-0.40646	—	—	0.92808	-0.00119	-0.04709	-0.09286	—	—	0.59300	-0.03804	-0.11242	-0.17389	—	—
36	1.80479	-0.09237	-0.25795	-0.38746	—	—	0.93525	0.00273	-0.04044	-0.08175	—	—	0.60800	-0.03305	-0.10366	-0.16283	—	—
37	1.83208	-0.08490	-0.24647	—	—	—	0.94045	0.00567	-0.03545	—	—	—	0.61957	-0.02896	-0.09666	—	—	—
38	1.85367	-0.07995	-0.23658	—	—	—	0.94499	0.00726	-0.03123	—	—	—	0.62759	-0.02569	-0.09025	—	—	—
39	1.87176	-0.07725	-0.23047	—	—	—	0.94921	0.00805	-0.02892	—	—	—	0.63381	-0.02381	-0.08541	—	—	—
40	1.88489	-0.07465	-0.22422	—	—	—	0.95220	0.00902	-0.02690	—	—	—	0.63843	-0.02264	-0.08168	—	—	—
41	1.89355	-0.07247	-0.22126	—	—	—	0.95400	0.00979	-0.02548	—	—	—	0.64135	-0.02168	-0.08008	—	—	—
42	1.89932	-0.07251	—	—	—	—	0.95540	0.00962	—	—	—	—	0.64301	-0.02136	—	—	—	—
43	1.90317	-0.07229	—	—	—	—	0.95614	0.00986	—	—	—	—	0.64426	-0.02127	—	—	—	—
44	1.90553	-0.07227	—	—	—	—	0.95671	0.00996	—	—	—	—	0.64489	-0.02106	—	—	—	—
45	1.90677	-0.07229	—	—	—	—	0.95697	0.01003	—	—	—	—	0.64524	-0.02097	—	—	—	—

Source: Human Fertility Database. Own elaboration.

Table A.6: Cumulative change in total, first and second birth progression by age, birth cohorts 1955, 1960, 1965, 1970, 1975, 1980 and 1985 in Sweden (benchmark cohort 1955)

	Total							1º Child							2º Child						
Age	**1955**	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	**1955**	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**	**1955**	**1960**	**1965**	**1970**	**1975**	**1980**	**1985**
15	0.00244	-0.00089	-0.00148	-0.00192	-0.00160	-0.00178	-0.00176	0.00242	-0.00087	-0.00149	-0.00190	-0.00160	-0.00176	-0.00176	0.00002	-0.00002	0.00001	-0.00002	0.00000	-0.00002	0.00000
16	0.01465	-0.00714	-0.01098	-0.01164	-0.01113	-0.01193	-0.01176	0.01443	-0.00709	-0.01084	-0.01146	-0.01105	-0.01177	-0.01164	0.00023	-0.00007	-0.00015	-0.00019	-0.00010	-0.00017	-0.00013
17	0.04272	-0.02142	-0.03127	-0.03270	-0.03276	-0.03522	-0.03420	0.04158	-0.02090	-0.03045	-0.03189	-0.03197	-0.03438	-0.03333	0.00116	-0.00057	-0.00086	-0.00084	-0.00084	-0.00086	-0.00089
18	0.09025	-0.04118	-0.06385	-0.06405	-0.06714	-0.07259	-0.07339	0.08525	-0.03887	-0.06023	-0.06079	-0.06362	-0.06870	-0.06951	0.00495	-0.00239	-0.00364	-0.00329	-0.00357	-0.00392	-0.00387
19	0.16091	-0.06683	-0.10446	-0.09709	-0.11404	-0.12485	-0.12729	0.14631	-0.06037	-0.09430	-0.08798	-0.10395	-0.11333	-0.11566	0.01411	-0.00639	-0.00991	-0.00901	-0.00983	-0.01130	-0.01124
20	0.24338	-0.08703	-0.13798	-0.12275	-0.16283	-0.18074	-0.18291	0.21137	-0.07485	-0.11831	-0.10647	-0.14143	-0.15584	-0.15841	0.03076	-0.01191	-0.01919	-0.01615	-0.02073	-0.02431	-0.02385
21	0.33672	-0.10499	-0.16433	-0.14517	-0.21302	-0.23647	-0.23788	0.27569	-0.08488	-0.13170	-0.11923	-0.17347	-0.19061	-0.19287	0.05787	-0.01957	-0.03157	-0.02542	-0.03795	-0.04396	-0.04319
22	0.44063	-0.12234	-0.17796	-0.16511	-0.26461	-0.29225	-0.29020	0.33738	-0.09049	-0.13071	-0.12733	-0.19902	-0.21820	-0.21795	0.09606	-0.03047	-0.04533	-0.03723	-0.06195	-0.07006	-0.06838
23	0.55244	-0.13612	-0.17840	-0.18026	-0.31609	-0.34970	-0.34052	0.39804	-0.09479	-0.12255	-0.13359	-0.22275	-0.24321	-0.23787	0.14033	-0.03949	-0.05366	-0.04558	-0.08635	-0.09842	-0.09510
24	0.67702	-0.14285	-0.16754	-0.20268	-0.36992	-0.40505	-0.38778	0.46368	-0.09836	-0.11257	-0.14663	-0.24628	-0.26684	-0.25680	0.18874	-0.04302	-0.05276	-0.05348	-0.11193	-0.12426	-0.11817
25	0.80306	-0.13759	-0.14412	-0.21973	-0.41041	-0.44704	-0.42587	0.52363	-0.09330	-0.09741	-0.15093	-0.25639	-0.27705	-0.26468	0.24076	-0.04432	-0.04809	-0.06398	-0.13545	-0.14860	-0.14177
26	0.93003	-0.12347	-0.11688	-0.23865	-0.43965	-0.47596	—	0.57778	-0.08130	-0.08301	-0.15254	-0.25703	-0.27476	—	0.29488	-0.04429	-0.04029	-0.07626	-0.15465	-0.17074	—
27	1.05192	-0.09745	-0.08749	-0.25034	-0.44851	-0.48280	—	0.62556	-0.06852	-0.06893	-0.14888	-0.24473	-0.25893	—	0.34815	-0.03695	-0.03142	-0.08623	-0.16786	-0.18510	—
28	1.17557	-0.06837	-0.06418	-0.25736	-0.44428	-0.47682	—	0.66890	-0.05481	-0.05804	-0.14180	-0.22193	-0.23284	—	0.40332	-0.02950	-0.02546	-0.09306	-0.17718	-0.19547	—
29	1.29652	-0.03853	-0.05385	-0.25882	-0.42955	-0.45517	—	0.70777	-0.04232	-0.05169	-0.13032	-0.19390	-0.19892	—	0.45456	-0.01922	-0.01992	-0.09651	-0.17711	-0.19601	—
30	1.41250	-0.01348	-0.05271	-0.25370	-0.40118	-0.42599	—	0.74175	-0.03175	-0.04672	-0.11392	-0.16029	-0.16633	—	0.50269	-0.01152	-0.01884	-0.09718	-0.16999	-0.18753	—
31	1.51994	0.00897	-0.05787	-0.23894	-0.36360	—	—	0.76874	-0.02339	-0.04096	-0.09248	-0.12613	—	—	0.54733	-0.00365	-0.01990	-0.09319	-0.15478	—	—
32	1.61863	0.02226	-0.06495	-0.21919	-0.32419	—	—	0.79037	-0.01768	-0.03563	-0.07142	-0.09717	—	—	0.58638	0.00160	-0.02032	-0.08389	-0.13342	—	—
33	1.70569	0.02706	-0.07033	-0.19538	-0.28806	—	—	0.80868	-0.01436	-0.03124	-0.05320	-0.07655	—	—	0.62051	0.00213	-0.02113	-0.07112	-0.11162	—	—
34	1.78080	0.02861	-0.07112	-0.17013	-0.24592	—	—	0.82366	-0.01266	-0.02625	-0.04047	-0.05736	—	—	0.64663	0.00346	-0.01878	-0.05380	-0.08461	—	—
35	1.84705	0.02336	-0.06982	-0.14921	-0.21339	—	—	0.83726	-0.01222	-0.02272	-0.03077	-0.04375	—	—	0.66737	0.00381	-0.01428	-0.03729	-0.06414	—	—
36	1.90115	0.01759	-0.06739	-0.12705	—	—	—	0.84734	-0.01161	-0.01962	-0.02098	—	—	—	0.68426	0.00421	-0.01002	-0.02514	—	—	—
37	1.94235	0.01513	-0.05998	-0.10690	—	—	—	0.85505	-0.01105	-0.01599	-0.01377	—	—	—	0.69649	0.00524	-0.00443	-0.01427	—	—	—
38	1.97424	0.01290	-0.05320	-0.08905	—	—	—	0.86105	-0.01060	-0.01338	-0.00846	—	—	—	0.70615	0.00515	-0.00121	-0.00572	—	—	—
39	1.99642	0.01401	-0.04476	-0.07245	—	—	—	0.86519	-0.01003	-0.01034	-0.00337	—	—	—	0.71274	0.00570	0.00175	0.00128	—	—	—
40	2.01107	0.01534	-0.03805	-0.05919	—	—	—	0.86780	-0.00904	-0.00808	0.00045	—	—	—	0.71721	0.00595	0.00380	0.00592	—	—	—
41	2.02095	0.01844	-0.03213	—	—	—	—	0.86982	-0.00829	-0.00658	—	—	—	—	0.72016	0.00661	0.00545	—	—	—	—
42	2.02681	0.02019	-0.02740	—	—	—	—	0.87084	-0.00768	-0.00553	—	—	—	—	0.72151	0.00744	0.00752	—	—	—	—
43	2.03079	0.02102	-0.02526	—	—	—	—	0.87151	-0.00745	-0.00498	—	—	—	—	0.72244	0.00769	0.00849	—	—	—	—
44	2.03273	0.02194	-0.02329	—	—	—	—	0.87184	-0.00720	-0.00445	—	—	—	—	0.72292	0.00777	0.00895	—	—	—	—
45	2.03354	0.02257	-0.02233	—	—	—	—	0.87200	-0.00701	-0.00418	—	—	—	—	0.72311	0.00795	0.00915	—	—	—	—

Source: Human Fertility Database. Own elaboration.

Table A.7: Age Specific fertility rates between ages 15 to 30, in years 1960 to 2012, for Austria

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1960	0.00321	0.01353	0.03749	0.06714	0.10243	0.13236	0.15199	0.16985	0.17894	0.18035	0.17634	0.17272	0.16146	0.15244	0.13477	0.12184
1961	0.00432	0.01712	0.04137	0.07549	0.10720	0.13549	0.15674	0.17162	0.18556	0.18768	0.18379	0.17543	0.16422	0.15690	0.13907	0.13030
1962	0.00408	0.01839	0.04684	0.08003	0.11121	0.13835	0.15625	0.17107	0.18123	0.18599	0.18433	0.17699	0.16513	0.15454	0.14203	0.13303
1963	0.00422	0.01840	0.04927	0.08746	0.11839	0.14264	0.15726	0.16988	0.17598	0.17970	0.18701	0.17673	0.16639	0.15823	0.14200	0.13133
1964	0.00460	0.01796	0.05124	0.09510	0.12269	0.14499	0.15477	0.16839	0.17367	0.17301	0.17351	0.17676	0.16294	0.15222	0.14419	0.12934
1965	0.00337	0.01745	0.04929	0.09405	0.13396	0.14362	0.15666	0.16629	0.16798	0.16992	0.16760	0.15795	0.15611	0.14596	0.13452	0.12619
1966	0.00310	0.01706	0.05111	0.09616	0.13577	0.15995	0.15986	0.16568	0.17035	0.16439	0.16001	0.15391	0.14529	0.14270	0.12935	0.11891
1967	0.00335	0.01764	0.04981	0.09628	0.13619	0.16584	0.17095	0.16515	0.16735	0.16344	0.15606	0.15177	0.14008	0.13276	0.12745	0.11549
1968	0.00276	0.01475	0.05300	0.09740	0.13973	0.17016	0.17757	0.17475	0.16244	0.16135	0.15327	0.14612	0.13666	0.12659	0.11715	0.11078
1969	0.00281	0.01512	0.05028	0.10075	0.14007	0.16448	0.17170	0.17341	0.16734	0.15010	0.14221	0.13891	0.12827	0.12088	0.10803	0.10090
1970	0.00335	0.01648	0.04899	0.09116	0.13264	0.15291	0.16213	0.16536	0.15218	0.14129	0.13135	0.12515	0.11618	0.10868	0.09884	0.08967
1971	0.00317	0.01710	0.04989	0.08946	0.12566	0.14500	0.15582	0.15488	0.14863	0.13852	0.12927	0.11687	0.11113	0.10291	0.09392	0.08736
1972	0.00371	0.01874	0.05184	0.09023	0.12065	0.13789	0.14692	0.14567	0.14055	0.13628	0.12522	0.11424	0.10418	0.09688	0.08616	0.07925
1973	0.00477	0.02014	0.05155	0.08421	0.11529	0.13014	0.13519	0.13622	0.13506	0.12580	0.11560	0.10778	0.09693	0.08564	0.07927	0.07185
1974	0.00415	0.01853	0.04874	0.08379	0.10998	0.13048	0.13758	0.13554	0.13499	0.12844	0.11972	0.11018	0.09716	0.08829	0.07619	0.06704
1975	0.00320	0.01549	0.04214	0.07470	0.10465	0.12027	0.13208	0.13445	0.13349	0.12753	0.11966	0.10933	0.09850	0.08917	0.07689	0.06776
1976	0.00250	0.01333	0.03743	0.06375	0.09282	0.10720	0.12161	0.12577	0.12532	0.12162	0.11494	0.10915	0.09460	0.08630	0.07383	0.06298
1977	0.00241	0.01149	0.03259	0.05690	0.08462	0.10386	0.11595	0.12258	0.12418	0.12284	0.11417	0.10428	0.09662	0.08487	0.07298	0.06273
1978	0.00228	0.01024	0.02954	0.05420	0.08244	0.09830	0.11210	0.11922	0.12254	0.12140	0.11902	0.10956	0.09661	0.08677	0.07539	0.06321
1979	0.00199	0.00977	0.02863	0.05260	0.07971	0.09912	0.11173	0.11641	0.12268	0.12135	0.11764	0.10784	0.09824	0.08744	0.07770	0.06628
1980	0.00206	0.01008	0.02751	0.05185	0.08169	0.10157	0.11538	0.12105	0.12492	0.12709	0.12186	0.11446	0.10213	0.09213	0.07897	0.06996
1981	0.00212	0.00962	0.02597	0.05159	0.07950	0.10229	0.11763	0.12273	0.12741	0.12644	0.12096	0.11213	0.10573	0.09490	0.08479	0.07220
1982	0.00149	0.00914	0.02560	0.04978	0.07802	0.09844	0.11258	0.12420	0.12863	0.12571	0.12102	0.11687	0.10451	0.09405	0.08258	0.07556
1983	0.00159	0.00785	0.02076	0.04348	0.07041	0.09153	0.10375	0.11156	0.11739	0.11934	0.11520	0.10873	0.10201	0.09310	0.08226	0.06902
1984	0.00159	0.00654	0.01983	0.03829	0.06373	0.08606	0.09886	0.11179	0.11494	0.11652	0.11701	0.10800	0.09981	0.08961	0.08198	0.06966
1985	0.00138	0.00648	0.01749	0.03527	0.05848	0.07929	0.09297	0.10150	0.10867	0.11680	0.11222	0.10655	0.10026	0.09137	0.07829	0.06912
1986	0.00151	0.00625	0.01701	0.03261	0.05586	0.07405	0.08677	0.10078	0.10981	0.11207	0.11004	0.10685	0.09947	0.09013	0.07968	0.07066
1987	0.00166	0.00644	0.01620	0.03138	0.04954	0.06747	0.08645	0.09372	0.10664	0.11169	0.11070	0.10423	0.10273	0.09033	0.08003	0.06996
1988	0.00184	0.00616	0.01521	0.03044	0.05081	0.06688	0.08326	0.09601	0.10516	0.11095	0.11210	0.10804	0.10408	0.09120	0.08423	0.07417
1989	0.00175	0.00703	0.01630	0.02825	0.04828	0.06512	0.07778	0.09163	0.10067	0.11141	0.11353	0.10895	0.10371	0.09416	0.08426	0.07560
1990	0.00159	0.00718	0.01715	0.03005	0.04477	0.06322	0.07711	0.08605	0.09875	0.10709	0.11397	0.10943	0.10581	0.09698	0.08695	0.07758
1991	0.00213	0.00684	0.01837	0.03200	0.04903	0.06548	0.07616	0.08761	0.09828	0.11283	0.11627	0.11516	0.10981	0.10136	0.08866	0.07919
1992	0.00202	0.00713	0.01826	0.03133	0.05123	0.06404	0.07801	0.08812	0.09787	0.10569	0.11420	0.11272	0.10843	0.10243	0.09052	0.08050
1993	0.00149	0.00704	0.01659	0.03066	0.05110	0.06444	0.07583	0.08819	0.09663	0.10492	0.11170	0.11101	0.11065	0.10249	0.09343	0.08143
1994	0.00138	0.00581	0.01390	0.02732	0.04262	0.06147	0.07280	0.08142	0.09402	0.10182	0.10616	0.10953	0.10929	0.10350	0.09307	0.08349
1995	0.00167	0.00500	0.01383	0.02360	0.04189	0.05368	0.06680	0.07701	0.08705	0.09542	0.10475	0.10757	0.10507	0.10032	0.09470	0.08478
1996	0.00097	0.00480	0.01194	0.02244	0.03890	0.05254	0.06400	0.07781	0.08659	0.09891	0.10422	0.10758	0.10814	0.10184	0.09605	0.08812
1997	0.00099	0.00416	0.01099	0.02192	0.03750	0.05007	0.06041	0.07234	0.08230	0.09023	0.10093	0.10285	0.10306	0.09741	0.09163	0.08467
1998	0.00105	0.00382	0.01041	0.02133	0.03548	0.04707	0.05911	0.06818	0.07975	0.08783	0.09597	0.10148	0.10228	0.09834	0.09213	0.08645
1999	0.00112	0.00353	0.01051	0.01879	0.03240	0.04693	0.05646	0.06632	0.07469	0.08853	0.09144	0.09645	0.09749	0.09588	0.09173	0.08285
2000	0.00138	0.00401	0.01044	0.01891	0.03291	0.04493	0.05648	0.06629	0.07434	0.08576	0.09275	0.09721	0.10138	0.09712	0.09525	0.08689
2001	0.00180	0.00491	0.01111	0.01982	0.02956	0.04290	0.05181	0.06187	0.06938	0.07796	0.08540	0.09442	0.09601	0.09504	0.09157	0.08684
2002	0.00166	0.00549	0.01081	0.01939	0.03053	0.04214	0.05127	0.06139	0.07118	0.07918	0.08921	0.09241	0.09901	0.10052	0.09938	0.09202
2003	0.00148	0.00507	0.01013	0.01909	0.02927	0.03861	0.04835	0.05733	0.06454	0.07765	0.08565	0.09162	0.09630	0.09963	0.09743	0.09383
2004	0.00165	0.00484	0.01075	0.01889	0.03172	0.03932	0.04855	0.05796	0.06668	0.07782	0.08600	0.09070	0.09927	0.09970	0.10111	0.09789

2005	0.00134	0.00410	0.00961	0.01929	0.02970	0.03766	0.04564	0.05261	0.06473	0.07337	0.08496	0.09065	0.09458	0.09841	0.10063	0.09451
2006	0.00142	0.00440	0.00886	0.01608	0.02893	0.03795	0.04516	0.05153	0.06090	0.07003	0.07816	0.08550	0.09598	0.10001	0.09814	0.09792
2007	0.00131	0.00392	0.00852	0.01577	0.02633	0.03480	0.04250	0.05077	0.05976	0.06553	0.07537	0.08576	0.08969	0.09402	0.09676	0.09584
2008	0.00142	0.00390	0.00889	0.01628	0.02552	0.03638	0.04326	0.04877	0.05883	0.06633	0.07543	0.08489	0.09023	0.09923	0.09755	0.09582
2009	0.00105	0.00381	0.00769	0.01438	0.02446	0.03281	0.04039	0.04759	0.05676	0.06500	0.07230	0.08018	0.08575	0.09250	0.09886	0.09867
2010	0.00125	0.00359	0.00850	0.01254	0.02390	0.03170	0.04039	0.04788	0.05629	0.06449	0.07388	0.08280	0.08575	0.09752	0.10161	0.09947
2011	0.00313	0.00662	0.01171	0.01679	0.02598	0.02975	0.03573	0.04121	0.04586	0.04987	0.05717	0.06600	0.07425	0.08429	0.09018	0.09371
2012	0.00269	0.00646	0.01043	0.01606	0.02334	0.02797	0.03205	0.03706	0.04262	0.04818	0.05404	0.06340	0.07177	0.07793	0.08630	0.09090

Source: Human Fertility Database. Own elaboration.

Table A.7. (Continued)Age Specific fertility rates between ages 31 to 49, in years 1960 to 2012, for Austria

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1960	0.00256	0.00932	0.02347	0.04922	0.08500	0.11939	0.15666	0.18861	0.20289	0.20667	0.19851	0.18593	0.17182	0.15513	0.14201	0.12710	0.00256	0.00932	0.02347
1961	0.00247	0.01002	0.02532	0.05061	0.08780	0.12886	0.16286	0.19418	0.20816	0.21293	0.20494	0.19262	0.17769	0.16133	0.14533	0.13044	0.00247	0.01002	0.02532
1962	0.00237	0.00933	0.02528	0.05187	0.08688	0.12742	0.16572	0.19272	0.20745	0.21080	0.20378	0.19205	0.17630	0.15997	0.14494	0.12877	0.00237	0.00933	0.02528
1963	0.00224	0.00944	0.02537	0.05555	0.09519	0.13806	0.17438	0.20526	0.21298	0.21647	0.20784	0.19811	0.18137	0.16558	0.14874	0.13312	0.00224	0.00944	0.02537
1964	0.00246	0.00963	0.02583	0.05623	0.10134	0.14567	0.18312	0.20606	0.21405	0.21462	0.20831	0.19532	0.18031	0.16464	0.14865	0.13206	0.00246	0.00963	0.02583
1965	0.00288	0.01023	0.02682	0.05614	0.10023	0.14695	0.18276	0.20290	0.20863	0.20799	0.20104	0.19031	0.17687	0.16023	0.14476	0.12977	0.00288	0.01023	0.02682
1966	0.00243	0.00936	0.02536	0.05483	0.09758	0.14337	0.18111	0.20220	0.20456	0.20436	0.19403	0.18556	0.17420	0.15852	0.14067	0.12852	0.00243	0.00936	0.02536
1967	0.00227	0.00892	0.02450	0.05201	0.09258	0.13482	0.16844	0.19260	0.19907	0.19442	0.18566	0.17707	0.16596	0.15197	0.13746	0.12276	0.00227	0.00892	0.02450
1968	0.00218	0.00906	0.02458	0.05230	0.09001	0.13097	0.16440	0.18459	0.19284	0.19093	0.17994	0.16934	0.15886	0.14619	0.13448	0.11908	0.00218	0.00906	0.02458
1969	0.00234	0.00911	0.02524	0.05242	0.09034	0.12913	0.15957	0.18085	0.18694	0.18669	0.17716	0.16635	0.15482	0.14143	0.13018	0.11769	0.00234	0.00911	0.02524
1970	0.00231	0.00893	0.02578	0.05395	0.09191	0.12925	0.15865	0.17952	0.18513	0.18401	0.17525	0.16494	0.15001	0.13600	0.12603	0.11223	0.00231	0.00893	0.02578
1971	0.00273	0.00995	0.02700	0.05625	0.09566	0.13246	0.16104	0.17915	0.18745	0.18532	0.17637	0.16604	0.15180	0.13815	0.12250	0.11102	0.00273	0.00995	0.02700
1972	0.00265	0.01072	0.02914	0.05874	0.09771	0.13130	0.15927	0.17580	0.18059	0.18240	0.17148	0.15983	0.14600	0.13256	0.11612	0.10447	0.00265	0.01072	0.02914
1973	0.00278	0.01047	0.02967	0.05972	0.09537	0.12864	0.15353	0.16904	0.17325	0.17340	0.16414	0.15305	0.14051	0.12582	0.11111	0.09813	0.00278	0.01047	0.02967
1974	0.00271	0.01027	0.02767	0.05647	0.08881	0.11795	0.13819	0.15326	0.15929	0.16144	0.15345	0.14377	0.13122	0.11630	0.10251	0.09039	0.00271	0.01027	0.02767
1975	0.00256	0.00938	0.02515	0.05116	0.08223	0.10657	0.12546	0.13930	0.14815	0.15070	0.14555	0.13466	0.12271	0.10915	0.09471	0.08146	0.00256	0.00938	0.02515
1976	0.00203	0.00858	0.02193	0.04659	0.07683	0.10127	0.11927	0.13306	0.14266	0.14515	0.14302	0.13398	0.12062	0.10705	0.09342	0.08003	0.00203	0.00858	0.02193
1977	0.00209	0.00776	0.02087	0.04437	0.07516	0.10046	0.12117	0.13771	0.14702	0.15089	0.14937	0.13972	0.12652	0.11141	0.09694	0.08279	0.00209	0.00776	0.02087
1978	0.00180	0.00701	0.01844	0.04014	0.06823	0.09390	0.11515	0.13417	0.14484	0.14968	0.14667	0.14062	0.12743	0.11242	0.09755	0.08368	0.00180	0.00701	0.01844
1979	0.00178	0.00613	0.01664	0.03596	0.06461	0.09030	0.11382	0.13277	0.14708	0.15318	0.15205	0.14611	0.13379	0.11791	0.10356	0.08737	0.00178	0.00613	0.01664
1980	0.00176	0.00646	0.01615	0.03567	0.06312	0.08945	0.11527	0.13656	0.15195	0.16053	0.16124	0.15370	0.14217	0.12605	0.11099	0.09572	0.00176	0.00646	0.01615
1981	0.00167	0.00586	0.01498	0.03232	0.05855	0.08431	0.11029	0.13250	0.14961	0.15816	0.16121	0.15495	0.14338	0.12906	0.11350	0.09895	0.00167	0.00586	0.01498
1982	0.00155	0.00551	0.01406	0.02966	0.05502	0.08065	0.10573	0.12878	0.14591	0.15657	0.15820	0.15364	0.14157	0.12811	0.11381	0.09864	0.00155	0.00551	0.01406
1983	0.00149	0.00500	0.01246	0.02654	0.04834	0.07258	0.09702	0.11934	0.13602	0.14483	0.14993	0.14335	0.13418	0.12100	0.10765	0.09250	0.00149	0.00500	0.01246
1984	0.00151	0.00484	0.01169	0.02428	0.04575	0.06828	0.09230	0.11608	0.13374	0.14748	0.15141	0.14802	0.13775	0.12549	0.10990	0.09601	0.00151	0.00484	0.01169
1985	0.00136	0.00435	0.01034	0.02211	0.04066	0.06189	0.08580	0.11100	0.13150	0.14472	0.15371	0.14992	0.14198	0.12948	0.11397	0.10001	0.00136	0.00435	0.01034
1986	0.00129	0.00404	0.00966	0.02117	0.03874	0.05815	0.08093	0.10451	0.12721	0.14343	0.15243	0.15329	0.14547	0.13315	0.11875	0.10466	0.00129	0.00404	0.00966
1987	0.00117	0.00378	0.00894	0.01955	0.03551	0.05281	0.07310	0.09656	0.11856	0.13681	0.14886	0.14877	0.14548	0.13438	0.12053	0.10573	0.00117	0.00378	0.00894
1988	0.00104	0.00350	0.00832	0.01818	0.03461	0.05086	0.06903	0.09167	0.11329	0.13238	0.14652	0.14956	0.14482	0.13633	0.12253	0.10961	0.00104	0.00350	0.00832
1989	0.00104	0.00339	0.00798	0.01738	0.03226	0.04792	0.06695	0.08672	0.10762	0.12788	0.14099	0.14677	0.14452	0.13522	0.12398	0.11044	0.00104	0.00339	0.00798
1990	0.00103	0.00351	0.00778	0.01689	0.03130	0.04580	0.06348	0.08342	0.10291	0.12228	0.13905	0.14431	0.14339	0.13694	0.12494	0.11276	0.00103	0.00351	0.00778
1991	0.00106	0.00346	0.00784	0.01681	0.03055	0.04379	0.06090	0.07985	0.10011	0.11927	0.13643	0.14471	0.14393	0.13657	0.12562	0.11294	0.00106	0.00346	0.00784
1992	0.00107	0.00341	0.00768	0.01620	0.02847	0.04086	0.05576	0.07381	0.09383	0.11380	0.13026	0.13981	0.14125	0.13688	0.12545	0.11342	0.00107	0.00341	0.00768

1993	0.00099	0.00310	0.00740	0.01522	0.02694	0.03702	0.05075	0.06609	0.08540	0.10561	0.12215	0.13315	0.13604	0.13253	0.12387	0.11151	0.00099	0.00310	0.00740
1994	0.00096	0.00275	0.00693	0.01402	0.02527	0.03531	0.04717	0.06286	0.08021	0.10096	0.11917	0.13278	0.13778	0.13482	0.12712	0.11541	0.00096	0.00275	0.00693
1995	0.00094	0.00263	0.00663	0.01368	0.02463	0.03401	0.04645	0.06007	0.07783	0.09884	0.11883	0.13444	0.14286	0.14086	0.13342	0.12254	0.00094	0.00263	0.00663
1996	0.00087	0.00288	0.00674	0.01352	0.02424	0.03447	0.04485	0.05935	0.07421	0.09484	0.11625	0.13303	0.14219	0.14340	0.13692	0.12659	0.00087	0.00288	0.00674
1997	0.00096	0.00298	0.00644	0.01358	0.02386	0.03320	0.04440	0.05724	0.07358	0.09202	0.11216	0.12941	0.13977	0.14099	0.13796	0.12691	0.00096	0.00298	0.00644
1998	0.00090	0.00282	0.00660	0.01345	0.02386	0.03330	0.04440	0.05676	0.07184	0.09128	0.11189	0.12832	0.14142	0.14478	0.14121	0.13077	0.00090	0.00282	0.00660
1999	0.00097	0.00297	0.00682	0.01431	0.02505	0.03405	0.04584	0.05794	0.07339	0.09050	0.11123	0.12870	0.14068	0.14381	0.14144	0.13189	0.00097	0.00297	0.00682
2000	0.00103	0.00329	0.00733	0.01542	0.02701	0.03747	0.04800	0.06017	0.07460	0.09507	0.11433	0.13254	0.14415	0.14937	0.14812	0.13996	0.00103	0.00329	0.00733
2001	0.00108	0.00358	0.00795	0.01596	0.02816	0.03911	0.04947	0.06216	0.07583	0.09244	0.11264	0.12991	0.14163	0.14681	0.14545	0.13789	0.00108	0.00358	0.00795
2002	0.00104	0.00320	0.00733	0.01574	0.02734	0.03764	0.04819	0.06035	0.07439	0.09059	0.11030	0.12708	0.14010	0.14723	0.14463	0.13833	0.00104	0.00320	0.00733
2003	0.00099	0.00298	0.00716	0.01480	0.02703	0.03653	0.04756	0.05948	0.07265	0.09047	0.10887	0.12588	0.14038	0.14721	0.14686	0.13920	0.00099	0.00298	0.00716
2004	0.00093	0.00296	0.00736	0.01487	0.02627	0.03741	0.04741	0.05952	0.07421	0.09073	0.10995	0.12634	0.13877	0.14638	0.14817	0.14134	0.00093	0.00296	0.00736
2005	0.00083	0.00289	0.00683	0.01464	0.02576	0.03633	0.04729	0.05911	0.07380	0.08915	0.10838	0.12511	0.13938	0.14643	0.14860	0.14399	0.00083	0.00289	0.00683
2006	0.00094	0.00281	0.00683	0.01414	0.02603	0.03651	0.04792	0.06068	0.07475	0.09214	0.11028	0.12705	0.14209	0.15042	0.15201	0.14830	0.00094	0.00281	0.00683
2007	0.00092	0.00295	0.00680	0.01404	0.02511	0.03591	0.04670	0.05914	0.07339	0.08830	0.10859	0.12374	0.13910	0.14806	0.15011	0.14553	0.00092	0.00295	0.00680
2008	0.00092	0.00295	0.00674	0.01423	0.02513	0.03577	0.04818	0.06022	0.07457	0.08996	0.10816	0.12528	0.13866	0.14876	0.15127	0.14785	0.00092	0.00295	0.00674
2009	0.00104	0.00292	0.00655	0.01348	0.02448	0.03512	0.04632	0.05913	0.07287	0.08992	0.10896	0.12354	0.13733	0.14648	0.15049	0.14778	0.00104	0.00292	0.00655
2010	0.00104	0.00296	0.00678	0.01320	0.02407	0.03426	0.04567	0.05861	0.07393	0.08938	0.10783	0.12432	0.13847	0.14706	0.15110	0.15034	0.00104	0.00296	0.00678
2011	0.00101	0.00303	0.00641	0.01286	0.02344	0.03321	0.04353	0.05677	0.07170	0.08903	0.10666	0.12233	0.13686	0.14551	0.14879	0.14586	0.00101	0.00303	0.00641
2012	0.00105	0.00319	0.00665	0.01280	0.02313	0.03293	0.04329	0.05618	0.07011	0.08792	0.10627	0.12073	0.13458	0.14477	0.14903	0.14760	0.00105	0.00319	0.00665

Source: Human Fertility Database. Own elaboration.

Table A.8: Age Specific fertility rates between ages 15 to 30, in years 1960 to 2012 for France

	15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
1960	0.00321	0.01353	0.03749	0.06714	0.10243	0.13236	0.15199	0.16985	0.17894	0.18035	0.17634	0.17272	0.16146	0.15244	0.13477	0.12184
1961	0.00432	0.01712	0.04137	0.07549	0.10720	0.13549	0.15674	0.17162	0.18556	0.18768	0.18379	0.17543	0.16422	0.15690	0.13907	0.13030
1962	0.00408	0.01839	0.04684	0.08003	0.11121	0.13835	0.15625	0.17107	0.18123	0.18599	0.18433	0.17699	0.16513	0.15454	0.14203	0.13303
1963	0.00422	0.01840	0.04927	0.08746	0.11839	0.14264	0.15726	0.16988	0.17598	0.17970	0.18701	0.17673	0.16639	0.15823	0.14200	0.13133
1964	0.00460	0.01796	0.05124	0.09510	0.12269	0.14499	0.15477	0.16839	0.17367	0.17301	0.17351	0.17676	0.16294	0.15222	0.14419	0.12934
1965	0.00337	0.01745	0.04929	0.09405	0.13396	0.14362	0.15666	0.16629	0.16798	0.16992	0.16760	0.15795	0.15611	0.14596	0.13452	0.12619
1966	0.00310	0.01706	0.05111	0.09616	0.13577	0.15995	0.15986	0.16568	0.17035	0.16439	0.16001	0.15391	0.14529	0.14270	0.12935	0.11891
1967	0.00335	0.01764	0.04981	0.09628	0.13619	0.16584	0.17095	0.16515	0.16735	0.16344	0.15606	0.15177	0.14008	0.13276	0.12745	0.11549
1968	0.00276	0.01475	0.05300	0.09740	0.13973	0.17016	0.17757	0.17475	0.16244	0.16135	0.15327	0.14612	0.13666	0.12659	0.11715	0.11078
1969	0.00281	0.01512	0.05028	0.10075	0.14007	0.16448	0.17170	0.17341	0.16734	0.15010	0.14221	0.13891	0.12827	0.12088	0.10803	0.10090
1970	0.00335	0.01648	0.04899	0.09116	0.13264	0.15291	0.16213	0.16536	0.15218	0.14129	0.13135	0.12515	0.11618	0.10868	0.09884	0.08967
1971	0.00317	0.01710	0.04989	0.08946	0.12566	0.14500	0.15582	0.15488	0.14863	0.13852	0.12927	0.11687	0.11113	0.10291	0.09392	0.08736
1972	0.00371	0.01874	0.05184	0.09023	0.12065	0.13789	0.14692	0.14567	0.14055	0.13628	0.12522	0.11424	0.10418	0.09688	0.08616	0.07925
1973	0.00477	0.02014	0.05155	0.08421	0.11529	0.13014	0.13519	0.13622	0.13506	0.12580	0.11560	0.10778	0.09693	0.08564	0.07927	0.07185
1974	0.00415	0.01853	0.04874	0.08379	0.10998	0.13048	0.13758	0.13554	0.13499	0.12844	0.11972	0.11018	0.09716	0.08829	0.07619	0.06704
1975	0.00320	0.01549	0.04214	0.07470	0.10465	0.12027	0.13208	0.13445	0.13349	0.12753	0.11966	0.10933	0.09850	0.08917	0.07689	0.06776
1976	0.00250	0.01333	0.03743	0.06375	0.09282	0.10720	0.12161	0.12577	0.12532	0.12162	0.11494	0.10915	0.09460	0.08630	0.07383	0.06298
1977	0.00241	0.01149	0.03259	0.05690	0.08462	0.10386	0.11595	0.12258	0.12418	0.12284	0.11417	0.10428	0.09662	0.08487	0.07298	0.06273
1978	0.00228	0.01024	0.02954	0.05420	0.08244	0.09830	0.11210	0.11922	0.12254	0.12140	0.11902	0.10956	0.09661	0.08677	0.07539	0.06321
1979	0.00199	0.00977	0.02863	0.05260	0.07971	0.09912	0.11173	0.11641	0.12268	0.12135	0.11764	0.10784	0.09824	0.08744	0.07770	0.06628
1980	0.00206	0.01008	0.02751	0.05185	0.08169	0.10157	0.11538	0.12105	0.12492	0.12709	0.12186	0.11446	0.10213	0.09213	0.07897	0.06996
1981	0.00212	0.00962	0.02597	0.05159	0.07950	0.10229	0.11763	0.12273	0.12741	0.12644	0.12096	0.11213	0.10573	0.09490	0.08479	0.07220

1982	0.00149	0.00914	0.02560	0.04978	0.07802	0.09844	0.11258	0.12420	0.12863	0.12571	0.12102	0.11687	0.10451	0.09405	0.08258	0.07556
1983	0.00159	0.00785	0.02076	0.04348	0.07041	0.09153	0.10375	0.11156	0.11739	0.11934	0.11520	0.10873	0.10201	0.09310	0.08226	0.06902
1984	0.00159	0.00654	0.01983	0.03829	0.06373	0.08606	0.09886	0.11179	0.11494	0.11652	0.11701	0.10800	0.09981	0.08961	0.08198	0.06966
1985	0.00138	0.00648	0.01749	0.03527	0.05848	0.07929	0.09297	0.10150	0.10867	0.11680	0.11222	0.10655	0.10026	0.09137	0.07829	0.06912
1986	0.00151	0.00625	0.01701	0.03261	0.05586	0.07405	0.08677	0.10078	0.10981	0.11207	0.11004	0.10685	0.09947	0.09013	0.07968	0.07066
1987	0.00166	0.00644	0.01620	0.03138	0.04954	0.06747	0.08645	0.09372	0.10664	0.11169	0.11070	0.10423	0.10273	0.09033	0.08003	0.06996
1988	0.00184	0.00616	0.01521	0.03044	0.05081	0.06688	0.08326	0.09601	0.10516	0.11095	0.11210	0.10804	0.10408	0.09120	0.08423	0.07417
1989	0.00175	0.00703	0.01630	0.02825	0.04828	0.06512	0.07778	0.09163	0.10067	0.11141	0.11353	0.10895	0.10371	0.09416	0.08426	0.07560
1990	0.00159	0.00718	0.01715	0.03005	0.04477	0.06322	0.07711	0.08605	0.09875	0.10709	0.11397	0.10943	0.10581	0.09698	0.08695	0.07758
1991	0.00213	0.00684	0.01837	0.03200	0.04903	0.06548	0.07616	0.08761	0.09828	0.11283	0.11627	0.11516	0.10981	0.10136	0.08866	0.07919
1992	0.00202	0.00713	0.01826	0.03133	0.05123	0.06404	0.07801	0.08812	0.09787	0.10569	0.11420	0.11272	0.10843	0.10243	0.09052	0.08050
1993	0.00149	0.00704	0.01659	0.03066	0.05110	0.06444	0.07583	0.08819	0.09663	0.10492	0.11170	0.11101	0.11065	0.10249	0.09343	0.08143
1994	0.00138	0.00581	0.01390	0.02732	0.04262	0.06147	0.07280	0.08142	0.09402	0.10182	0.10616	0.10953	0.10929	0.10350	0.09307	0.08349
1995	0.00167	0.00500	0.01383	0.02360	0.04189	0.05368	0.06680	0.07701	0.08705	0.09542	0.10475	0.10757	0.10507	0.10032	0.09470	0.08478
1996	0.00097	0.00480	0.01194	0.02244	0.03890	0.05254	0.06400	0.07781	0.08659	0.09891	0.10422	0.10758	0.10814	0.10184	0.09605	0.08812
1997	0.00099	0.00416	0.01099	0.02192	0.03750	0.05007	0.06041	0.07234	0.08230	0.09023	0.10093	0.10285	0.10306	0.09741	0.09163	0.08467
1998	0.00105	0.00382	0.01041	0.02133	0.03548	0.04707	0.05911	0.06818	0.07975	0.08783	0.09597	0.10148	0.10228	0.09834	0.09213	0.08645
1999	0.00112	0.00353	0.01051	0.01879	0.03240	0.04693	0.05646	0.06632	0.07469	0.08853	0.09144	0.09645	0.09749	0.09588	0.09173	0.08285
2000	0.00138	0.00401	0.01044	0.01891	0.03291	0.04493	0.05648	0.06629	0.07434	0.08576	0.09275	0.09721	0.10138	0.09712	0.09525	0.08689
2001	0.00180	0.00491	0.01111	0.01982	0.02956	0.04290	0.05181	0.06187	0.06938	0.07796	0.08540	0.09442	0.09601	0.09504	0.09157	0.08684
2002	0.00166	0.00549	0.01081	0.01939	0.03053	0.04214	0.05127	0.06139	0.07118	0.07918	0.08921	0.09241	0.09901	0.10052	0.09938	0.09202
2003	0.00148	0.00507	0.01013	0.01909	0.02927	0.03861	0.04835	0.05733	0.06454	0.07765	0.08565	0.09162	0.09630	0.09963	0.09743	0.09383
2004	0.00165	0.00484	0.01075	0.01889	0.03172	0.03932	0.04855	0.05796	0.06668	0.07782	0.08600	0.09070	0.09927	0.09970	0.10111	0.09789
2005	0.00134	0.00410	0.00961	0.01929	0.02970	0.03766	0.04564	0.05261	0.06473	0.07337	0.08496	0.09065	0.09458	0.09841	0.10063	0.09451
2006	0.00142	0.00440	0.00886	0.01608	0.02893	0.03795	0.04516	0.05153	0.06090	0.07003	0.07816	0.08550	0.09598	0.10001	0.09814	0.09792
2007	0.00131	0.00392	0.00852	0.01577	0.02633	0.03480	0.04250	0.05077	0.05976	0.06553	0.07537	0.08576	0.08969	0.09402	0.09676	0.09584
2008	0.00142	0.00390	0.00889	0.01628	0.02552	0.03638	0.04326	0.04877	0.05883	0.06633	0.07543	0.08489	0.09023	0.09923	0.09755	0.09582
2009	0.00105	0.00381	0.00769	0.01438	0.02446	0.03281	0.04039	0.04759	0.05676	0.06500	0.07230	0.08018	0.08575	0.09250	0.09886	0.09867
2010	0.00125	0.00359	0.00850	0.01254	0.02390	0.03170	0.04039	0.04788	0.05629	0.06449	0.07388	0.08280	0.08575	0.09752	0.10161	0.09947
2011	0.00313	0.00662	0.01171	0.01679	0.02598	0.02975	0.03573	0.04121	0.04586	0.04987	0.05717	0.06600	0.07425	0.08429	0.09018	0.09371
2012	0.00269	0.00646	0.01043	0.01606	0.02334	0.02797	0.03205	0.03706	0.04262	0.04818	0.05404	0.06340	0.07177	0.07793	0.08630	0.09090

Source: Human Fertility Database. Own elaboration.

Table A.8. (Continued)Age Specific fertility rates between ages 31 to 49, in years 1960 to 2012, for France

	31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
1960	0.11265	0.10015	0.08796	0.07784	0.06721	0.05930	0.05039	0.04247	0.03421	0.02833	0.02041	0.01513	0.00936	0.00548	0.00280	0.00127	0.00060	0.00026	0.00014
1961	0.11669	0.10262	0.09044	0.07819	0.06858	0.05939	0.05227	0.04298	0.03451	0.02727	0.02130	0.01445	0.00966	0.00573	0.00312	0.00125	0.00051	0.00024	0.00008
1962	0.11472	0.10085	0.08781	0.07677	0.06742	0.05775	0.04923	0.04127	0.03374	0.02620	0.01899	0.01430	0.00933	0.00557	0.00295	0.00138	0.00060	0.00022	0.00008
1963	0.11760	0.10454	0.09142	0.08025	0.06912	0.05889	0.05020	0.04135	0.03407	0.02614	0.01983	0.01353	0.00923	0.00518	0.00285	0.00147	0.00063	0.00025	0.00011
1964	0.11902	0.10339	0.09162	0.07918	0.06931	0.05917	0.04982	0.04168	0.03379	0.02657	0.01958	0.01368	0.00852	0.00527	0.00288	0.00144	0.00058	0.00023	0.00012
1965	0.11384	0.10068	0.08805	0.07777	0.06733	0.05689	0.04769	0.03980	0.03194	0.02494	0.01889	0.01285	0.00819	0.00490	0.00294	0.00130	0.00061	0.00030	0.00009
1966	0.11395	0.10013	0.08748	0.07649	0.06639	0.05628	0.04686	0.03884	0.03173	0.02496	0.01806	0.01280	0.00837	0.00467	0.00259	0.00125	0.00041	0.00027	0.00011
1967	0.10857	0.09461	0.08353	0.07324	0.06302	0.05410	0.04570	0.03746	0.03013	0.02317	0.01694	0.01159	0.00791	0.00465	0.00231	0.00111	0.00053	0.00019	0.00006
1968	0.10418	0.09231	0.08052	0.07062	0.06087	0.05194	0.04416	0.03634	0.02912	0.02232	0.01656	0.01158	0.00748	0.00446	0.00235	0.00101	0.00045	0.00022	0.00008
1969	0.10331	0.08974	0.07963	0.06820	0.05930	0.05062	0.04280	0.03562	0.02848	0.02200	0.01602	0.01101	0.00730	0.00426	0.00243	0.00116	0.00047	0.00017	0.00011
1970	0.09916	0.08671	0.07494	0.06609	0.05730	0.04877	0.04132	0.03305	0.02704	0.02097	0.01511	0.01029	0.00673	0.00396	0.00211	0.00100	0.00049	0.00020	0.00009
1971	0.09835	0.08656	0.07550	0.06481	0.05706	0.04891	0.04102	0.03313	0.02655	0.02061	0.01548	0.01038	0.00673	0.00379	0.00227	0.00100	0.00045	0.00017	0.00009
1972	0.09379	0.08119	0.07168	0.06054	0.05358	0.04538	0.03828	0.03148	0.02563	0.01935	0.01426	0.01016	0.00640	0.00368	0.00194	0.00089	0.00043	0.00017	0.00009
1973	0.08553	0.07725	0.06680	0.05759	0.05012	0.04209	0.03515	0.02859	0.02327	0.01819	0.01301	0.00913	0.00581	0.00329	0.00170	0.00077	0.00040	0.00019	0.00009
1974	0.07706	0.06742	0.05933	0.05165	0.04364	0.03686	0.03049	0.02540	0.02016	0.01545	0.01149	0.00791	0.00526	0.00292	0.00159	0.00079	0.00030	0.00013	0.00007
1975	0.07031	0.06035	0.05184	0.04504	0.03814	0.03162	0.02571	0.02079	0.01711	0.01267	0.00881	0.00658	0.00413	0.00232	0.00125	0.00057	0.00030	0.00011	0.00005
1976	0.06701	0.05604	0.04664	0.03969	0.03364	0.02755	0.02194	0.01744	0.01369	0.01043	0.00732	0.00514	0.00336	0.00178	0.00101	0.00055	0.00020	0.00010	0.00006
1977	0.06795	0.05730	0.04737	0.03913	0.03176	0.02743	0.02099	0.01610	0.01259	0.00957	0.00662	0.00452	0.00297	0.00173	0.00097	0.00049	0.00024	0.00008	0.00004
1978	0.06925	0.05677	0.04640	0.03926	0.03104	0.02506	0.02036	0.01566	0.01170	0.00882	0.00599	0.00415	0.00269	0.00154	0.00090	0.00049	0.00020	0.00011	0.00003
1979	0.07359	0.06026	0.04908	0.04015	0.03256	0.02528	0.01993	0.01650	0.01171	0.00832	0.00604	0.00383	0.00249	0.00150	0.00075	0.00040	0.00016	0.00011	0.00006
1980	0.07970	0.06597	0.05321	0.04373	0.03461	0.02774	0.02148	0.01624	0.01263	0.00878	0.00589	0.00373	0.00240	0.00153	0.00071	0.00039	0.00018	0.00009	0.00008
1981	0.08254	0.06838	0.05678	0.04548	0.03637	0.02950	0.02311	0.01688	0.01266	0.00943	0.00637	0.00370	0.00224	0.00137	0.00079	0.00039	0.00021	0.00013	0.00005
1982	0.08215	0.06868	0.05595	0.04593	0.03669	0.02854	0.02248	0.01707	0.01248	0.00900	0.00669	0.00430	0.00239	0.00144	0.00074	0.00042	0.00024	0.00011	0.00006
1983	0.07809	0.06413	0.05326	0.04265	0.03492	0.02672	0.02089	0.01630	0.01182	0.00847	0.00578	0.00387	0.00259	0.00136	0.00074	0.00031	0.00023	0.00009	0.00007
1984	0.08032	0.06705	0.05522	0.04545	0.03582	0.02894	0.02147	0.01623	0.01253	0.00884	0.00591	0.00410	0.00255	0.00148	0.00073	0.00041	0.00021	0.00010	0.00007
1985	0.08427	0.07141	0.05933	0.04862	0.03916	0.03009	0.02360	0.01692	0.01271	0.00926	0.00642	0.00396	0.00249	0.00166	0.00077	0.00035	0.00019	0.00009	0.00005
1986	0.08925	0.07472	0.06208	0.05195	0.04149	0.03246	0.02429	0.01895	0.01356	0.00962	0.00646	0.00407	0.00252	0.00147	0.00076	0.00045	0.00023	0.00012	0.00008
1987	0.09066	0.07663	0.06472	0.05346	0.04388	0.03479	0.02627	0.01943	0.01454	0.01009	0.00650	0.00442	0.00259	0.00155	0.00066	0.00043	0.00023	0.00010	0.00007
1988	0.09425	0.08040	0.06738	0.05645	0.04575	0.03723	0.02817	0.02115	0.01513	0.01042	0.00701	0.00438	0.00261	0.00134	0.00070	0.00034	0.00024	0.00014	0.00006
1989	0.09560	0.08117	0.06890	0.05768	0.04763	0.03819	0.02963	0.02265	0.01626	0.01134	0.00757	0.00450	0.00271	0.00145	0.00073	0.00043	0.00019	0.00014	0.00008
1990	0.09698	0.08267	0.07014	0.05924	0.04885	0.03949	0.03022	0.02329	0.01726	0.01189	0.00778	0.00497	0.00275	0.00152	0.00081	0.00037	0.00017	0.00014	0.00009
1991	0.09769	0.08357	0.07070	0.05954	0.05010	0.03986	0.03169	0.02403	0.01775	0.01241	0.00783	0.00482	0.00287	0.00150	0.00078	0.00043	0.00023	0.00012	0.00006
1992	0.09830	0.08453	0.07082	0.06054	0.04986	0.04056	0.03188	0.02475	0.01848	0.01281	0.00837	0.00492	0.00284	0.00154	0.00078	0.00037	0.00019	0.00007	0.00006
1993	0.09652	0.08284	0.07077	0.05855	0.04899	0.03963	0.03073	0.02395	0.01833	0.01271	0.00858	0.00525	0.00291	0.00157	0.00069	0.00036	0.00014	0.00009	0.00004
1994	0.09997	0.08523	0.07258	0.06175	0.05087	0.04111	0.03194	0.02462	0.01840	0.01312	0.00867	0.00541	0.00292	0.00155	0.00080	0.00035	0.00012	0.00009	0.00005
1995	0.10783	0.09234	0.07753	0.06554	0.05460	0.04353	0.03353	0.02602	0.01937	0.01371	0.00904	0.00545	0.00317	0.00162	0.00084	0.00030	0.00017	0.00008	0.00005
1996	0.11150	0.09600	0.08117	0.06814	0.05687	0.04608	0.03597	0.02726	0.02030	0.01432	0.00950	0.00572	0.00340	0.00161	0.00087	0.00036	0.00012	0.00007	0.00005
1997	0.11239	0.09732	0.08272	0.06958	0.05784	0.04690	0.03715	0.02818	0.02124	0.01492	0.00966	0.00606	0.00342	0.00184	0.00089	0.00037	0.00015	0.00004	0.00003
1998	0.11706	0.10112	0.08658	0.07386	0.06158	0.04915	0.03887	0.02984	0.02261	0.01563	0.01049	0.00652	0.00362	0.00196	0.00084	0.00037	0.00016	0.00008	0.00002
1999	0.11986	0.10484	0.08919	0.07671	0.06372	0.05148	0.03988	0.03128	0.02359	0.01642	0.01081	0.00670	0.00368	0.00188	0.00099	0.00039	0.00020	0.00008	0.00006
2000	0.12432	0.10979	0.09444	0.08011	0.06695	0.05480	0.04282	0.03310	0.02539	0.01784	0.01194	0.00711	0.00423	0.00211	0.00089	0.00035	0.00016	0.00008	0.00003
2001	0.12565	0.10973	0.09548	0.08120	0.06874	0.05509	0.04458	0.03414	0.02548	0.01816	0.01233	0.00782	0.00432	0.00222	0.00100	0.00046	0.00017	0.00010	0.00004
2002	0.12617	0.10963	0.09434	0.08208	0.06835	0.05660	0.04545	0.03467	0.02631	0.01871	0.01229	0.00788	0.00448	0.00227	0.00100	0.00049	0.00021	0.00007	0.00006

2003	0.12691	0.11277	0.09793	0.08332	0.07046	0.05747	0.04525	0.03554	0.02701	0.01960	0.01293	0.00769	0.00471	0.00243	0.00113	0.00050	0.00023	0.00011	0.00006
2004	0.12985	0.11593	0.09938	0.08556	0.07225	0.05943	0.04657	0.03675	0.02824	0.02025	0.01317	0.00836	0.00483	0.00256	0.00122	0.00060	0.00027	0.00014	0.00006
2005	0.13270	0.11865	0.10405	0.08920	0.07505	0.06083	0.04931	0.03828	0.02874	0.02141	0.01416	0.00865	0.00504	0.00260	0.00134	0.00064	0.00031	0.00012	0.00007
2006	0.13778	0.12344	0.10856	0.09393	0.07936	0.06556	0.05173	0.04034	0.03086	0.02212	0.01481	0.00913	0.00534	0.00257	0.00126	0.00060	0.00030	0.00015	0.00012
2007	0.13619	0.12383	0.10797	0.09437	0.08017	0.06583	0.05224	0.04101	0.03109	0.02277	0.01538	0.00925	0.00558	0.00279	0.00137	0.00062	0.00028	0.00014	0.00013
2008	0.14001	0.12700	0.11008	0.09590	0.08194	0.06804	0.05350	0.04218	0.03282	0.02306	0.01558	0.01016	0.00593	0.00300	0.00147	0.00070	0.00033	0.00022	0.00012
2009	0.14079	0.12743	0.11215	0.09770	0.08319	0.06890	0.05474	0.04288	0.03298	0.02354	0.01607	0.01008	0.00597	0.00309	0.00148	0.00077	0.00033	0.00017	0.00012
2010	0.14242	0.12990	0.11583	0.10073	0.08612	0.07091	0.05600	0.04416	0.03404	0.02483	0.01644	0.01050	0.00622	0.00327	0.00171	0.00088	0.00042	0.00020	0.00014
2011	0.13957	0.12953	0.11579	0.10107	0.08755	0.07138	0.05721	0.04473	0.03487	0.02533	0.01749	0.01073	0.00648	0.00367	0.00172	0.00081	0.00042	0.00023	0.00013
2012	0.13911	0.12972	0.11561	0.10176	0.08804	0.07330	0.05825	0.04613	0.03545	0.02521	0.01736	0.01108	0.00680	0.00359	0.00189	0.00084	0.00037	0.00028	0.00014

Source: Human Fertility Database. Own elaboration.

Table A.9: Age Specific fertility rates between ages 15 to 30, in years 1960 to 2009 for Hungary

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1960	0.00417	0.01589	0.04083	0.08122	0.12320	0.15372	0.16969	0.16794	0.15965	0.14813	0.13275	0.12019	0.10399	0.09039	0.08167	0.06905
1961	0.00427	0.01413	0.03902	0.07830	0.12222	0.14697	0.16528	0.16136	0.15355	0.14394	0.13061	0.11256	0.10092	0.08791	0.07549	0.06555
1962	0.00330	0.01153	0.03529	0.06968	0.10966	0.13756	0.14771	0.15433	0.14326	0.13432	0.12231	0.10753	0.09267	0.08427	0.07061	0.06311
1963	0.00331	0.01021	0.03086	0.06445	0.10769	0.14028	0.14749	0.15060	0.14926	0.13598	0.12639	0.11318	0.09960	0.08841	0.07685	0.06638
1964	0.00366	0.01177	0.03076	0.06731	0.10602	0.13973	0.14995	0.15382	0.14535	0.13848	0.12626	0.11582	0.10187	0.08820	0.07577	0.06583
1965	0.00385	0.01215	0.03331	0.06553	0.11337	0.14010	0.15692	0.15591	0.14979	0.13616	0.12687	0.11123	0.10101	0.08953	0.07687	0.06693
1966	0.00389	0.01384	0.03472	0.07068	0.11540	0.14784	0.16245	0.16368	0.15178	0.14343	0.13047	0.11908	0.10566	0.09001	0.08064	0.06657
1967	0.00457	0.01357	0.03690	0.07584	0.12698	0.15561	0.16817	0.16856	0.16727	0.15215	0.14069	0.12673	0.11309	0.09752	0.08650	0.07513
1968	0.00430	0.01405	0.03831	0.07990	0.12855	0.16276	0.17289	0.17293	0.16600	0.15696	0.14393	0.13205	0.11703	0.10316	0.08989	0.07529
1969	0.00417	0.01363	0.03674	0.08020	0.13664	0.16372	0.17214	0.16871	0.16359	0.15122	0.14146	0.12542	0.11159	0.10052	0.08696	0.07417
1970	0.00496	0.01303	0.03748	0.07937	0.12890	0.16324	0.16873	0.16708	0.15582	0.14684	0.13652	0.12364	0.11039	0.09598	0.08147	0.06983
1971	0.00571	0.01578	0.03700	0.07705	0.12852	0.16056	0.16839	0.16545	0.15304	0.14219	0.13007	0.11604	0.10652	0.09298	0.07844	0.06706
1972	0.00656	0.01718	0.03988	0.07351	0.12736	0.15819	0.16838	0.16648	0.15635	0.14530	0.13387	0.11803	0.10640	0.09265	0.07876	0.06605
1973	0.00702	0.01838	0.04152	0.07928	0.12214	0.15106	0.16737	0.16705	0.15830	0.14823	0.13451	0.11746	0.10675	0.08908	0.08004	0.06682
1974	0.00781	0.02162	0.04891	0.08854	0.14006	0.16775	0.18602	0.19571	0.18680	0.17456	0.16349	0.14470	0.12929	0.11261	0.09576	0.08236
1975	0.00927	0.02448	0.05551	0.10181	0.14541	0.17465	0.18433	0.19214	0.19274	0.18009	0.16845	0.15180	0.13316	0.11451	0.10196	0.08546
1976	0.00945	0.02796	0.05967	0.10654	0.15119	0.17495	0.18591	0.18503	0.17843	0.17041	0.15381	0.13790	0.12099	0.10611	0.09103	0.07701
1977	0.01041	0.02795	0.06407	0.10338	0.14673	0.17435	0.18002	0.18026	0.17292	0.15891	0.15038	0.13090	0.11525	0.10022	0.08324	0.07236
1978	0.01067	0.02986	0.06301	0.10469	0.14450	0.17181	0.17976	0.17677	0.16750	0.15565	0.13964	0.12321	0.10684	0.09085	0.07665	0.06746
1979	0.00993	0.02928	0.06476	0.10436	0.14500	0.16902	0.17577	0.17391	0.16479	0.15148	0.13806	0.12047	0.10199	0.08771	0.07416	0.06079
1980	0.00992	0.02892	0.06051	0.10073	0.13624	0.15875	0.16830	0.16566	0.15864	0.14652	0.12758	0.11435	0.09669	0.08342	0.07078	0.05633
1981	0.00921	0.02631	0.05640	0.09181	0.13203	0.15284	0.16341	0.16310	0.15733	0.14639	0.13172	0.11533	0.09946	0.08390	0.06992	0.05775
1982	0.00927	0.02481	0.05292	0.08784	0.12577	0.14672	0.15360	0.15690	0.14994	0.14299	0.12810	0.11120	0.09547	0.08199	0.06703	0.05664
1983	0.00934	0.02408	0.04733	0.08099	0.11665	0.13899	0.15317	0.14985	0.15010	0.14120	0.12898	0.11307	0.09573	0.07945	0.06783	0.05466
1984	0.00919	0.02585	0.04774	0.07876	0.11305	0.13869	0.15039	0.15682	0.15064	0.14285	0.12927	0.11528	0.09753	0.08057	0.06789	0.05633
1985	0.00976	0.02444	0.04702	0.07684	0.11162	0.13889	0.15599	0.16466	0.16075	0.15462	0.14090	0.12360	0.10606	0.08854	0.07391	0.06087
1986	0.00887	0.02157	0.04158	0.07098	0.10739	0.13405	0.15111	0.15750	0.15896	0.15577	0.14233	0.12688	0.11104	0.09330	0.07768	0.06372
1987	0.00817	0.02089	0.03928	0.06823	0.10089	0.12711	0.14624	0.15757	0.16048	0.15534	0.14383	0.12451	0.11015	0.09491	0.07673	0.06639
1988	0.00704	0.01950	0.03768	0.06133	0.09847	0.12439	0.14296	0.15701	0.15979	0.15270	0.14570	0.13051	0.11437	0.09514	0.07960	0.06717
1989	0.00710	0.01805	0.03445	0.05899	0.09305	0.11961	0.13870	0.15439	0.15942	0.15669	0.14644	0.13253	0.11519	0.09874	0.07930	0.06772

1990	0.00636	0.01801	0.03394	0.05939	0.09469	0.12338	0.14169	0.15320	0.15943	0.15909	0.14967	0.13368	0.11511	0.10009	0.08140	0.07015
1991	0.00710	0.01670	0.03329	0.05781	0.09141	0.11877	0.13853	0.15349	0.16122	0.15741	0.15249	0.13253	0.11726	0.09924	0.08395	0.07291
1992	0.00666	0.01543	0.02806	0.05406	0.08468	0.11209	0.12942	0.14176	0.14793	0.14855	0.14300	0.12792	0.11338	0.09678	0.08155	0.07063
1993	0.00642	0.01538	0.02713	0.04657	0.07683	0.10058	0.11461	0.13087	0.13428	0.13695	0.13441	0.12481	0.11277	0.09804	0.08202	0.06968
1994	0.00682	0.01558	0.02716	0.04520	0.06756	0.09103	0.10714	0.12005	0.12823	0.13089	0.13246	0.12206	0.10916	0.09661	0.08098	0.06987
1995	0.00656	0.01591	0.02560	0.04167	0.06168	0.08000	0.09744	0.11067	0.11931	0.12502	0.12492	0.12077	0.11048	0.09515	0.08244	0.07019
1996	0.00622	0.01407	0.02541	0.03933	0.05601	0.07032	0.08589	0.09861	0.10881	0.11338	0.11236	0.11036	0.10093	0.09168	0.07959	0.06895
1997	0.00600	0.01435	0.02354	0.03590	0.05139	0.06390	0.07762	0.08610	0.09765	0.10434	0.10587	0.10338	0.09909	0.08876	0.07786	0.06564
1998	0.00516	0.01285	0.02207	0.03506	0.04750	0.05692	0.07062	0.07895	0.08842	0.09737	0.10088	0.10330	0.09606	0.08864	0.07786	0.06802
1999	0.00537	0.01205	0.02028	0.03208	0.04174	0.05487	0.06308	0.07326	0.08158	0.09034	0.09645	0.09639	0.09568	0.08864	0.07901	0.06886
2000	0.00519	0.01210	0.02031	0.03228	0.04362	0.05152	0.06091	0.06962	0.07859	0.08726	0.09348	0.10076	0.09890	0.09390	0.08628	0.07387
2001	0.00553	0.01193	0.02022	0.03084	0.03988	0.04779	0.05525	0.06390	0.07379	0.08105	0.09103	0.09480	0.09735	0.09353	0.08601	0.07826
2002	0.00514	0.01232	0.02086	0.02994	0.03822	0.04734	0.05123	0.05820	0.06738	0.07650	0.08466	0.09375	0.09594	0.09595	0.09100	0.08244
2003	0.00525	0.01253	0.01872	0.02816	0.03733	0.04357	0.04886	0.05516	0.06197	0.07020	0.07921	0.08759	0.09293	0.09308	0.08978	0.08140
2004	0.00609	0.01220	0.01999	0.02709	0.03666	0.03941	0.04482	0.04919	0.05625	0.06649	0.07532	0.08602	0.09059	0.09625	0.09100	0.08757
2005	0.00557	0.01261	0.02001	0.02687	0.03339	0.03945	0.04237	0.04833	0.05536	0.06323	0.07340	0.08370	0.09209	0.09796	0.09695	0.09054
2006	0.00532	0.01191	0.01997	0.02745	0.03386	0.03888	0.04083	0.04621	0.05285	0.06215	0.07179	0.08332	0.09410	0.09690	0.09882	0.09482
2007	0.00489	0.01193	0.01963	0.02689	0.03344	0.03632	0.03832	0.04513	0.04933	0.05759	0.06665	0.07849	0.08703	0.09510	0.09742	0.09426
2008	0.00536	0.01268	0.01976	0.02795	0.03376	0.03896	0.04113	0.04411	0.05041	0.05569	0.06676	0.07812	0.08735	0.09368	0.09798	0.09661
2009	0.00566	0.01251	0.01866	0.02631	0.03262	0.03591	0.04034	0.04276	0.04857	0.05336	0.06285	0.07063	0.08272	0.09217	0.09499	0.09290

Source: Human Fertility Database. Own elaboration.

Table A.9. (Continued)Age Specific fertility rates between ages 31 to 49, in years 1960 to 2009, for Hungary

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1960	0.05917	0.05291	0.04503	0.03939	0.03529	0.03052	0.02367	0.02018	0.01640	0.01283	0.00891	0.00640	0.00478	0.00231	0.00133	0.00066	0.00029	0.00020	0.00004
1961	0.05726	0.04869	0.04335	0.03618	0.03159	0.02566	0.02441	0.01850	0.01510	0.01135	0.00903	0.00639	0.00378	0.00259	0.00122	0.00057	0.00032	0.00008	0.00011
1962	0.05433	0.04523	0.03926	0.03369	0.02790	0.02334	0.02087	0.01633	0.01339	0.01031	0.00852	0.00567	0.00402	0.00209	0.00103	0.00054	0.00014	0.00005	0.00007
1963	0.05639	0.04695	0.03952	0.03442	0.02943	0.02489	0.02041	0.01770	0.01339	0.01016	0.00738	0.00532	0.00372	0.00141	0.00058	0.00052	0.00028	0.00006	0.00001
1964	0.05708	0.04570	0.03950	0.03353	0.02744	0.02275	0.01918	0.01448	0.01238	0.00936	0.00693	0.00488	0.00319	0.00177	0.00097	0.00045	0.00013	0.00007	0.00005
1965	0.05521	0.04642	0.03862	0.03283	0.02690	0.02129	0.01746	0.01480	0.01130	0.00904	0.00630	0.00412	0.00270	0.00184	0.00097	0.00040	0.00003	0.00008	0.00000
1966	0.05767	0.04681	0.03956	0.03448	0.02724	0.02271	0.01793	0.01485	0.01111	0.00851	0.00629	0.00418	0.00284	0.00176	0.00110	0.00034	0.00004	0.00003	0.00011
1967	0.06261	0.05177	0.04306	0.03508	0.02955	0.02326	0.01954	0.01490	0.01190	0.00851	0.00578	0.00413	0.00293	0.00180	0.00084	0.00037	0.00017	0.00008	0.00003
1968	0.06469	0.05341	0.04346	0.03658	0.02923	0.02407	0.01941	0.01514	0.01161	0.00866	0.00632	0.00390	0.00226	0.00134	0.00083	0.00028	0.00016	0.00005	0.00006
1969	0.06278	0.05409	0.04338	0.03557	0.02961	0.02336	0.01950	0.01473	0.01186	0.00883	0.00585	0.00430	0.00228	0.00142	0.00091	0.00027	0.00015	0.00008	0.00004
1970	0.06127	0.05044	0.04129	0.03505	0.02736	0.02156	0.01837	0.01410	0.01116	0.00798	0.00541	0.00418	0.00266	0.00129	0.00075	0.00033	0.00012	0.00007	0.00004
1971	0.05819	0.04930	0.04049	0.03388	0.02661	0.02275	0.01625	0.01377	0.01103	0.00787	0.00536	0.00329	0.00247	0.00131	0.00068	0.00024	0.00017	0.00004	0.00004
1972	0.05539	0.04723	0.03918	0.03078	0.02548	0.02135	0.01692	0.01405	0.01007	0.00800	0.00539	0.00379	0.00229	0.00120	0.00072	0.00044	0.00015	0.00011	0.00003
1973	0.05615	0.04668	0.03956	0.03190	0.02698	0.02177	0.01801	0.01312	0.00996	0.00712	0.00525	0.00368	0.00243	0.00130	0.00055	0.00035	0.00014	0.00004	0.00003
1974	0.06925	0.05929	0.04627	0.04087	0.03039	0.02406	0.01915	0.01536	0.01153	0.00839	0.00631	0.00386	0.00230	0.00152	0.00052	0.00032	0.00012	0.00003	0.00008
1975	0.07328	0.06120	0.05035	0.03855	0.03168	0.02507	0.01881	0.01486	0.01086	0.00852	0.00567	0.00387	0.00189	0.00126	0.00075	0.00016	0.00006	0.00005	0.00001
1976	0.06373	0.05511	0.04415	0.03586	0.02746	0.02236	0.01757	0.01417	0.01012	0.00764	0.00486	0.00359	0.00196	0.00122	0.00054	0.00023	0.00012	0.00003	0.00000
1977	0.06145	0.05043	0.04063	0.03429	0.02800	0.02078	0.01571	0.01272	0.00934	0.00713	0.00522	0.00373	0.00228	0.00138	0.00048	0.00038	0.00012	0.00003	0.00000
1978	0.05642	0.04617	0.03734	0.03071	0.02371	0.01971	0.01430	0.01167	0.00894	0.00595	0.00470	0.00329	0.00194	0.00090	0.00043	0.00023	0.00012	0.00004	0.00000

1979	0.05066	0.04087	0.03459	0.02681	0.02354	0.01770	0.01399	0.01053	0.00780	0.00580	0.00407	0.00304	0.00152	0.00135	0.00050	0.00027	0.00010	0.00005	0.00000
1980	0.04682	0.03987	0.03172	0.02654	0.02099	0.01658	0.01274	0.00980	0.00736	0.00552	0.00392	0.00257	0.00155	0.00093	0.00041	0.00019	0.00007	0.00007	0.00000
1981	0.04678	0.03964	0.03151	0.02451	0.02019	0.01569	0.01251	0.00902	0.00764	0.00521	0.00382	0.00270	0.00159	0.00088	0.00044	0.00015	0.00006	0.00001	0.00000
1982	0.04460	0.03616	0.02982	0.02586	0.01960	0.01488	0.01142	0.00882	0.00704	0.00489	0.00317	0.00238	0.00147	0.00089	0.00045	0.00015	0.00006	0.00001	0.00001
1983	0.04535	0.03603	0.02900	0.02379	0.01868	0.01483	0.01161	0.00832	0.00640	0.00467	0.00335	0.00258	0.00127	0.00074	0.00036	0.00014	0.00009	0.00001	0.00000
1984	0.04642	0.03737	0.03014	0.02446	0.01902	0.01486	0.01089	0.00858	0.00635	0.00444	0.00333	0.00197	0.00143	0.00065	0.00036	0.00012	0.00006	0.00005	0.00000
1985	0.04892	0.04160	0.03466	0.02740	0.02142	0.01689	0.01234	0.00920	0.00696	0.00490	0.00366	0.00208	0.00128	0.00078	0.00031	0.00017	0.00003	0.00002	0.00000
1986	0.05273	0.04183	0.03435	0.02798	0.02247	0.01807	0.01421	0.01014	0.00724	0.00535	0.00374	0.00227	0.00120	0.00076	0.00031	0.00025	0.00008	0.00003	0.00000
1987	0.05365	0.04309	0.03497	0.02983	0.02302	0.01798	0.01436	0.01088	0.00823	0.00544	0.00414	0.00229	0.00151	0.00063	0.00035	0.00015	0.00001	0.00005	0.00000
1988	0.05374	0.04324	0.03507	0.02890	0.02308	0.01869	0.01368	0.01087	0.00814	0.00559	0.00369	0.00236	0.00139	0.00081	0.00040	0.00020	0.00004	0.00000	0.00000
1989	0.05435	0.04425	0.03609	0.02955	0.02427	0.01888	0.01440	0.01115	0.00785	0.00612	0.00372	0.00251	0.00158	0.00063	0.00034	0.00004	0.00003	0.00001	0.00002
1990	0.05683	0.04644	0.03774	0.02971	0.02457	0.02011	0.01524	0.01159	0.00858	0.00582	0.00393	0.00253	0.00144	0.00078	0.00034	0.00008	0.00010	0.00001	0.00000
1991	0.05977	0.04834	0.03944	0.03196	0.02557	0.01992	0.01524	0.01276	0.00941	0.00630	0.00389	0.00300	0.00163	0.00078	0.00035	0.00013	0.00007	0.00000	0.00000
1992	0.05567	0.04660	0.03833	0.03111	0.02657	0.01984	0.01556	0.01219	0.00902	0.00633	0.00410	0.00305	0.00134	0.00078	0.00030	0.00022	0.00007	0.00000	0.00000
1993	0.05603	0.04678	0.03845	0.03157	0.02593	0.02044	0.01550	0.01179	0.00883	0.00683	0.00465	0.00274	0.00142	0.00081	0.00047	0.00024	0.00006	0.00003	0.00003
1994	0.05719	0.04937	0.04169	0.03326	0.02764	0.02219	0.01736	0.01243	0.00932	0.00696	0.00459	0.00283	0.00169	0.00087	0.00036	0.00013	0.00003	0.00006	0.00001
1995	0.05733	0.04791	0.03959	0.03251	0.02658	0.02162	0.01687	0.01255	0.00871	0.00666	0.00456	0.00291	0.00181	0.00065	0.00044	0.00014	0.00001	0.00009	0.00002
1996	0.05557	0.04509	0.03858	0.03274	0.02681	0.02103	0.01591	0.01193	0.00932	0.00638	0.00421	0.00306	0.00180	0.00082	0.00035	0.00020	0.00004	0.00003	0.00001
1997	0.05620	0.04512	0.03833	0.03114	0.02744	0.02082	0.01570	0.01210	0.00978	0.00662	0.00449	0.00277	0.00158	0.00093	0.00028	0.00024	0.00010	0.00003	0.00001
1998	0.05596	0.04744	0.03811	0.03162	0.02585	0.02078	0.01578	0.01323	0.00931	0.00693	0.00424	0.00253	0.00161	0.00061	0.00043	0.00022	0.00004	0.00001	0.00004
1999	0.05651	0.04891	0.04023	0.03333	0.02597	0.02177	0.01704	0.01268	0.00955	0.00679	0.00441	0.00297	0.00143	0.00058	0.00037	0.00023	0.00009	0.00001	0.00000
2000	0.06276	0.05311	0.04364	0.03567	0.03046	0.02330	0.01843	0.01435	0.01060	0.00792	0.00452	0.00344	0.00136	0.00069	0.00038	0.00018	0.00008	0.00005	0.00006
2001	0.06739	0.05737	0.04730	0.03971	0.03239	0.02565	0.02037	0.01532	0.01168	0.00783	0.00537	0.00329	0.00188	0.00105	0.00047	0.00019	0.00001	0.00000	0.00000
2002	0.06951	0.05884	0.04935	0.04110	0.03423	0.02618	0.02097	0.01698	0.01199	0.00913	0.00579	0.00338	0.00178	0.00105	0.00046	0.00010	0.00009	0.00006	0.00000
2003	0.07071	0.06046	0.05388	0.04443	0.03587	0.02784	0.02184	0.01626	0.01194	0.00882	0.00544	0.00350	0.00200	0.00097	0.00043	0.00017	0.00005	0.00002	0.00000
2004	0.07603	0.06707	0.05439	0.04621	0.03844	0.03076	0.02289	0.01756	0.01335	0.00965	0.00614	0.00358	0.00212	0.00091	0.00052	0.00019	0.00004	0.00000	0.00004
2005	0.08114	0.07066	0.05987	0.05257	0.04169	0.03250	0.02617	0.01932	0.01407	0.01020	0.00692	0.00396	0.00208	0.00093	0.00046	0.00026	0.00010	0.00005	0.00004
2006	0.08806	0.07822	0.06754	0.05598	0.04458	0.03705	0.02692	0.02107	0.01492	0.01063	0.00634	0.00403	0.00229	0.00103	0.00060	0.00030	0.00004	0.00001	0.00001
2007	0.08971	0.07856	0.06789	0.05834	0.04587	0.03667	0.02935	0.02141	0.01552	0.01178	0.00719	0.00453	0.00309	0.00113	0.00046	0.00031	0.00012	0.00004	0.00001
2008	0.09044	0.08195	0.07059	0.06180	0.04810	0.04033	0.03115	0.02366	0.01756	0.01177	0.00803	0.00529	0.00264	0.00141	0.00066	0.00036	0.00008	0.00003	0.00003
2009	0.09008	0.08288	0.07271	0.06131	0.05306	0.04042	0.03227	0.02411	0.01815	0.01241	0.00827	0.00565	0.00274	0.00150	0.00063	0.00042	0.00021	0.00005	0.00003

Source: Human Fertility Database. Own elaboration.

Table A.10: Age Specific fertility rates between ages 15 to 30, in years 1960 to 2012, in Portugal

	15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
1960	0.00164	0.00722	0.02096	0.04186	0.06743	0.10179	0.12812	0.16203	0.17851	0.18651	0.19226	0.18821	0.18072	0.17282	0.15852	0.15679
1961	0.00195	0.00786	0.02076	0.04185	0.06669	0.10768	0.12797	0.16420	0.17991	0.19073	0.19273	0.18846	0.18375	0.17634	0.16438	0.16244
1962	0.00203	0.00798	0.01919	0.04501	0.07214	0.11191	0.13446	0.16658	0.18945	0.19412	0.19857	0.19439	0.18907	0.18015	0.16387	0.16490
1963	0.00244	0.00757	0.02026	0.04244	0.06908	0.10503	0.12719	0.15683	0.17276	0.19236	0.19367	0.19125	0.18430	0.17503	0.16601	0.16144
1964	0.00283	0.00884	0.02073	0.04378	0.06911	0.11052	0.13345	0.16551	0.18255	0.19914	0.20459	0.19993	0.19231	0.18136	0.16723	0.16665
1965	0.00233	0.00867	0.02176	0.04285	0.06748	0.10814	0.13373	0.16251	0.18478	0.19561	0.19914	0.20407	0.19099	0.17891	0.16414	0.16201
1966	0.00234	0.00919	0.02328	0.04453	0.07198	0.10650	0.13461	0.17049	0.18256	0.19599	0.19848	0.19387	0.19678	0.18486	0.16368	0.16191
1967	0.00286	0.01012	0.02431	0.04755	0.07254	0.10724	0.13369	0.16776	0.19109	0.19598	0.20143	0.19360	0.18686	0.18406	0.16235	0.16022
1968	0.00307	0.01058	0.02453	0.04702	0.07263	0.10564	0.13346	0.16240	0.18644	0.19988	0.19687	0.19207	0.17687	0.17553	0.16739	0.15625
1969	0.00326	0.01064	0.02534	0.04592	0.07056	0.10687	0.12839	0.16275	0.18332	0.19760	0.20662	0.18706	0.18502	0.16736	0.15620	0.16151

1970	0.00369	0.01124	0.02500	0.04445	0.07007	0.09761	0.12867	0.15679	0.18526	0.19668	0.19802	0.19358	0.17402	0.16352	0.14946	0.14327
1971	0.00356	0.01133	0.02602	0.04636	0.07015	0.09999	0.12452	0.15610	0.18260	0.19799	0.19996	0.19305	0.18598	0.16298	0.15356	0.13391
1972	0.00353	0.01225	0.02649	0.04879	0.07203	0.09819	0.12343	0.14675	0.17093	0.17982	0.19340	0.18301	0.17068	0.16141	0.14120	0.13528
1973	0.00397	0.01256	0.02924	0.04823	0.07246	0.09917	0.12304	0.14246	0.16294	0.17155	0.17915	0.17513	0.16555	0.15209	0.14107	0.12809
1974	0.00431	0.01462	0.03044	0.05316	0.07544	0.10344	0.12207	0.14684	0.15982	0.16927	0.17524	0.17005	0.16186	0.14873	0.13506	0.13171
1975	0.00499	0.01693	0.03516	0.05925	0.08742	0.11839	0.14235	0.15948	0.17376	0.18421	0.17922	0.17107	0.16178	0.14822	0.13747	0.12846
1976	0.00691	0.02123	0.04407	0.07588	0.11049	0.14924	0.16775	0.18315	0.19044	0.19171	0.18039	0.17112	0.15060	0.14140	0.12669	0.11945
1977	0.00691	0.02051	0.04394	0.07696	0.11024	0.14380	0.16827	0.18199	0.18597	0.18000	0.17529	0.16204	0.14712	0.13564	0.12201	0.11246
1978	0.00625	0.01742	0.04006	0.06916	0.10270	0.13360	0.15209	0.17201	0.16974	0.16872	0.15752	0.15013	0.13859	0.12694	0.11269	0.10286
1979	0.00510	0.01712	0.03608	0.06424	0.09236	0.12459	0.14587	0.16019	0.16065	0.16147	0.15232	0.14495	0.13515	0.12265	0.10691	0.10033
1980	0.00583	0.01677	0.03701	0.06332	0.09053	0.12233	0.14232	0.15261	0.15706	0.15957	0.15211	0.14095	0.12906	0.12019	0.10939	0.09940
1981	0.00583	0.01639	0.03419	0.05780	0.08512	0.10842	0.12784	0.14275	0.15050	0.14837	0.14497	0.13903	0.12615	0.11722	0.10839	0.09892
1982	0.00613	0.01527	0.03497	0.05733	0.08427	0.10912	0.12585	0.14048	0.14496	0.14445	0.14305	0.13991	0.12385	0.11481	0.10569	0.09697
1983	0.00566	0.01540	0.03360	0.05473	0.08051	0.10355	0.11846	0.13202	0.13562	0.13742	0.13681	0.12923	0.12127	0.10904	0.09771	0.09063
1984	0.00541	0.01525	0.03306	0.05443	0.07967	0.10263	0.11663	0.12745	0.13621	0.13531	0.13244	0.12675	0.11652	0.11022	0.09838	0.08750
1985	0.00412	0.01352	0.02884	0.05011	0.07153	0.09197	0.10398	0.11401	0.12012	0.12275	0.12114	0.11498	0.11149	0.09874	0.09147	0.08046
1986	0.00454	0.01217	0.02765	0.04534	0.06803	0.08662	0.10088	0.11084	0.11886	0.11924	0.11679	0.11629	0.10617	0.09951	0.08873	0.08067
1987	0.00419	0.01131	0.02545	0.04220	0.06412	0.08276	0.09399	0.10383	0.10961	0.11639	0.11533	0.11047	0.10554	0.09871	0.09075	0.08133
1988	0.00413	0.01134	0.02327	0.03961	0.06087	0.07783	0.09140	0.10313	0.10826	0.11451	0.11545	0.11420	0.10733	0.10353	0.09350	0.08120
1989	0.00427	0.01108	0.02261	0.03767	0.05627	0.07234	0.08609	0.09826	0.10492	0.10944	0.11103	0.11178	0.10813	0.09891	0.09264	0.08359
1990	0.00395	0.01029	0.02165	0.03450	0.05088	0.06443	0.08001	0.09142	0.10206	0.10934	0.11251	0.11208	0.11065	0.10365	0.09435	0.08383
1991	0.00406	0.01059	0.02177	0.03303	0.04818	0.06039	0.07540	0.08800	0.09771	0.10504	0.11086	0.11701	0.11094	0.10568	0.09787	0.08664
1992	0.00385	0.00968	0.01979	0.03276	0.04620	0.05867	0.06907	0.08121	0.09317	0.10000	0.10946	0.11458	0.11122	0.10750	0.10089	0.09067
1993	0.00426	0.01098	0.02128	0.03096	0.04370	0.05795	0.06527	0.07668	0.08835	0.09735	0.10497	0.11094	0.10993	0.10575	0.09866	0.09222
1994	0.00420	0.00999	0.01969	0.02983	0.03925	0.05230	0.06210	0.06925	0.07884	0.08989	0.09766	0.10373	0.10571	0.10315	0.09765	0.08727
1995	0.00393	0.00972	0.01829	0.02861	0.03790	0.04717	0.05688	0.06512	0.07363	0.08292	0.09154	0.09969	0.10064	0.10203	0.09789	0.09133
1996	0.00416	0.00960	0.01844	0.02816	0.03946	0.04667	0.05486	0.06427	0.07354	0.08181	0.09212	0.09978	0.10498	0.10304	0.09921	0.09458
1997	0.00444	0.01025	0.01997	0.02896	0.03787	0.04848	0.05452	0.06334	0.07140	0.08033	0.09187	0.09833	0.10465	0.10529	0.10414	0.09918
1998	0.00447	0.00993	0.01923	0.02890	0.03770	0.04543	0.05403	0.06088	0.06833	0.07741	0.08854	0.09503	0.10016	0.10407	0.10483	0.10002
1999	0.00470	0.01053	0.01869	0.02855	0.03898	0.04469	0.05207	0.06123	0.06905	0.07840	0.08909	0.09721	0.10401	0.10607	0.10258	0.10109
2000	0.00504	0.01146	0.02034	0.02916	0.03876	0.04745	0.05402	0.06041	0.06966	0.07867	0.08932	0.09664	0.10479	0.10839	0.10590	0.10286
2001	0.00445	0.01102	0.01923	0.02706	0.03697	0.04111	0.05041	0.05516	0.06251	0.07029	0.07980	0.08815	0.09536	0.09884	0.10165	0.10036
2002	0.00468	0.01153	0.02065	0.02737	0.03642	0.04170	0.04747	0.05305	0.06139	0.06789	0.07785	0.08665	0.09596	0.09947	0.10393	0.10135
2003	0.00468	0.01069	0.01951	0.02718	0.03423	0.03996	0.04534	0.04863	0.05643	0.06620	0.07331	0.08230	0.09272	0.09792	0.10039	0.10296
2004	0.00427	0.01119	0.01923	0.02670	0.03382	0.03748	0.04355	0.04824	0.05330	0.06069	0.06869	0.07859	0.08791	0.09297	0.09679	0.09674
2005	0.00452	0.01029	0.01794	0.02615	0.03455	0.03779	0.04360	0.04863	0.05338	0.05801	0.06660	0.07602	0.08616	0.09548	0.09673	0.10164
2006	0.00362	0.01001	0.01486	0.02410	0.03162	0.03758	0.04190	0.04594	0.05095	0.05586	0.06431	0.07385	0.08109	0.08979	0.09365	0.09587
2007	0.00401	0.00927	0.01529	0.02454	0.03088	0.03672	0.04099	0.04543	0.04794	0.05420	0.06333	0.07106	0.07742	0.08479	0.09303	0.09415
2008	0.00369	0.00818	0.01496	0.02224	0.03020	0.03774	0.04194	0.04740	0.05208	0.05602	0.06379	0.07058	0.07993	0.08926	0.09308	0.09647
2009	0.00337	0.00862	0.01335	0.02117	0.02864	0.03552	0.03941	0.04573	0.04855	0.05520	0.06178	0.06803	0.07521	0.08324	0.09022	0.09238
2010	0.00323	0.00819	0.01315	0.01905	0.02678	0.03317	0.03982	0.04457	0.05246	0.05709	0.06174	0.07026	0.07897	0.08723	0.09139	0.09606
2011	0.00313	0.00662	0.01171	0.01679	0.02598	0.02975	0.03573	0.04121	0.04586	0.04987	0.05717	0.06600	0.07425	0.08429	0.09018	0.09371
2012	0.00269	0.00646	0.01043	0.01606	0.02334	0.02797	0.03205	0.03706	0.04262	0.04818	0.05404	0.06340	0.07177	0.07793	0.08630	0.09090

Source: Human Fertility Database. Own elaboration.

Table A.10. (Continued)Age Specific fertility rates between ages 31 to 49, in years 1960 to 2012, in Portugal

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1960	0.13463	0.12954	0.12525	0.11499	0.11149	0.10617	0.09247	0.08838	0.07322	0.06524	0.05204	0.04365	0.03227	0.02345	0.01028	0.00561	0.00255	0.00139	0.00045
1961	0.13743	0.13926	0.12770	0.12268	0.11402	0.10721	0.09633	0.09057	0.07669	0.06839	0.04771	0.04570	0.03050	0.02285	0.00989	0.00492	0.00243	0.00115	0.00045
1962	0.14257	0.13812	0.13139	0.11895	0.11716	0.10642	0.09417	0.09022	0.07768	0.06818	0.05006	0.04300	0.03401	0.02090	0.01016	0.00530	0.00236	0.00095	0.00030
1963	0.14413	0.13788	0.12600	0.12176	0.10877	0.10342	0.09453	0.08514	0.07749	0.06637	0.04903	0.04184	0.02981	0.02351	0.00909	0.00484	0.00241	0.00112	0.00043
1964	0.14355	0.14493	0.13094	0.12002	0.11717	0.10458	0.09729	0.08975	0.07796	0.06827	0.05018	0.04335	0.03046	0.02143	0.00953	0.00500	0.00251	0.00103	0.00033
1965	0.14211	0.13906	0.13140	0.11866	0.10652	0.10336	0.09267	0.08689	0.07489	0.06434	0.04671	0.04253	0.02966	0.02013	0.00927	0.00480	0.00253	0.00117	0.00052
1966	0.14003	0.13691	0.12676	0.11796	0.10709	0.09711	0.09590	0.08538	0.07306	0.06114	0.04626	0.04262	0.02903	0.01996	0.00960	0.00528	0.00216	0.00108	0.00027
1967	0.13524	0.13320	0.12596	0.11390	0.10806	0.09576	0.08836	0.08273	0.07161	0.06196	0.04558	0.03993	0.02820	0.02009	0.00935	0.00551	0.00228	0.00121	0.00048
1968	0.13433	0.12914	0.12088	0.11358	0.10240	0.09615	0.08658	0.07675	0.07190	0.05728	0.04466	0.03749	0.02776	0.01870	0.00908	0.00494	0.00166	0.00097	0.00053
1969	0.13614	0.12874	0.11584	0.10688	0.10441	0.09299	0.08641	0.07431	0.06561	0.05971	0.04274	0.03765	0.02588	0.01760	0.00849	0.00456	0.00203	0.00099	0.00042
1970	0.13929	0.12339	0.11274	0.10366	0.09379	0.09150	0.07850	0.07391	0.06120	0.05050	0.04168	0.03388	0.02354	0.01551	0.00770	0.00422	0.00219	0.00137	0.00029
1971	0.13039	0.12951	0.11343	0.10264	0.09913	0.08592	0.07683	0.07022	0.06181	0.04935	0.03927	0.03449	0.02548	0.01631	0.00819	0.00412	0.00177	0.00126	0.00046
1972	0.11912	0.11314	0.10714	0.09599	0.08947	0.07926	0.07117	0.06629	0.05819	0.04870	0.03773	0.02875	0.02309	0.01398	0.00775	0.00403	0.00155	0.00091	0.00061
1973	0.11483	0.10651	0.10149	0.09872	0.08579	0.07743	0.06995	0.06218	0.05473	0.04846	0.03711	0.02932	0.02122	0.01524	0.00778	0.00465	0.00189	0.00116	0.00073
1974	0.10974	0.10231	0.09224	0.08825	0.08477	0.07645	0.06739	0.05976	0.05345	0.04501	0.03473	0.02937	0.01810	0.01328	0.00759	0.00342	0.00190	0.00063	0.00035
1975	0.11205	0.10105	0.08990	0.08176	0.07672	0.07132	0.06242	0.05625	0.04930	0.04185	0.03318	0.02579	0.01979	0.01180	0.00641	0.00336	0.00154	0.00086	0.00037
1976	0.10109	0.09401	0.08130	0.07398	0.06673	0.06481	0.05687	0.05188	0.04548	0.03778	0.02866	0.02416	0.01714	0.01104	0.00593	0.00361	0.00151	0.00066	0.00031
1977	0.09845	0.08777	0.07876	0.06503	0.06124	0.05575	0.04846	0.04687	0.04084	0.03313	0.02634	0.02036	0.01563	0.00992	0.00632	0.00378	0.00158	0.00078	0.00032
1978	0.08689	0.07911	0.07141	0.06284	0.05469	0.04897	0.04164	0.03825	0.03480	0.02982	0.02290	0.01764	0.01316	0.00904	0.00531	0.00310	0.00145	0.00067	0.00035
1979	0.08602	0.07629	0.06696	0.05815	0.05332	0.04472	0.03824	0.03489	0.03076	0.02668	0.02038	0.01572	0.01140	0.00800	0.00478	0.00285	0.00139	0.00069	0.00041
1980	0.08624	0.07330	0.06336	0.05601	0.04923	0.04352	0.03587	0.03152	0.02725	0.02445	0.01952	0.01501	0.01016	0.00733	0.00428	0.00272	0.00105	0.00073	0.00050
1981	0.08512	0.07383	0.06108	0.05203	0.04702	0.04008	0.03447	0.02861	0.02454	0.02149	0.01742	0.01320	0.00989	0.00574	0.00391	0.00184	0.00132	0.00073	0.00047
1982	0.08282	0.07190	0.05972	0.05351	0.04463	0.03883	0.03208	0.02845	0.02360	0.01808	0.01495	0.01135	0.00861	0.00524	0.00372	0.00184	0.00109	0.00041	0.00040
1983	0.07912	0.06641	0.05909	0.04906	0.04226	0.03536	0.03112	0.02546	0.02052	0.01744	0.01352	0.01002	0.00746	0.00568	0.00318	0.00174	0.00083	0.00039	0.00026
1984	0.07706	0.06768	0.05596	0.04811	0.04154	0.03394	0.03036	0.02414	0.02008	0.01640	0.01179	0.00951	0.00619	0.00384	0.00274	0.00166	0.00074	0.00024	0.00025
1985	0.06884	0.06120	0.05281	0.04490	0.03890	0.03153	0.02652	0.02186	0.01896	0.01469	0.01104	0.00819	0.00589	0.00380	0.00233	0.00118	0.00070	0.00031	0.00024
1986	0.06710	0.05936	0.05023	0.04342	0.03663	0.02981	0.02513	0.02005	0.01646	0.01364	0.00991	0.00758	0.00569	0.00304	0.00228	0.00119	0.00062	0.00037	0.00018
1987	0.06779	0.05858	0.05021	0.04470	0.03776	0.03145	0.02451	0.01963	0.01558	0.01233	0.00973	0.00681	0.00487	0.00268	0.00159	0.00089	0.00072	0.00026	0.00023
1988	0.06945	0.05942	0.05001	0.04255	0.03558	0.02973	0.02429	0.01851	0.01396	0.01144	0.00868	0.00636	0.00442	0.00298	0.00153	0.00076	0.00059	0.00026	0.00007
1989	0.07032	0.05809	0.04941	0.04315	0.03471	0.02930	0.02371	0.01873	0.01374	0.01093	0.00726	0.00520	0.00394	0.00267	0.00117	0.00096	0.00031	0.00021	0.00010
1990	0.07164	0.06026	0.04948	0.04240	0.03364	0.02857	0.02245	0.01783	0.01349	0.01017	0.00742	0.00528	0.00326	0.00211	0.00102	0.00059	0.00032	0.00018	0.00016
1991	0.07492	0.06243	0.05307	0.04418	0.03624	0.02954	0.02304	0.01719	0.01394	0.01065	0.00777	0.00502	0.00284	0.00193	0.00097	0.00050	0.00033	0.00022	0.00014
1992	0.07608	0.06515	0.05490	0.04483	0.03766	0.02916	0.02196	0.01710	0.01276	0.01014	0.00752	0.00460	0.00352	0.00164	0.00085	0.00043	0.00020	0.00015	0.00005
1993	0.07925	0.06864	0.05494	0.04606	0.03746	0.02959	0.02285	0.01715	0.01315	0.00989	0.00721	0.00462	0.00322	0.00178	0.00089	0.00050	0.00012	0.00022	0.00003
1994	0.07724	0.06721	0.05551	0.04641	0.03751	0.02933	0.02278	0.01802	0.01270	0.01013	0.00698	0.00442	0.00249	0.00199	0.00085	0.00038	0.00021	0.00006	0.00016
1995	0.07825	0.06847	0.05627	0.04765	0.03852	0.03017	0.02353	0.01752	0.01360	0.00993	0.00673	0.00458	0.00286	0.00168	0.00101	0.00044	0.00026	0.00011	0.00008
1996	0.08318	0.07248	0.06129	0.05162	0.04198	0.03370	0.02446	0.01844	0.01355	0.00983	0.00718	0.00452	0.00275	0.00155	0.00077	0.00039	0.00024	0.00009	0.00005
1997	0.08766	0.07434	0.06349	0.05349	0.04413	0.03542	0.02640	0.01996	0.01460	0.01075	0.00666	0.00482	0.00287	0.00208	0.00086	0.00057	0.00021	0.00010	0.00006
1998	0.09268	0.07787	0.06714	0.05820	0.04813	0.03597	0.02778	0.02157	0.01593	0.01023	0.00683	0.00506	0.00287	0.00178	0.00077	0.00032	0.00023	0.00006	0.00004
1999	0.08960	0.08162	0.06847	0.05903	0.04978	0.04000	0.03298	0.02369	0.01676	0.01184	0.00789	0.00514	0.00358	0.00165	0.00097	0.00039	0.00026	0.00001	0.00006
2000	0.09593	0.08599	0.07370	0.06295	0.05280	0.04206	0.03223	0.02531	0.01830	0.01304	0.00848	0.00558	0.00323	0.00221	0.00093	0.00069	0.00037	0.00014	0.00010
2001	0.09106	0.07965	0.07138	0.06136	0.05170	0.04140	0.03258	0.02467	0.01751	0.01315	0.00896	0.00547	0.00291	0.00186	0.00098	0.00056	0.00023	0.00013	0.00014
2002	0.09376	0.08350	0.07393	0.06329	0.05392	0.04369	0.03373	0.02450	0.01967	0.01369	0.00858	0.00594	0.00319	0.00209	0.00095	0.00057	0.00034	0.00016	0.00011
2003	0.09380	0.08454	0.07476	0.06555	0.05549	0.04408	0.03449	0.02569	0.01964	0.01413	0.01000	0.00570	0.00360	0.00181	0.00100	0.00049	0.00029	0.00013	0.00009
2004	0.09291	0.08559	0.07720	0.06590	0.05595	0.04359	0.03439	0.02703	0.02073	0.01365	0.00995	0.00679	0.00393	0.00209	0.00119	0.00059	0.00032	0.00026	0.00021
2005	0.09181	0.08790	0.07701	0.06962	0.05844	0.04592	0.03579	0.02845	0.02085	0.01489	0.00993	0.00582	0.00403	0.00230	0.00119	0.00047	0.00018	0.00014	0.00014
2006	0.09310	0.08639	0.07691	0.06745	0.05903	0.04716	0.03730	0.02812	0.02098	0.01558	0.01006	0.00653	0.00370	0.00245	0.00119	0.00050	0.00021	0.00009	0.00000

2007	0.09114	0.08322	0.07576	0.06934	0.05843	0.04968	0.03754	0.02948	0.02118	0.01529	0.01052	0.00552	0.00384	0.00205	0.00086	0.00039	0.00012	0.00005	0.00008
2008	0.09486	0.08607	0.08101	0.07198	0.06252	0.05101	0.03969	0.03139	0.02364	0.01598	0.01073	0.00666	0.00397	0.00204	0.00114	0.00057	0.00019	0.00008	0.00007
2009	0.08993	0.08604	0.07795	0.07001	0.06143	0.05049	0.03892	0.03160	0.02331	0.01657	0.01015	0.00738	0.00397	0.00219	0.00120	0.00060	0.00026	0.00011	0.00005
2010	0.09601	0.08988	0.08173	0.07206	0.06417	0.05428	0.04178	0.03320	0.02519	0.01929	0.01192	0.00726	0.00442	0.00240	0.00110	0.00062	0.00018	0.00019	0.00006
2011	0.09283	0.08991	0.08193	0.07535	0.06601	0.05607	0.04415	0.03431	0.02498	0.01905	0.01229	0.00840	0.00418	0.00228	0.00109	0.00055	0.00025	0.00013	0.00004
2012	0.08879	0.08427	0.07975	0.07279	0.06222	0.05274	0.04218	0.03386	0.02505	0.01832	0.01193	0.00712	0.00443	0.00254	0.00133	0.00073	0.00016	0.00016	0.00015

Source: Human Fertility Database. Own elaboration.

Table A.11: Age Specific fertility rates between ages 15 to 30, in years 1960 to 2012, in Spain

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1960	0.00099	0.00295	0.00686	0.01371	0.02609	0.04344	0.07020	0.10269	0.13574	0.16239	0.18360	0.18951	0.18925	0.18676	0.18491	0.17182
1961	0.00110	0.00318	0.00716	0.01398	0.02648	0.04461	0.07240	0.10631	0.14057	0.16710	0.18143	0.18581	0.18489	0.18291	0.18263	0.17137
1962	0.00401	0.00696	0.00998	0.01446	0.02535	0.04687	0.07560	0.11230	0.14977	0.17508	0.18316	0.18788	0.18726	0.18488	0.18314	0.17073
1963	0.00094	0.00288	0.00687	0.01392	0.02644	0.04823	0.07697	0.11134	0.14635	0.17581	0.18853	0.19496	0.19521	0.19326	0.19191	0.17929
1964	0.00112	0.00334	0.00774	0.01532	0.02875	0.05168	0.08188	0.11772	0.15385	0.18372	0.19736	0.20355	0.20318	0.20029	0.19783	0.18389
1965	0.00097	0.00309	0.00763	0.01573	0.02946	0.05188	0.08018	0.11268	0.14548	0.17485	0.18987	0.19755	0.19838	0.19578	0.19246	0.17813
1966	0.00128	0.00372	0.00839	0.01620	0.02975	0.05280	0.08160	0.11498	0.14861	0.17767	0.19078	0.19776	0.19794	0.19477	0.19093	0.17605
1967	0.00134	0.00379	0.00835	0.01578	0.02861	0.05071	0.07757	0.10871	0.14063	0.16960	0.18922	0.19874	0.20105	0.19906	0.19533	0.18121
1968	0.00162	0.00448	0.00963	0.01792	0.03236	0.05674	0.08689	0.12120	0.15449	0.18111	0.19432	0.19782	0.19527	0.19050	0.18614	0.17285
1969	0.00165	0.00457	0.00983	0.01832	0.03328	0.05770	0.08893	0.12460	0.15897	0.18566	0.19747	0.20013	0.19629	0.18990	0.18371	0.16962
1970	0.00145	0.00436	0.01013	0.01981	0.03593	0.06000	0.09004	0.12309	0.15510	0.18271	0.19875	0.20323	0.19988	0.19218	0.18298	0.16514
1971	0.00161	0.00482	0.01110	0.02154	0.03895	0.06477	0.09694	0.13183	0.16462	0.19128	0.20478	0.20617	0.20041	0.19141	0.18203	0.16319
1972	0.00186	0.00531	0.01175	0.02222	0.04012	0.06704	0.10140	0.13868	0.17221	0.19574	0.20583	0.20307	0.19454	0.18461	0.17597	0.15809
1973	0.00205	0.00585	0.01285	0.02408	0.04297	0.07016	0.10416	0.14045	0.17342	0.19844	0.20968	0.20815	0.19952	0.18793	0.17625	0.15453
1974	0.00229	0.00697	0.01615	0.03082	0.05301	0.08086	0.11242	0.14321	0.17110	0.19640	0.20956	0.20841	0.20119	0.19149	0.18168	0.16211
1975	0.00321	0.00934	0.02012	0.03562	0.05686	0.07923	0.11020	0.14596	0.17772	0.19390	0.20111	0.20216	0.19401	0.17182	0.17440	0.15513
1976	0.00316	0.00961	0.02074	0.03745	0.05710	0.08520	0.11378	0.14710	0.18167	0.19957	0.20132	0.19635	0.19423	0.17913	0.16499	0.15432
1977	0.00318	0.00967	0.02119	0.03787	0.05908	0.08590	0.11264	0.14222	0.17132	0.19103	0.19432	0.18402	0.17559	0.17070	0.16194	0.14423
1978	0.00355	0.01021	0.02170	0.03881	0.05909	0.08374	0.10901	0.13789	0.16072	0.17761	0.18597	0.18221	0.16699	0.15679	0.15466	0.14380
1979	0.00396	0.01091	0.02229	0.03829	0.05946	0.08038	0.10487	0.13032	0.14875	0.16140	0.16807	0.17042	0.16139	0.14461	0.13882	0.13245
1980	0.00403	0.01126	0.02217	0.03684	0.05529	0.07810	0.09666	0.12165	0.13962	0.15120	0.15552	0.15529	0.15224	0.13999	0.12636	0.11991
1981	0.00346	0.01016	0.01995	0.03215	0.04858	0.06843	0.08778	0.10762	0.12874	0.14013	0.14429	0.14386	0.13985	0.13292	0.12426	0.11281
1982	0.00300	0.00910	0.01882	0.03137	0.04478	0.06183	0.07834	0.09952	0.11844	0.13167	0.13990	0.13821	0.13209	0.12570	0.12354	0.11534
1983	0.00288	0.00837	0.01754	0.02905	0.04273	0.05528	0.06785	0.08773	0.10622	0.11896	0.13071	0.12980	0.12616	0.12069	0.11396	0.10576
1984	0.00288	0.00826	0.01714	0.02711	0.03994	0.05323	0.06425	0.07911	0.09644	0.11310	0.12164	0.12902	0.12405	0.11734	0.11050	0.10470
1985	0.00259	0.00803	0.01660	0.02660	0.03760	0.04958	0.05995	0.07205	0.08618	0.10290	0.11617	0.12197	0.12345	0.11611	0.10820	0.09781
1986	0.00215	0.00650	0.01460	0.02451	0.03527	0.04378	0.05477	0.06699	0.07848	0.09320	0.10699	0.11762	0.11752	0.11543	0.10929	0.09923
1987	0.00200	0.00623	0.01357	0.02324	0.03403	0.04204	0.04984	0.06184	0.07494	0.08631	0.10050	0.10960	0.11546	0.11306	0.10946	0.09866
1988	0.00203	0.00598	0.01321	0.02292	0.03204	0.04062	0.04716	0.05645	0.06919	0.08395	0.09642	0.10519	0.11211	0.11222	0.10773	0.09880
1989	0.00178	0.00547	0.01164	0.01898	0.02819	0.03618	0.04315	0.05214	0.06272	0.07888	0.09240	0.10118	0.10820	0.10998	0.10906	0.09934
1990	0.00163	0.00503	0.01033	0.01730	0.02497	0.03188	0.03978	0.04892	0.05949	0.07128	0.08776	0.10045	0.10531	0.10747	0.10729	0.10085
1991	0.00169	0.00464	0.00982	0.01606	0.02235	0.02853	0.03510	0.04382	0.05494	0.06706	0.08147	0.09600	0.10449	0.10603	0.10558	0.10223
1992	0.00163	0.00425	0.00916	0.01424	0.02051	0.02544	0.03218	0.04015	0.04929	0.06299	0.07718	0.09067	0.10221	0.10982	0.10778	0.10284

1993	0.00139	0.00391	0.00800	0.01312	0.01875	0.02246	0.02790	0.03422	0.04428	0.05618	0.07080	0.08469	0.09436	0.10503	0.10956	0.10367
1994	0.00138	0.00376	0.00715	0.01188	0.01612	0.01986	0.02391	0.02964	0.03800	0.04903	0.06074	0.07701	0.08788	0.09633	0.10419	0.10347
1995	0.00145	0.00366	0.00719	0.01063	0.01451	0.01797	0.02135	0.02582	0.03308	0.04330	0.05583	0.06931	0.08293	0.09382	0.09934	0.10288
1996	0.00123	0.00359	0.00697	0.01029	0.01358	0.01683	0.01955	0.02420	0.03005	0.03865	0.05018	0.06482	0.07798	0.09095	0.09956	0.10018
1997	0.00136	0.00350	0.00723	0.01085	0.01432	0.01709	0.01992	0.02253	0.02860	0.03614	0.04675	0.06032	0.07381	0.08717	0.09911	0.10401
1998	0.00139	0.00353	0.00699	0.01097	0.01449	0.01659	0.01857	0.02207	0.02708	0.03399	0.04354	0.05503	0.06934	0.08214	0.09348	0.09965
1999	0.00161	0.00384	0.00751	0.01178	0.01574	0.01788	0.02003	0.02277	0.02709	0.03342	0.04260	0.05385	0.06699	0.08105	0.09363	0.10116
2000	0.00176	0.00427	0.00774	0.01206	0.01646	0.01921	0.02164	0.02456	0.02760	0.03349	0.04228	0.05312	0.06703	0.08127	0.09509	0.10196
2001	0.00191	0.00465	0.00850	0.01356	0.01771	0.02077	0.02294	0.02554	0.02848	0.03372	0.04165	0.05120	0.06401	0.07779	0.09064	0.10011
2002	0.00185	0.00507	0.00884	0.01349	0.01821	0.02192	0.02388	0.02717	0.02977	0.03439	0.04156	0.05010	0.06221	0.07622	0.08811	0.09878
2003	0.00213	0.00499	0.00933	0.01495	0.01961	0.02250	0.02519	0.02771	0.03147	0.03564	0.04270	0.05061	0.06273	0.07559	0.08932	0.09952
2004	0.00194	0.00524	0.00972	0.01501	0.02019	0.02407	0.02699	0.02927	0.03204	0.03750	0.04356	0.05070	0.06117	0.07444	0.08543	0.09841
2005	0.00220	0.00538	0.01033	0.01617	0.02135	0.02448	0.02689	0.02959	0.03321	0.03712	0.04367	0.05110	0.06146	0.07155	0.08464	0.09636
2006	0.00215	0.00596	0.01087	0.01707	0.02247	0.02691	0.02911	0.03157	0.03434	0.03909	0.04530	0.05346	0.06087	0.07329	0.08466	0.09551
2007	0.00240	0.00605	0.01203	0.01772	0.02459	0.02859	0.03154	0.03411	0.03695	0.04088	0.04687	0.05359	0.06188	0.07166	0.08266	0.09336
2008	0.00247	0.00609	0.01140	0.01901	0.02601	0.03135	0.03437	0.03752	0.04034	0.04479	0.05002	0.05789	0.06499	0.07488	0.08422	0.09556
2009	0.00219	0.00552	0.01022	0.01652	0.02345	0.02833	0.03186	0.03475	0.03696	0.04133	0.04673	0.05200	0.06041	0.07082	0.08119	0.08883
2010	0.00189	0.00481	0.00904	0.01542	0.02060	0.02714	0.02966	0.03299	0.03729	0.04082	0.04592	0.05105	0.05926	0.06929	0.07859	0.08915
2011	0.00201	0.00453	0.00841	0.01307	0.01836	0.02315	0.02664	0.02996	0.03391	0.03862	0.04310	0.04915	0.05648	0.06666	0.07825	0.08563
2012	0.00181	0.00435	0.00814	0.01264	0.01719	0.02167	0.02548	0.02917	0.03288	0.03635	0.04219	0.04895	0.05588	0.06464	0.07437	0.08454

Source: Human Fertility Database. Own elaboration.

Table A.11. (Continued)Age Specific fertility rates between ages 31 to 49, in years 1960 to 2012, in Spain

	31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**
1960	0.15110	0.13658	0.12758	0.12217	0.11051	0.09488	0.08227	0.07123	0.06071	0.05139	0.04035	0.02775	0.01744	0.01035	0.00605	0.00374	0.00257	0.00187	0.00136
1961	0.15188	0.13732	0.12723	0.12008	0.10683	0.09044	0.07849	0.06879	0.05965	0.05088	0.04011	0.02711	0.01655	0.00949	0.00549	0.00333	0.00223	0.00157	0.00110
1962	0.15087	0.13625	0.12624	0.11922	0.10620	0.09012	0.07808	0.06811	0.05869	0.05005	0.03943	0.02636	0.01585	0.00893	0.00509	0.00309	0.00217	0.00168	0.00131
1963	0.15834	0.14254	0.13141	0.12338	0.10901	0.09182	0.07945	0.06958	0.06039	0.05126	0.04042	0.02747	0.01691	0.00978	0.00569	0.00346	0.00228	0.00157	0.00107
1964	0.16162	0.14571	0.13541	0.12878	0.11533	0.09824	0.08525	0.07432	0.06393	0.05549	0.04369	0.02893	0.01716	0.00951	0.00523	0.00317	0.00227	0.00184	0.00152
1965	0.15622	0.14093	0.13147	0.12585	0.11387	0.09805	0.08475	0.07289	0.06167	0.05291	0.04188	0.02863	0.01779	0.01038	0.00576	0.00357	0.00270	0.00238	0.00216
1966	0.15391	0.13858	0.12915	0.12354	0.11124	0.09544	0.08249	0.07104	0.06016	0.05183	0.04064	0.02740	0.01674	0.00962	0.00524	0.00322	0.00234	0.00190	0.00158
1967	0.15928	0.14375	0.13398	0.12812	0.11630	0.10069	0.08681	0.07417	0.06237	0.05292	0.04225	0.03042	0.02038	0.01299	0.00765	0.00493	0.00383	0.00338	0.00301
1968	0.15081	0.13551	0.12593	0.12000	0.10718	0.09186	0.07935	0.06835	0.05790	0.04943	0.03877	0.02658	0.01666	0.00986	0.00551	0.00341	0.00239	0.00179	0.00135
1969	0.14650	0.13113	0.12218	0.11726	0.10489	0.09016	0.07799	0.06709	0.05660	0.04789	0.03721	0.02504	0.01532	0.00884	0.00492	0.00300	0.00203	0.00146	0.00105
1970	0.14122	0.12558	0.11672	0.11220	0.10188	0.08776	0.07593	0.06531	0.05513	0.04684	0.03675	0.02490	0.01533	0.00888	0.00497	0.00306	0.00220	0.00175	0.00141
1971	0.13933	0.12344	0.11395	0.10850	0.09809	0.08355	0.07235	0.06277	0.05357	0.04593	0.03584	0.02366	0.01403	0.00780	0.00429	0.00258	0.00174	0.00127	0.00093
1972	0.13506	0.11987	0.11094	0.10589	0.09653	0.08262	0.07159	0.06196	0.05267	0.04473	0.03492	0.02330	0.01404	0.00795	0.00442	0.00268	0.00180	0.00129	0.00092
1973	0.13036	0.11481	0.10596	0.10121	0.09349	0.07995	0.06883	0.05892	0.04942	0.04164	0.03223	0.02108	0.01240	0.00684	0.00370	0.00224	0.00157	0.00123	0.00098
1974	0.13916	0.12215	0.10994	0.10087	0.08934	0.07395	0.06370	0.05602	0.04903	0.04253	0.03362	0.02252	0.01353	0.00761	0.00420	0.00251	0.00159	0.00103	0.00067
1975	0.13130	0.11405	0.09583	0.08963	0.08271	0.06657	0.06152	0.05612	0.04744	0.03779	0.02731	0.02010	0.01350	0.00870	0.00459	0.00222	0.00097	0.00058	0.00043
1976	0.13042	0.11663	0.10183	0.08370	0.07963	0.07352	0.05480	0.05010	0.04589	0.03858	0.02671	0.02016	0.01314	0.00815	0.00452	0.00238	0.00112	0.00057	0.00031
1977	0.12184	0.11083	0.09889	0.08571	0.06929	0.06607	0.05993	0.04452	0.04021	0.03519	0.02591	0.01857	0.01235	0.00754	0.00445	0.00237	0.00102	0.00051	0.00025
1978	0.11273	0.10254	0.09311	0.08316	0.07172	0.05839	0.05376	0.04807	0.03421	0.03138	0.02376	0.01759	0.01106	0.00685	0.00382	0.00201	0.00111	0.00047	0.00022
1979	0.11111	0.09085	0.08290	0.07542	0.06655	0.05736	0.04590	0.04258	0.03643	0.02537	0.01930	0.01606	0.01012	0.00626	0.00345	0.00167	0.00095	0.00053	0.00026
1980	0.10272	0.09109	0.07486	0.06890	0.06208	0.05411	0.04455	0.03456	0.03311	0.02887	0.01598	0.01361	0.00950	0.00588	0.00339	0.00158	0.00082	0.00044	0.00032

1981	0.09210	0.08401	0.07311	0.06039	0.05489	0.04945	0.04205	0.03439	0.02663	0.02464	0.01804	0.01124	0.00763	0.00504	0.00274	0.00130	0.00075	0.00034	0.00021
1982	0.08868	0.07742	0.07214	0.06249	0.05141	0.04662	0.04032	0.03365	0.02712	0.02152	0.01699	0.01238	0.00674	0.00451	0.00270	0.00155	0.00074	0.00029	0.00022
1983	0.08861	0.07297	0.06416	0.06013	0.05082	0.04147	0.03629	0.03153	0.02613	0.02032	0.01360	0.01058	0.00714	0.00373	0.00235	0.00132	0.00069	0.00028	0.00018
1984	0.08788	0.07562	0.06183	0.05421	0.05055	0.04293	0.03313	0.02903	0.02425	0.01970	0.01382	0.00854	0.00667	0.00437	0.00205	0.00112	0.00066	0.00034	0.00022
1985	0.08416	0.07462	0.06289	0.05189	0.04537	0.04068	0.03420	0.02592	0.02174	0.01766	0.01299	0.00869	0.00552	0.00349	0.00212	0.00090	0.00056	0.00031	0.00031
1986	0.08192	0.07071	0.06187	0.05224	0.04267	0.03636	0.03222	0.02580	0.01930	0.01594	0.01139	0.00808	0.00512	0.00277	0.00175	0.00095	0.00039	0.00023	0.00018
1987	0.08099	0.06990	0.05956	0.05130	0.04333	0.03502	0.02856	0.02431	0.01958	0.01390	0.00986	0.00737	0.00460	0.00276	0.00138	0.00078	0.00039	0.00018	0.00013
1988	0.08356	0.07049	0.05904	0.04929	0.04236	0.03462	0.02619	0.02199	0.01733	0.01385	0.00836	0.00638	0.00408	0.00247	0.00131	0.00058	0.00033	0.00017	0.00007
1989	0.08558	0.07224	0.05932	0.04912	0.04122	0.03324	0.02690	0.01997	0.01592	0.01270	0.00864	0.00562	0.00362	0.00235	0.00116	0.00048	0.00027	0.00013	0.00008
1990	0.08701	0.07512	0.06135	0.04955	0.04118	0.03324	0.02666	0.02069	0.01484	0.01081	0.00821	0.00506	0.00329	0.00188	0.00106	0.00052	0.00023	0.00011	0.00010
1991	0.08910	0.07579	0.06406	0.05281	0.04198	0.03253	0.02633	0.02026	0.01504	0.01087	0.00770	0.00514	0.00324	0.00156	0.00093	0.00046	0.00021	0.00009	0.00007
1992	0.09216	0.08076	0.06659	0.05564	0.04477	0.03435	0.02641	0.02007	0.01567	0.01131	0.00721	0.00453	0.00305	0.00163	0.00081	0.00039	0.00023	0.00007	0.00006
1993	0.09193	0.08076	0.06907	0.05522	0.04594	0.03560	0.02607	0.01996	0.01556	0.01070	0.00685	0.00442	0.00271	0.00151	0.00075	0.00031	0.00017	0.00013	0.00004
1994	0.09161	0.08052	0.06879	0.05792	0.04623	0.03712	0.02758	0.02034	0.01507	0.01041	0.00708	0.00414	0.00247	0.00139	0.00076	0.00027	0.00017	0.00007	0.00006
1995	0.09600	0.08359	0.07194	0.05987	0.04947	0.03826	0.02880	0.02137	0.01422	0.01044	0.00660	0.00420	0.00246	0.00120	0.00075	0.00031	0.00012	0.00004	0.00004
1996	0.09767	0.08892	0.07506	0.06298	0.05106	0.04079	0.03022	0.02233	0.01537	0.01057	0.00678	0.00418	0.00246	0.00131	0.00062	0.00026	0.00016	0.00007	0.00002
1997	0.09839	0.09117	0.08194	0.06808	0.05501	0.04364	0.03289	0.02340	0.01736	0.01166	0.00720	0.00433	0.00251	0.00129	0.00072	0.00029	0.00012	0.00006	0.00004
1998	0.09706	0.09033	0.08348	0.07373	0.05740	0.04550	0.03415	0.02536	0.01801	0.01193	0.00747	0.00462	0.00242	0.00132	0.00061	0.00032	0.00015	0.00007	0.00003
1999	0.10116	0.09531	0.08586	0.07646	0.06454	0.04929	0.03701	0.02752	0.02019	0.01309	0.00855	0.00492	0.00296	0.00144	0.00071	0.00031	0.00021	0.00012	0.00006
2000	0.10275	0.09998	0.09116	0.07976	0.06769	0.05495	0.04009	0.02916	0.02119	0.01435	0.00854	0.00525	0.00301	0.00160	0.00084	0.00039	0.00021	0.00008	0.00007
2001	0.10158	0.09864	0.09289	0.08131	0.07037	0.05683	0.04266	0.03118	0.02207	0.01519	0.00956	0.00571	0.00323	0.00175	0.00090	0.00043	0.00021	0.00011	0.00011
2002	0.10147	0.10071	0.09307	0.08363	0.07226	0.05770	0.04451	0.03347	0.02348	0.01603	0.01002	0.00639	0.00311	0.00187	0.00101	0.00039	0.00023	0.00017	0.00008
2003	0.10406	0.10297	0.09693	0.08803	0.07550	0.06190	0.04742	0.03563	0.02602	0.01730	0.01108	0.00655	0.00375	0.00201	0.00107	0.00041	0.00026	0.00017	0.00010
2004	0.10305	0.10371	0.09803	0.09163	0.07781	0.06393	0.04913	0.03719	0.02734	0.01850	0.01139	0.00681	0.00397	0.00212	0.00101	0.00055	0.00026	0.00012	0.00011
2005	0.10379	0.10453	0.09985	0.09234	0.08112	0.06555	0.05110	0.03864	0.02829	0.01897	0.01257	0.00752	0.00409	0.00238	0.00123	0.00055	0.00025	0.00018	0.00009
2006	0.10176	0.10383	0.10045	0.09421	0.08378	0.06909	0.05313	0.04053	0.02986	0.02053	0.01265	0.00804	0.00482	0.00261	0.00155	0.00091	0.00035	0.00025	0.00014
2007	0.09894	0.10093	0.09882	0.09293	0.08494	0.07235	0.05531	0.04113	0.03080	0.02141	0.01358	0.00829	0.00491	0.00298	0.00177	0.00093	0.00050	0.00024	0.00013
2008	0.10091	0.10314	0.10123	0.09720	0.08769	0.07467	0.06059	0.04546	0.03320	0.02304	0.01502	0.00953	0.00523	0.00335	0.00158	0.00095	0.00054	0.00032	0.00019
2009	0.09618	0.09736	0.09740	0.09335	0.08493	0.07302	0.06067	0.04717	0.03514	0.02346	0.01578	0.00948	0.00579	0.00328	0.00197	0.00102	0.00062	0.00040	0.00021
2010	0.09384	0.09842	0.09635	0.09406	0.08564	0.07529	0.06049	0.04819	0.03741	0.02601	0.01593	0.00983	0.00601	0.00341	0.00201	0.00109	0.00054	0.00034	0.00027
2011	0.09409	0.09663	0.09687	0.09360	0.08704	0.07587	0.06314	0.04915	0.03793	0.02747	0.01755	0.01067	0.00603	0.00342	0.00185	0.00105	0.00059	0.00030	0.00026
2012	0.09143	0.09600	0.09420	0.09211	0.08644	0.07485	0.06244	0.05039	0.03786	0.02852	0.01905	0.01193	0.00641	0.00386	0.00214	0.00118	0.00056	0.00033	0.00024

Source: Human Fertility Database. Own elaboration

Table A.12: Age Specific fertility rates between ages 15 to 30, in years 1960 to 2012, for Sweden

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1960	0.00232	0.01281	0.03201	0.05828	0.08317	0.10318	0.11785	0.13484	0.14191	0.14804	0.15209	0.14706	0.14087	0.13040	0.11654	0.10239
1961	0.00214	0.01314	0.03453	0.05776	0.08389	0.10284	0.12103	0.13399	0.14540	0.15545	0.15387	0.15122	0.14479	0.13112	0.12041	0.10832
1962	0.00248	0.01440	0.03536	0.06351	0.08490	0.10687	0.12482	0.13642	0.14681	0.15747	0.15700	0.15381	0.14528	0.13094	0.12105	0.10846
1963	0.00282	0.01439	0.03768	0.06380	0.08838	0.10636	0.12422	0.14266	0.15329	0.16046	0.16575	0.15840	0.15104	0.14046	0.12842	0.11168
1964	0.00333	0.01661	0.04186	0.07070	0.09640	0.11450	0.13018	0.14934	0.15876	0.17167	0.17556	0.16962	0.16033	0.14948	0.13535	0.12308
1965	0.00282	0.01838	0.04390	0.07320	0.09572	0.11473	0.13397	0.14378	0.15753	0.16288	0.17118	0.16191	0.15794	0.14451	0.12928	0.11572
1966	0.00314	0.01793	0.04477	0.07482	0.09924	0.11551	0.12854	0.14389	0.14732	0.16250	0.16715	0.16411	0.15230	0.13785	0.12860	0.11175
1967	0.00282	0.01606	0.04251	0.07224	0.09499	0.11330	0.12483	0.13803	0.14823	0.15241	0.16312	0.15462	0.15083	0.13704	0.12214	0.10337

1968	0.00243	0.01370	0.03714	0.06067	0.08375	0.09879	0.11361	0.12832	0.13597	0.14402	0.14813	0.14613	0.13838	0.12703	0.11242	0.09944
1969	0.00215	0.01071	0.02988	0.05264	0.07308	0.08981	0.10628	0.12016	0.12962	0.13566	0.14280	0.13450	0.13013	0.12218	0.10836	0.09270
1970	0.00268	0.01288	0.02980	0.05040	0.06982	0.08936	0.10714	0.12316	0.13633	0.14076	0.14228	0.14060	0.13258	0.11879	0.10480	0.09497
1971	0.00252	0.01239	0.03068	0.05046	0.07373	0.09451	0.11404	0.12880	0.14066	0.14642	0.15154	0.13993	0.13571	0.12046	0.10766	0.09596
1972	0.00257	0.01204	0.02957	0.04833	0.07285	0.09082	0.11224	0.12905	0.13748	0.14700	0.14503	0.14204	0.13124	0.12056	0.10816	0.09287
1973	0.00256	0.01008	0.02757	0.04548	0.06864	0.09149	0.11177	0.12529	0.13660	0.13981	0.14572	0.14078	0.13000	0.11907	0.10612	0.09161
1974	0.00193	0.00950	0.02550	0.04709	0.07484	0.09263	0.11059	0.12653	0.13818	0.14335	0.14505	0.14092	0.13193	0.12076	0.10393	0.08865
1975	0.00229	0.00814	0.02247	0.04182	0.06722	0.08546	0.10466	0.11769	0.12974	0.13661	0.14274	0.13531	0.12491	0.11404	0.10178	0.08654
1976	0.00141	0.00666	0.01923	0.03638	0.05912	0.08184	0.09347	0.11090	0.11887	0.12928	0.13509	0.13333	0.12149	0.11028	0.09763	0.08273
1977	0.00170	0.00565	0.01548	0.03135	0.05511	0.07505	0.09283	0.10591	0.11506	0.12769	0.13188	0.12917	0.12156	0.11238	0.09968	0.08597
1978	0.00111	0.00460	0.01301	0.02853	0.04916	0.06647	0.08696	0.10021	0.11003	0.12155	0.12753	0.12539	0.11768	0.11166	0.10121	0.08569
1979	0.00118	0.00364	0.01295	0.02571	0.04557	0.06346	0.08211	0.09521	0.11162	0.12448	0.12937	0.13068	0.12788	0.12024	0.10776	0.09195
1980	0.00094	0.00373	0.01109	0.02346	0.04318	0.06372	0.08167	0.09585	0.11103	0.12374	0.12884	0.13166	0.12943	0.12378	0.10969	0.09699
1981	0.00087	0.00317	0.00983	0.02215	0.03959	0.05768	0.07538	0.09168	0.10764	0.11744	0.12450	0.12615	0.12581	0.11801	0.10945	0.09798
1982	0.00060	0.00293	0.00870	0.01830	0.03793	0.05459	0.07285	0.08729	0.10122	0.11505	0.12497	0.12620	0.12384	0.12186	0.10950	0.09884
1983	0.00063	0.00239	0.00657	0.01678	0.03218	0.05076	0.06761	0.08491	0.09959	0.11364	0.12383	0.12541	0.12457	0.12139	0.11289	0.10007
1984	0.00061	0.00135	0.00607	0.01382	0.02987	0.04651	0.06824	0.08029	0.09740	0.11393	0.12536	0.13187	0.12978	0.12603	0.11626	0.10903
1985	0.00045	0.00198	0.00611	0.01423	0.02978	0.04842	0.06506	0.08255	0.10047	0.11923	0.12964	0.13509	0.13728	0.13372	0.12360	0.11339
1986	0.00060	0.00210	0.00619	0.01510	0.02979	0.04906	0.06681	0.08577	0.10112	0.11999	0.13281	0.14121	0.14064	0.13923	0.12816	0.11856
1987	0.00043	0.00238	0.00614	0.01480	0.02948	0.04752	0.06625	0.08709	0.10437	0.11954	0.12980	0.14077	0.14297	0.14469	0.13537	0.12439
1988	0.00067	0.00247	0.00681	0.01557	0.03157	0.05056	0.07095	0.09229	0.11040	0.12737	0.14178	0.14999	0.15255	0.14968	0.14451	0.13319
1989	0.00069	0.00288	0.00769	0.01703	0.03567	0.05240	0.07276	0.09229	0.11091	0.12998	0.14320	0.14938	0.15333	0.15533	0.14700	0.13459
1990	0.00078	0.00295	0.00820	0.01886	0.03802	0.05657	0.07637	0.09858	0.11869	0.13658	0.14933	0.15839	0.16223	0.15884	0.15252	0.14176
1991	0.00075	0.00267	0.00778	0.01795	0.03403	0.05466	0.07195	0.09242	0.11424	0.12979	0.14661	0.15432	0.16108	0.15956	0.14985	0.14274
1992	0.00053	0.00259	0.00738	0.01425	0.03012	0.04937	0.06876	0.08971	0.10731	0.12984	0.14165	0.15196	0.15489	0.15413	0.15108	0.14019
1993	0.00057	0.00235	0.00623	0.01447	0.02757	0.04438	0.06288	0.08043	0.10005	0.11933	0.13553	0.14478	0.14811	0.14967	0.14463	0.13588
1994	0.00050	0.00225	0.00574	0.01247	0.02476	0.03885	0.05515	0.07300	0.09067	0.11100	0.12625	0.13611	0.14220	0.14675	0.13982	0.12881
1995	0.00064	0.00214	0.00578	0.01133	0.02205	0.03573	0.05045	0.06660	0.07972	0.09635	0.11410	0.12347	0.13096	0.13361	0.12651	0.11999
1996	0.00057	0.00210	0.00538	0.00997	0.02043	0.03262	0.04454	0.05655	0.07144	0.08411	0.10286	0.11314	0.11924	0.12087	0.12003	0.11484
1997	0.00056	0.00215	0.00528	0.00900	0.01925	0.02812	0.04013	0.05418	0.06498	0.08120	0.09219	0.10377	0.11510	0.12030	0.11489	0.11064
1998	0.00067	0.00156	0.00453	0.00947	0.01691	0.02566	0.03821	0.04959	0.06130	0.07348	0.08697	0.10053	0.10974	0.11390	0.11828	0.11180
1999	0.00041	0.00206	0.00412	0.01007	0.01756	0.02690	0.03812	0.04662	0.05805	0.07084	0.08305	0.09777	0.10804	0.11631	0.11726	0.11384
2000	0.00052	0.00187	0.00559	0.00936	0.01861	0.02782	0.03885	0.04513	0.05699	0.07002	0.08400	0.10004	0.10963	0.12043	0.12161	0.11954
2001	0.00067	0.00208	0.00453	0.00901	0.01801	0.02641	0.03626	0.04578	0.05802	0.07050	0.08271	0.09708	0.10562	0.11683	0.12022	0.12158
2002	0.00039	0.00211	0.00536	0.01014	0.01732	0.02741	0.03777	0.04722	0.05961	0.07005	0.08564	0.09764	0.11320	0.12123	0.12904	0.13288
2003	0.00055	0.00188	0.00531	0.00889	0.01572	0.02748	0.03853	0.04814	0.05529	0.06962	0.08525	0.09759	0.11411	0.12598	0.13545	0.13812
2004	0.00051	0.00200	0.00445	0.00827	0.01629	0.02764	0.03765	0.04678	0.05469	0.07139	0.08557	0.09809	0.11187	0.12883	0.13750	0.13886
2005	0.00060	0.00170	0.00423	0.00809	0.01698	0.02610	0.03661	0.04738	0.05744	0.06969	0.08159	0.09877	0.10981	0.12985	0.13416	0.14282
2006	0.00043	0.00171	0.00477	0.00794	0.01702	0.02684	0.03778	0.04950	0.05818	0.07080	0.08505	0.09886	0.11619	0.13224	0.14070	0.14545
2007	0.00058	0.00180	0.00408	0.00774	0.01691	0.02687	0.03994	0.04954	0.06107	0.07517	0.08459	0.10110	0.11348	0.12670	0.14067	0.14497
2008	0.00049	0.00130	0.00407	0.00773	0.01686	0.02843	0.04087	0.05168	0.06229	0.07692	0.08891	0.09887	0.11419	0.13050	0.14266	0.14703
2009	0.00058	0.00141	0.00407	0.00703	0.01593	0.02859	0.03883	0.05143	0.06279	0.07401	0.08806	0.10246	0.11689	0.12779	0.14022	0.14798
2010	0.00041	0.00155	0.00367	0.00741	0.01530	0.02696	0.03902	0.04985	0.06368	0.07788	0.09100	0.10507	0.11897	0.13237	0.14477	0.14631
2011	0.00039	0.00166	0.00334	0.00715	0.01495	0.02404	0.03520	0.04712	0.05956	0.07647	0.08572	0.09918	0.11381	0.12734	0.13476	0.13893

Source: Human Fertility Database. Own elaboration.

Table A.12. (Continued)Age Specific fertility rates between ages 31 to 49, in years 1960 to 2012, for Sweden

	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
1960	0.09642	0.08320	0.07138	0.06306	0.05445	0.04583	0.03816	0.03205	0.02699	0.02086	0.01498	0.01186	0.00721	0.00468	0.00241	0.00112	0.00054	0.00013	0.00000
1961	0.09344	0.08344	0.07225	0.06180	0.05407	0.04711	0.03894	0.03151	0.02691	0.02004	0.01434	0.00991	0.00732	0.00346	0.00231	0.00124	0.00068	0.00013	0.00007
1962	0.09394	0.08325	0.07336	0.06402	0.05380	0.04487	0.03813	0.03144	0.02502	0.01932	0.01385	0.00993	0.00619	0.00415	0.00189	0.00084	0.00048	0.00024	0.00006
1963	0.09984	0.08706	0.07556	0.06331	0.05562	0.04777	0.03815	0.03146	0.02472	0.01991	0.01470	0.00887	0.00622	0.00385	0.00203	0.00099	0.00067	0.00006	0.00006
1964	0.10438	0.09433	0.08028	0.06711	0.05855	0.04765	0.04038	0.03251	0.02579	0.01962	0.01446	0.01017	0.00589	0.00377	0.00181	0.00073	0.00027	0.00016	0.00004
1965	0.09965	0.09022	0.07545	0.06720	0.05604	0.04695	0.03995	0.03070	0.02433	0.01889	0.01301	0.00962	0.00550	0.00390	0.00205	0.00077	0.00032	0.00016	0.00010
1966	0.09879	0.08632	0.07231	0.06437	0.05355	0.04556	0.03680	0.02985	0.02397	0.01776	0.01193	0.00850	0.00499	0.00312	0.00190	0.00080	0.00022	0.00014	0.00006
1967	0.09521	0.08123	0.07017	0.05894	0.05185	0.04163	0.03437	0.02766	0.02238	0.01674	0.01141	0.00764	0.00532	0.00288	0.00165	0.00067	0.00038	0.00012	0.00004
1968	0.08700	0.07278	0.06458	0.05433	0.04585	0.03869	0.03162	0.02520	0.01929	0.01392	0.01012	0.00646	0.00351	0.00259	0.00092	0.00043	0.00017	0.00009	0.00008
1969	0.08197	0.07056	0.05831	0.05086	0.04015	0.03390	0.02919	0.02197	0.01697	0.01336	0.00995	0.00543	0.00388	0.00258	0.00112	0.00058	0.00023	0.00012	0.00003
1970	0.07815	0.06851	0.05545	0.04878	0.03985	0.03413	0.02655	0.02144	0.01604	0.01171	0.00835	0.00569	0.00335	0.00195	0.00109	0.00052	0.00023	0.00014	0.00002
1971	0.07970	0.06902	0.05679	0.04740	0.03930	0.03306	0.02421	0.01976	0.01558	0.01098	0.00706	0.00539	0.00359	0.00194	0.00083	0.00036	0.00012	0.00010	0.00002
1972	0.07961	0.06482	0.05345	0.04382	0.03582	0.02898	0.02412	0.01848	0.01421	0.01006	0.00719	0.00501	0.00273	0.00133	0.00075	0.00022	0.00020	0.00008	0.00000
1973	0.07557	0.06359	0.05180	0.04405	0.03696	0.02812	0.02121	0.01728	0.01226	0.00877	0.00585	0.00374	0.00250	0.00129	0.00082	0.00050	0.00016	0.00010	0.00002
1974	0.07704	0.06590	0.05348	0.04162	0.03503	0.02766	0.02108	0.01679	0.01247	0.00956	0.00581	0.00373	0.00204	0.00114	0.00048	0.00045	0.00002	0.00004	0.00000
1975	0.07359	0.06026	0.05034	0.04181	0.03246	0.02533	0.01889	0.01429	0.01092	0.00737	0.00518	0.00308	0.00225	0.00102	0.00037	0.00022	0.00015	0.00006	0.00002
1976	0.07210	0.05945	0.04858	0.04269	0.03121	0.02593	0.01953	0.01432	0.01113	0.00712	0.00464	0.00344	0.00186	0.00104	0.00054	0.00031	0.00015	0.00000	0.00004
1977	0.07041	0.05794	0.04865	0.04077	0.03200	0.02562	0.01922	0.01433	0.01122	0.00711	0.00455	0.00327	0.00198	0.00077	0.00072	0.00015	0.00011	0.00002	0.00000
1978	0.07420	0.06159	0.04853	0.04112	0.03260	0.02717	0.02005	0.01420	0.01073	0.00768	0.00487	0.00298	0.00156	0.00094	0.00039	0.00016	0.00017	0.00004	0.00000
1979	0.08054	0.06636	0.05435	0.04355	0.03717	0.02944	0.02129	0.01702	0.01241	0.00841	0.00555	0.00405	0.00207	0.00086	0.00047	0.00023	0.00005	0.00002	0.00000
1980	0.08327	0.07019	0.05930	0.04689	0.03605	0.03039	0.02319	0.01724	0.01317	0.00827	0.00610	0.00313	0.00209	0.00112	0.00047	0.00014	0.00009	0.00002	0.00000
1981	0.08549	0.07054	0.05833	0.05112	0.03730	0.03004	0.02356	0.01758	0.01195	0.00880	0.00570	0.00431	0.00199	0.00103	0.00041	0.00021	0.00007	0.00007	0.00000
1982	0.08714	0.07405	0.06132	0.05025	0.04056	0.03114	0.02359	0.01778	0.01267	0.00920	0.00591	0.00356	0.00234	0.00134	0.00040	0.00025	0.00016	0.00005	0.00002
1983	0.08919	0.07424	0.06207	0.05184	0.04176	0.03314	0.02355	0.01823	0.01367	0.00934	0.00588	0.00344	0.00272	0.00123	0.00048	0.00031	0.00002	0.00000	0.00002
1984	0.09417	0.08031	0.06541	0.05380	0.04475	0.03500	0.02729	0.01971	0.01440	0.01039	0.00697	0.00422	0.00254	0.00135	0.00052	0.00037	0.00011	0.00005	0.00000
1985	0.10107	0.08615	0.07201	0.05954	0.04892	0.03780	0.02839	0.02182	0.01608	0.01053	0.00721	0.00453	0.00266	0.00136	0.00078	0.00019	0.00007	0.00007	0.00000
1986	0.10406	0.08870	0.07640	0.06274	0.05264	0.04080	0.03104	0.02187	0.01641	0.01109	0.00692	0.00469	0.00291	0.00142	0.00067	0.00023	0.00004	0.00000	0.00002
1987	0.11107	0.09515	0.07973	0.06571	0.05221	0.04280	0.03110	0.02377	0.01751	0.01140	0.00740	0.00459	0.00295	0.00178	0.00060	0.00036	0.00008	0.00000	0.00002
1988	0.11621	0.10002	0.08462	0.06965	0.05722	0.04567	0.03567	0.02677	0.01934	0.01247	0.00839	0.00482	0.00271	0.00162	0.00080	0.00022	0.00010	0.00004	0.00000
1989	0.11850	0.10376	0.08996	0.07276	0.06141	0.04930	0.03574	0.02924	0.02046	0.01367	0.00872	0.00582	0.00278	0.00111	0.00082	0.00039	0.00015	0.00000	0.00000
1990	0.13090	0.11077	0.09352	0.07930	0.06703	0.05123	0.03946	0.03036	0.02169	0.01485	0.01014	0.00580	0.00341	0.00163	0.00055	0.00036	0.00014	0.00007	0.00000
1991	0.13012	0.11262	0.09609	0.08070	0.06576	0.05336	0.04170	0.03141	0.02253	0.01570	0.00976	0.00630	0.00370	0.00160	0.00091	0.00023	0.00014	0.00002	0.00004
1992	0.12719	0.11441	0.09904	0.08194	0.06819	0.05445	0.04279	0.03274	0.02269	0.01558	0.01051	0.00643	0.00345	0.00202	0.00079	0.00036	0.00024	0.00003	0.00002
1993	0.12324	0.11179	0.09404	0.08033	0.06665	0.05427	0.04025	0.03235	0.02273	0.01668	0.01017	0.00650	0.00341	0.00162	0.00063	0.00037	0.00006	0.00003	0.00000
1994	0.11971	0.10544	0.08979	0.07864	0.06625	0.05429	0.04056	0.03162	0.02324	0.01565	0.01045	0.00618	0.00373	0.00154	0.00085	0.00035	0.00010	0.00003	0.00003
1995	0.10974	0.10046	0.08601	0.07418	0.06327	0.04922	0.04048	0.02941	0.02160	0.01549	0.00922	0.00608	0.00321	0.00178	0.00073	0.00033	0.00011	0.00005	0.00005
1996	0.10512	0.09315	0.08171	0.06944	0.05825	0.04951	0.03776	0.02869	0.02122	0.01470	0.00933	0.00625	0.00325	0.00177	0.00088	0.00034	0.00014	0.00003	0.00000
1997	0.10152	0.09086	0.07768	0.07011	0.05547	0.04707	0.03788	0.02813	0.02033	0.01477	0.00965	0.00604	0.00328	0.00164	0.00071	0.00037	0.00016	0.00003	0.00003
1998	0.10809	0.09361	0.08180	0.07098	0.06044	0.05102	0.03851	0.02993	0.02231	0.01540	0.00949	0.00605	0.00375	0.00195	0.00082	0.00042	0.00019	0.00002	0.00002
1999	0.10585	0.09582	0.08198	0.07270	0.06216	0.05040	0.04032	0.02935	0.02347	0.01548	0.01033	0.00624	0.00378	0.00186	0.00083	0.00046	0.00005	0.00009	0.00003
2000	0.10951	0.09938	0.09068	0.07514	0.06464	0.05121	0.04138	0.03238	0.02360	0.01641	0.01001	0.00635	0.00423	0.00188	0.00091	0.00049	0.00014	0.00012	0.00007
2001	0.11873	0.10514	0.09349	0.07895	0.06930	0.05512	0.04319	0.03237	0.02497	0.01659	0.01224	0.00714	0.00386	0.00201	0.00081	0.00039	0.00014	0.00010	0.00007
2002	0.12695	0.11336	0.09881	0.08717	0.07037	0.05904	0.04459	0.03474	0.02642	0.01834	0.01254	0.00736	0.00418	0.00230	0.00100	0.00041	0.00018	0.00010	0.00003
2003	0.13222	0.12527	0.10648	0.09236	0.07705	0.06156	0.05136	0.03765	0.02908	0.01992	0.01338	0.00756	0.00458	0.00216	0.00109	0.00065	0.00012	0.00011	0.00003
2004	0.13642	0.12866	0.11403	0.09797	0.07936	0.06697	0.05182	0.04059	0.03031	0.02163	0.01423	0.00867	0.00533	0.00288	0.00091	0.00048	0.00024	0.00005	0.00004
2005	0.13874	0.13126	0.11465	0.10015	0.08553	0.07075	0.05298	0.04144	0.03138	0.02131	0.01372	0.00912	0.00506	0.00260	0.00152	0.00061	0.00019	0.00014	0.00005
2006	0.14631	0.13646	0.12257	0.10967	0.09113	0.07432	0.05959	0.04403	0.03281	0.02314	0.01516	0.00913	0.00583	0.00290	0.00094	0.00093	0.00037	0.00016	0.00003

2007	0.14538	0.13891	0.12543	0.10945	0.09319	0.07806	0.06073	0.04688	0.03501	0.02438	0.01651	0.01052	0.00605	0.00305	0.00146	0.00073	0.00051	0.00014	0.00009
2008	0.14697	0.13717	0.12536	0.11090	0.09456	0.07837	0.06078	0.04931	0.03684	0.02477	0.01712	0.01025	0.00568	0.00301	0.00155	0.00090	0.00030	0.00017	0.00007
2009	0.14702	0.13959	0.12501	0.11509	0.10061	0.08002	0.06552	0.05052	0.03699	0.02646	0.01829	0.01037	0.00671	0.00331	0.00181	0.00082	0.00030	0.00028	0.00016
2010	0.15244	0.14489	0.12960	0.11682	0.10019	0.08601	0.06697	0.05178	0.04130	0.02777	0.01866	0.01189	0.00632	0.00376	0.00200	0.00091	0.00044	0.00012	0.00019
2011	0.14209	0.13421	0.12751	0.11538	0.09583	0.08449	0.06856	0.05028	0.03911	0.02898	0.01880	0.01117	0.00662	0.00323	0.00181	0.00089	0.00032	0.00016	0.00017

Source: Human Fertility Database. Own elaboration.

Table A.13: Age that 50% first and second births occurred, from 1991 to the last year available for Austria, Hungary, Portugal and Sweden

		Austria	**Hungary**	**Portugal**	**Sweden**
1991	1º birth	25	23	25	26
	2º birth	28	28	29	29
2000	1º birth	27	28	27	29
	2º birth	29	29	31	31
Last year available	1º birth	29	29	30	29
	2º birth	31	31	33	32
Average Differences - From 1º to 2º birth		2.3	2.7	3.7	2.7

Notes: The last year available: 2010 for Austria. 2009 for Hungary. 2012 for Portugal and 2011 for Sweden
Source: Human Fertility Database. Own elaboration.

Table A.14: TFR and MAC evolution between 1960 and 2012 for selected countries

	Austria		France		Hungary		Portugal		Spain		Sweden	
	TFR	**MAC**	**TFR**	**MAC**	**TFR**	**MAC**	**TFR**	**MAC**	**TFR**	**MAC**	**TFR**	**MAC**
1960	2.70	27.58	2.74	27.60	2.02	25.77	3.16	29.55	2.79	30.09	2.20	27.47
1961	2.79	27.52	2.83	27.55	1.94	25.70	3.22	29.56	2.77	29.98	2.23	27.41
1962	2.80	27.47	2.80	27.49	1.80	25.72	3.29	29.48	2.81	29.83	2.25	27.31
1963	2.82	27.41	2.90	27.42	1.82	25.81	3.20	29.53	2.88	29.93	2.33	27.31
1964	2.79	27.38	2.91	27.36	1.82	25.71	3.31	29.47	3.01	29.93	2.48	27.25
1965	2.70	27.26	2.85	27.29	1.83	25.60	3.25	29.40	2.93	29.98	2.41	27.15
1966	2.66	27.11	2.80	27.31	1.90	25.55	3.24	29.32	2.91	29.86	2.36	27.06
1967	2.62	26.97	2.67	27.32	2.03	25.55	3.21	29.24	2.96	30.13	2.27	27.01
1968	2.59	26.85	2.59	27.30	2.08	25.53	3.15	29.17	2.90	29.69	2.07	27.02
1969	2.49	26.76	2.53	27.28	2.05	25.50	3.11	29.12	2.88	29.56	1.92	27.08
1970	2.29	26.67	2.48	27.17	1.99	25.43	3.00	29.01	2.86	29.50	1.92	26.97
1971	2.20	26.67	2.50	27.11	1.94	25.36	3.00	28.97	2.87	29.27	1.96	26.84
1972	2.09	26.53	2.42	26.98	1.94	25.31	2.84	28.85	2.85	29.16	1.91	26.76
1973	1.94	26.41	2.31	26.87	1.94	25.31	2.75	28.84	2.84	28.97	1.87	26.73
1974	1.91	26.31	2.11	26.79	2.29	25.40	2.69	28.65	2.90	28.84	1.88	26.69
1975	1.83	26.27	1.93	26.67	2.37	25.34	2.76	28.23	2.79	28.61	1.77	26.70
1976	1.69	26.24	1.83	26.56	2.25	25.09	2.80	27.57	2.80	28.51	1.68	26.87
1977	1.63	26.27	1.86	26.52	2.17	25.00	2.68	27.37	2.67	28.43	1.65	26.98
1978	1.60	26.25	1.82	26.59	2.08	24.81	2.44	27.28	2.55	28.35	1.60	27.18
1979	1.60	26.27	1.86	26.71	2.02	24.68	2.31	27.26	2.37	28.24	1.66	27.45
1980	1.65	26.27	1.95	26.82	1.91	24.65	2.25	27.17	2.21	28.20	1.68	27.56
1981	1.67	26.33	1.95	26.99	1.88	24.73	2.14	27.21	2.04	28.22	1.64	27.72
1982	1.66	26.35	1.91	27.06	1.81	24.74	2.09	27.11	1.94	28.32	1.63	27.88
1983	1.56	26.47	1.78	27.12	1.76	24.81	1.97	27.06	1.80	28.37	1.61	28.04
1984	1.52	26.56	1.80	27.26	1.77	24.83	1.93	26.99	1.73	28.42	1.66	28.25
1985	1.47	26.68	1.81	27.48	1.87	25.00	1.75	27.06	1.64	28.45	1.74	28.36
1986	1.45	26.77	1.83	27.66	1.87	25.20	1.70	27.03	1.56	28.53	1.80	28.41
1987	1.43	26.91	1.80	27.87	1.85	25.32	1.65	27.14	1.50	28.56	1.84	28.50
1988	1.45	26.95	1.81	28.04	1.85	25.41	1.63	27.15	1.45	28.57	1.97	28.52
1989	1.45	27.07	1.79	28.20	1.84	25.52	1.58	27.21	1.40	28.72	2.02	28.56
1990	1.46	27.21	1.78	28.32	1.87	25.56	1.56	27.32	1.36	28.86	2.14	28.58
1991	1.51	27.22	1.77	28.41	1.88	25.67	1.56	27.47	1.33	29.04	2.11	28.72
1992	1.50	27.26	1.73	28.55	1.78	25.78	1.54	27.59	1.32	29.25	2.08	28.87
1993	1.50	27.31	1.66	28.67	1.69	25.98	1.52	27.68	1.27	29.46	1.98	28.98
1994	1.47	27.50	1.66	28.83	1.64	26.18	1.45	27.83	1.20	29.72	1.88	29.13
1995	1.42	27.66	1.71	28.98	1.57	26.32	1.41	28.02	1.17	29.96	1.73	29.22
1996	1.45	27.81	1.73	29.11	1.46	26.46	1.44	28.14	1.16	30.19	1.60	29.36
1997	1.39	27.93	1.73	29.20	1.38	26.63	1.47	28.25	1.17	30.38	1.53	29.47
1998	1.37	28.01	1.76	29.31	1.33	26.81	1.47	28.41	1.15	30.54	1.52	29.71
1999	1.34	28.15	1.79	29.35	1.28	27.04	1.50	28.53	1.19	30.66	1.51	29.78
2000	1.36	28.22	1.87	29.38	1.32	27.28	1.55	28.61	1.23	30.72	1.56	29.85
2001	1.33	28.39	1.88	29.40	1.31	27.57	1.45	28.75	1.24	30.76	1.58	30.00
2002	1.39	28.57	1.86	29.47	1.30	27.77	1.46	28.86	1.25	30.80	1.67	30.07
2003	1.38	28.76	1.87	29.55	1.27	27.95	1.44	29.03	1.30	30.85	1.73	30.25
2004	1.42	28.84	1.90	29.61	1.28	28.21	1.40	29.16	1.31	30.88	1.77	30.37
2005	1.41	29.03	1.92	29.71	1.31	28.45	1.41	29.25	1.33	30.91	1.79	30.45
2006	1.40	29.21	1.98	29.78	1.34	28.65	1.37	29.40	1.36	30.90	1.87	30.54
2007	1.38	29.37	1.96	29.85	1.32	28.83	1.35	29.45	1.38	30.84	1.89	30.59
2008	1.41	29.48	1.99	29.89	1.35	28.91	1.39	29.56	1.45	30.83	1.92	30.58
2009	1.39	29.67	1.99	29.96	1.32	29.08	1.34	29.65	1.38	31.04	1.94	30.68
2010	1.44	29.82	2.01	30.03	-	-	1.39	29.82	1.37	31.20	1.99	30.74
2011	-	-	2.00	30.10	-	-	1.35	30.09	1.34	31.44	1.90	30.82
2012	-	-	2.00	-	-	-	1.28	-	1.32	-	-	-

Source: Human Fertility Database. Own elaboration.

Table A.15: Differences between the total mean age at birth and the mean age at first birth. for selected years and for Austria.,Hungary, Portugal and Sweden (Table 2.3 in the chapter - Full Table)

	Austria	Hungary	Portugal	Sweden
1960		-2.91	-4.28	
1961		-2.86	-4.33	
1962		-2.81	-4.31	
1963		-2.80	-4.29	
1964		-2.75	-4.32	
1965		-2.66	-4.29	
1966		-2.66	-4.37	
1967		-2.68	-4.32	
1968		-2.69	-4.32	
1969		-2.68	-4.29	
1970		-2.61	-4.22	-2.75
1971		-2.62	-4.17	-2.67
1972		-2.59	-4.14	-2.62
1973		-2.60	-4.22	-2.57
1974		-2.73	-4.13	-2.51
1975		-2.81	-3.93	-2.37
1976		-2.67	-3.59	-2.33
1977		-2.57	-3.41	-2.29
1978		-2.38	-3.30	-2.30
1979		-2.26	-3.25	-2.37
1980		-2.21	-3.15	-2.34
1981		-2.18	-3.23	-2.38
1982		-2.17	-3.20	-2.38
1983		-2.15	-3.22	-2.32
1984	-2.46	-2.12	-3.06	-2.32
1985	-2.36	-2.20	-2.97	-2.34
1986	-2.36	-2.33	-2.88	-2.31
1987	-2.28	-2.37	-2.83	-2.31
1988	-2.23	-2.35	-2.64	-2.32
1989	-2.25	-2.42	-2.56	-2.30
1990	-2.24	-2.47	-2.43	-2.31
1991	-2.27	-2.48	-2.40	-2.26
1992	-2.22	-2.47	-2.35	-2.16
1993	-2.17	-2.57	-2.30	-2.06
1994	-2.09	-2.62	-2.28	-2.04
1995	-2.01	-2.54	-2.28	-2.02
1996	-1.90	-2.42	-2.26	-1.98
1997	-1.93	-2.40	-2.28	-1.97
1998	-1.86	-2.28	-2.28	-1.96
1999	-1.84	-2.18	-2.14	-1.91
2000	-1.83	-2.18	-2.14	-1.98
2001	-1.85	-2.25	-2.11	-1.87
2002	-1.81	-2.17	-2.07	-1.85
2003	-1.83	-2.03	-1.98	-1.80
2004	-1.79	-1.93	-2.03	-1.76
2005	-1.77	-1.82	-1.96	-1.79
2006	-1.73	-1.75	-1.92	-1.79
2007	-1.72	-1.73	-1.90	-1.84
2008	-1.72	-1.71	-1.87	-1.83
2009	-1.71	-1.71	-1.77	-1.81
2010	-1.60		-1.70	-1.83
2011			-1.67	-1.82
2012			-1.56	

Source: Human Fertility Database. Own elaboration.

Table A.16: Birth order contribution to the TFR in Austria, Hungary, Portugal and Sweden

	Austria				**Hungary**				**Portugal**				**Sweden**			
	TFR1	TFR2	TFR3	TFR4+	TFR1	TFR2	TFR3	TFR4+	TFR1	TFR2	TFR3	TFR4+	TFR1	TFR2	TFR3	TFR4+
1959	-	-	-	-	0.90	0.60	0.26	0.28	0.99	0.63	0.45	1.09	-	-	-	-
1960	-	-	-	-	0.88	0.57	0.24	0.26	1.01	0.64	0.43	1.07	-	-	-	-
1961	-	-	-	-	0.82	0.52	0.22	0.24	1.01	0.66	0.44	1.11	-	-	-	-
1962	-	-	-	-	0.82	0.56	0.21	0.24	1.03	0.69	0.45	1.12	-	-	-	-
1963	-	-	-	-	0.86	0.55	0.20	0.22	0.97	0.69	0.46	1.08	-	-	-	-
1964	-	-	-	-	0.89	0.55	0.19	0.21	1.01	0.70	0.46	1.13	-	-	-	-
1965	-	-	-	-	0.92	0.60	0.18	0.20	1.02	0.69	0.45	1.08	-	-	-	-
1966	-	-	-	-	0.97	0.67	0.19	0.20	1.00	0.72	0.45	1.07	-	-	-	-
1967	-	-	-	-	0.98	0.71	0.19	0.19	1.03	0.72	0.43	1.03	-	-	-	-
1968	-	-	-	-	0.98	0.70	0.19	0.18	1.03	0.72	0.42	0.99	-	-	-	-
1969	-	-	-	-	0.95	0.69	0.18	0.17	1.01	0.74	0.41	0.95	-	-	-	-
1970	-	-	-	-	0.92	0.67	0.18	0.17	1.01	0.73	0.39	0.88	0.81	0.68	0.29	0.15
1971	-	-	-	-	0.91	0.69	0.18	0.16	1.03	0.75	0.39	0.84	0.85	0.69	0.28	0.14
1972	-	-	-	-	0.90	0.69	0.20	0.16	0.99	0.72	0.37	0.76	0.84	0.68	0.27	0.12
1973	-	-	-	-	0.97	0.89	0.26	0.17	0.97	0.70	0.36	0.72	0.83	0.66	0.26	0.12
1974	-	-	-	-	0.99	0.95	0.27	0.16	0.98	0.70	0.35	0.66	0.84	0.68	0.25	0.11
1975	-	-	-	-	1.00	0.87	0.24	0.14	1.07	0.75	0.34	0.60	0.80	0.65	0.23	0.09
1976	-	-	-	-	0.97	0.83	0.23	0.13	1.24	0.72	0.31	0.53	0.75	0.64	0.21	0.08
1977	-	-	-	-	0.96	0.79	0.21	0.12	1.21	0.74	0.29	0.45	0.72	0.64	0.21	0.08
1978	-	-	-	-	0.95	0.76	0.20	0.11	1.08	0.73	0.26	0.38	0.68	0.63	0.22	0.08
1979	-	-	-	-	0.91	0.72	0.19	0.10	0.98	0.73	0.26	0.34	0.70	0.63	0.24	0.09
1980	-	-	-	-	0.89	0.70	0.20	0.10	0.97	0.71	0.26	0.31	0.72	0.63	0.25	0.09
1981	-	-	-	-	0.86	0.66	0.19	0.09	0.90	0.71	0.25	0.28	0.69	0.61	0.25	0.09
1982	-	-	-	-	0.85	0.65	0.18	0.09	0.89	0.69	0.25	0.26	0.68	0.60	0.26	0.09
1983	-	-	-	-	0.87	0.64	0.17	0.09	0.85	0.64	0.24	0.24	0.67	0.59	0.26	0.09
1984	0.69	0.51	0.21	0.12	0.88	0.69	0.20	0.10	0.86	0.62	0.23	0.23	0.67	0.61	0.28	0.10
1985	0.67	0.50	0.20	0.11	0.85	0.70	0.21	0.11	0.79	0.56	0.21	0.20	0.71	0.62	0.30	0.11
1986	0.66	0.49	0.19	0.11	0.84	0.69	0.21	0.11	0.78	0.54	0.20	0.18	0.75	0.63	0.30	0.12
1987	0.66	0.48	0.19	0.10	0.83	0.68	0.22	0.11	0.77	0.53	0.19	0.17	0.77	0.65	0.30	0.12
1988	0.68	0.48	0.19	0.10	0.81	0.68	0.23	0.11	0.80	0.52	0.17	0.15	0.82	0.70	0.32	0.13
1989	0.67	0.49	0.19	0.10	0.82	0.68	0.25	0.12	0.79	0.50	0.16	0.13	0.85	0.70	0.33	0.14
1990	0.67	0.50	0.20	0.09	0.83	0.68	0.24	0.13	0.79	0.50	0.16	0.12	0.90	0.74	0.35	0.16
1991	0.71	0.51	0.20	0.09	0.77	0.64	0.24	0.13	0.79	0.50	0.15	0.11	0.87	0.74	0.35	0.16
1992	0.71	0.51	0.20	0.09	0.71	0.60	0.24	0.13	0.79	0.50	0.15	0.10	0.83	0.75	0.34	0.16
1993	0.70	0.52	0.19	0.09	0.68	0.57	0.26	0.14	0.79	0.49	0.14	0.10	0.79	0.72	0.32	0.15
1994	0.67	0.52	0.19	0.08	0.65	0.55	0.24	0.13	0.75	0.47	0.14	0.09	0.75	0.70	0.30	0.14
1995	0.66	0.50	0.18	0.08	0.62	0.50	0.21	0.13	0.74	0.46	0.13	0.08	0.70	0.64	0.27	0.12
1996	0.67	0.52	0.18	0.08	0.59	0.46	0.20	0.13	0.75	0.48	0.13	0.08	0.67	0.59	0.24	0.11
1997	0.66	0.49	0.18	0.07	0.58	0.44	0.19	0.12	0.77	0.49	0.14	0.08	0.64	0.57	0.22	0.10

1998	0.65	0.49	0.17	0.07	0.57	0.42	0.18	0.12	0.77	0.50	0.14	0.07	0.64	0.56	0.22	0.10
1999	0.64	0.47	0.17	0.07	0.58	0.43	0.19	0.12	0.81	0.50	0.13	0.06	0.65	0.55	0.22	0.10
2000	0.65	0.48	0.16	0.07	0.57	0.42	0.20	0.12	0.84	0.52	0.13	0.06	0.70	0.54	0.22	0.10
2001	0.64	0.46	0.16	0.07	0.58	0.42	0.18	0.12	0.77	0.50	0.13	0.06	0.72	0.55	0.21	0.10
2002	0.66	0.48	0.17	0.07	0.58	0.41	0.18	0.11	0.80	0.49	0.13	0.06	0.77	0.58	0.22	0.10
2003	0.66	0.48	0.17	0.07	0.60	0.40	0.17	0.11	0.79	0.48	0.12	0.05	0.79	0.61	0.23	0.10
2004	0.68	0.49	0.18	0.08	0.61	0.42	0.17	0.11	0.76	0.47	0.12	0.05	0.81	0.64	0.23	0.10
2005	0.67	0.49	0.18	0.07	0.62	0.44	0.18	0.11	0.77	0.47	0.12	0.05	0.81	0.65	0.23	0.10
2006	0.67	0.49	0.17	0.08	0.62	0.43	0.17	0.11	0.75	0.46	0.11	0.04	0.85	0.68	0.24	0.10
2007	0.65	0.48	0.17	0.07	0.64	0.43	0.17	0.11	0.74	0.46	0.11	0.04	0.86	0.68	0.25	0.10
2008	0.67	0.49	0.17	0.07	0.63	0.43	0.16	0.10	0.76	0.47	0.12	0.04	0.88	0.69	0.25	0.10
2009	0.67	0.48	0.17	0.07	-	-	-	-	0.75	0.45	0.11	0.04	0.88	0.71	0.25	0.10
2010	0.69	0.50	0.17	0.07	-	-	-	-	0.76	0.47	0.11	0.04	0.89	0.73	0.26	0.11
2011	-	-	-	-	-	-	-	-	0.75	0.46	0.11	0.04	0.84	0.71	0.25	0.11
2012	-	-	-	-	-	-	-	-	0.73	0.42	0.10	0.04	-	-	-	-

Source: Human Fertility Database. Own elaboration.

Table A.17: Cumulative births (Sbi) in the transition to the first child in Austria, between 1991 and 2010

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
15	5	4	4	5	3	2	3	3	2	1	2	3	3	4	1	4	1	1	3	4
16	26	24	19	18	19	12	12	13	13	15	20	19	18	19	14	18	14	16	14	16
17	91	90	85	74	68	58	52	50	47	53	68	73	65	67	53	61	52	53	50	51
18	262	258	236	205	197	167	154	148	147	153	173	176	161	168	145	145	132	139	123	130
19	555	536	510	444	407	366	356	343	319	324	355	350	333	335	321	290	275	287	254	242
20	978	974	940	810	767	699	683	650	602	613	617	613	587	611	571	537	502	509	466	450
21	1501	1477	1452	1297	1191	1115	1082	1022	973	981	961	950	894	927	875	842	781	804	729	711
22	2062	2049	1994	1818	1672	1579	1518	1449	1386	1392	1341	1327	1262	1277	1215	1176	1097	1122	1034	1010
23	2647	2630	2572	2347	2168	2080	2004	1903	1826	1830	1757	1748	1656	1664	1569	1524	1439	1453	1360	1331
24	3258	3229	3161	2916	2705	2607	2519	2405	2291	2282	2200	2186	2063	2088	1980	1895	1820	1816	1727	1685
25	3913	3832	3742	3496	3255	3177	3062	2913	2815	2776	2672	2648	2516	2543	2412	2321	2199	2214	2117	2072
26	4544	4452	4326	4072	3852	3756	3644	3461	3344	3299	3156	3127	3008	3022	2895	2773	2631	2633	2537	2501
27	5119	5007	4872	4642	4421	4340	4205	4004	3877	3828	3687	3624	3502	3512	3391	3243	3105	3097	2990	2968
28	5634	5506	5391	5162	4944	4887	4754	4541	4405	4367	4194	4143	4016	4029	3887	3738	3579	3580	3454	3428
29	6066	5960	5839	5625	5419	5365	5227	5026	4889	4855	4671	4652	4513	4513	4377	4251	4058	4092	3943	3934
30	6417	6334	6219	6019	5840	5811	5659	5485	5348	5324	5123	5132	4985	4989	4867	4737	4529	4581	4448	4445
31	6723	6645	6532	6353	6197	6195	6044	5887	5739	5729	5547	5563	5439	5450	5318	5219	5006	5036	4941	4935
32	6956	6894	6787	6622	6494	6509	6373	6213	6084	6071	5909	5939	5830	5857	5736	5667	5447	5479	5367	5399
33	7146	7083	6986	6831	6715	6759	6627	6488	6357	6358	6204	6270	6154	6195	6083	6047	5826	5869	5760	5801
34	7302	7241	7141	7011	6911	6949	6834	6702	6583	6590	6451	6529	6405	6461	6386	6346	6152	6204	6091	6148
35	7420	7365	7271	7147	7049	7106	6991	6867	6766	6780	6660	6738	6631	6694	6629	6604	6425	6485	6376	6454
36	7514	7470	7376	7260	7170	7232	7122	6995	6912	6927	6820	6912	6813	6891	6829	6818	6643	6725	6628	6711
37	7589	7553	7451	7348	7258	7325	7218	7099	7022	7044	6950	7046	6965	7040	6991	6978	6835	6913	6830	6924

38	7643	7606	7513	7408	7322	7392	7296	7187	7112	7137	7045	7143	7078	7155	7114	7110	6987	7056	6972	7086
39	7684	7644	7554	7455	7378	7441	7352	7249	7175	7202	7114	7224	7161	7244	7207	7201	7081	7161	7087	7216
40	7708	7667	7583	7483	7415	7480	7393	7295	7219	7247	7165	7286	7222	7310	7270	7273	7159	7236	7171	7312
41	7725	7683	7606	7506	7439	7507	7420	7323	7254	7279	7202	7326	7263	7350	7316	7327	7214	7293	7236	7374
42	7738	7693	7619	7521	7451	7526	7437	7339	7277	7296	7228	7346	7293	7376	7345	7356	7247	7323	7272	7415
43	7743	7701	7629	7531	7462	7535	7445	7348	7288	7308	7242	7361	7309	7393	7362	7371	7268	7345	7297	7439
44	7744	7705	7633	7536	7468	7539	7448	7353	7296	7313	7250	7369	7316	7401	7369	7382	7278	7356	7310	7452
45	7746	7708	7635	7539	7470	7542	7451	7355	7298	7317	7254	7373	7321	7405	7373	7388	7281	7362	7315	7460
46	7746	7709	7637	7539	7471	7543	7451	7357	7298	7317	7256	7374	7321	7407	7376	7390	7283	7365	7318	7463
47	7746	7709	7637	7540	7471	7543	7451	7357	7299	7319	7256	7376	7322	7407	7376	7390	7284	7366	7319	7464
48	7746	7709	7638	7540	7471	7543	7451	7357	7299	7319	7257	7376	7322	7408	7377	7391	7285	7367	7321	7466
49	7746	7709	7638	7540	7471	7543	7451	7357	7299	7319	7257	7376	7322	7409	7378	7391	7285	7368	7322	7466
50	7746	7709	7638	7540	7471	7543	7451	7357	7299	7319	7257	7376	7322	7409	7378	7391	7285	7369	7322	7467

Source: Human Fertility Database. Own elaboration.

Table A.18: Cumulative births (Sbi) in the transition to the second child in Austria, between 1991 and 2010

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
17	3	5	4	2	2	2	2	2	2	2	1	1	4	2	2	1	2	1	1	2
18	14	18	17	9	10	10	9	7	7	7	8	7	9	7	5	5	6	5	5	7
19	38	48	45	37	34	31	24	25	22	25	25	27	27	29	20	19	19	19	17	19
20	100	117	117	89	84	79	68	68	60	63	57	66	63	68	62	57	52	50	45	45
21	224	241	236	195	181	175	156	154	147	137	134	144	134	139	126	118	110	111	99	95
22	406	424	425	372	332	320	300	293	273	269	256	265	236	258	226	217	200	211	178	183
23	657	683	690	606	554	541	499	479	455	464	425	429	389	426	366	358	337	338	297	310
24	976	1003	1008	910	825	815	749	715	681	704	637	649	585	625	559	547	511	517	459	473
25	1366	1369	1387	1263	1148	1146	1036	1008	962	984	882	910	840	881	795	763	728	730	662	671
26	1802	1782	1800	1645	1508	1516	1385	1331	1258	1287	1172	1227	1124	1175	1082	1015	972	991	897	908
27	2253	2222	2232	2057	1907	1896	1761	1702	1592	1629	1496	1540	1446	1489	1389	1301	1251	1280	1164	1184
28	2702	2661	2665	2497	2317	2306	2149	2088	1949	1999	1849	1889	1781	1836	1721	1655	1567	1595	1456	1483
29	3128	3078	3080	2925	2727	2721	2549	2475	2324	2374	2217	2259	2159	2204	2091	2008	1899	1948	1784	1828
30	3510	3451	3461	3303	3125	3122	2931	2831	2680	2744	2579	2641	2535	2589	2469	2366	2263	2302	2140	2199
31	3844	3792	3798	3646	3471	3483	3278	3192	3025	3099	2926	3004	2897	2971	2826	2736	2619	2665	2515	2571
32	4133	4077	4082	3938	3769	3802	3603	3507	3330	3421	3256	3347	3230	3327	3181	3095	2971	3021	2893	2954
33	4361	4319	4323	4182	4020	4066	3878	3782	3614	3700	3545	3644	3543	3639	3516	3444	3310	3368	3246	3323
34	4558	4520	4511	4383	4229	4287	4106	4007	3848	3944	3796	3904	3808	3909	3816	3752	3621	3671	3571	3671
35	4712	4682	4661	4544	4388	4459	4273	4182	4043	4142	4000	4123	4039	4142	4070	4026	3878	3964	3855	3992
36	4827	4801	4787	4671	4514	4595	4414	4325	4195	4293	4163	4301	4231	4333	4272	4236	4091	4198	4114	4252
37	4925	4891	4882	4764	4615	4699	4528	4434	4313	4406	4285	4433	4373	4494	4436	4408	4272	4384	4310	4464
38	4996	4959	4942	4834	4684	4780	4609	4514	4400	4497	4375	4541	4480	4610	4558	4535	4408	4532	4469	4631
39	5040	5005	4991	4884	4739	4830	4670	4574	4466	4566	4448	4622	4555	4697	4651	4633	4502	4639	4585	4756
40	5068	5036	5022	4915	4776	4869	4705	4616	4514	4612	4499	4678	4609	4761	4717	4705	4574	4719	4667	4840
41	5085	5057	5045	4936	4799	4891	4733	4646	4550	4646	4531	4716	4647	4801	4761	4755	4629	4775	4728	4900

42	5098	5071	5057	4951	4809	4910	4750	4664	4568	4664	4552	4740	4670	4825	4785	4787	4660	4807	4762	4934
43	5102	5077	5064	4958	4816	4918	4761	4675	4577	4674	4563	4752	4686	4842	4802	4806	4677	4825	4782	4957
44	5105	5081	5069	4962	4821	4924	4766	4679	4584	4679	4570	4758	4692	4851	4810	4814	4686	4838	4794	4968
45	5106	5083	5071	4964	4823	4926	4769	4683	4587	4683	4574	4761	4696	4854	4814	4819	4691	4842	4798	4974
46	5108	5084	5071	4965	4824	4927	4770	4683	4588	4684	4574	4763	4697	4855	4816	4821	4693	4844	4799	4977
47	5109	5084	5071	4965	4824	4928	4770	4684	4588	4685	4575	4764	4698	4856	4817	4822	4694	4846	4801	4978
48	5109	5084	5071	4965	4824	4928	4770	4684	4588	4685	4575	4764	4698	4856	4817	4822	4694	4846	4801	4979
49	5109	5084	5071	4965	4825	4928	4770	4684	4588	4685	4575	4764	4698	4856	4817	4822	4694	4847	4801	4979
50	5109	5084	5071	4965	4825	4928	4770	4684	4588	4685	4575	4764	4698	4856	4817	4822	4694	4848	4801	4980

Source: Human Fertility Database. Own elaboration.

Table A.19: Cumulative births (Sbi) in the transition to the first child in Hungary, between 1991 and 2009

	1991	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
15	24	25	25	27	24	24	22	20	16	15	16	15	20	15	20	15	18	18	17
16	91	86	85	89	86	81	76	68	65	62	70	65	70	74	72	64	64	70	72
17	241	225	221	226	226	205	202	181	169	170	175	174	180	179	181	167	169	182	182
18	524	467	448	455	439	409	392	364	332	334	336	345	332	345	344	325	329	338	333
19	1008	905	837	823	773	724	672	638	575	581	573	574	536	542	544	521	524	540	529
20	1751	1584	1456	1364	1254	1152	1059	987	883	890	862	846	799	796	768	748	741	758	744
21	2648	2425	2217	2040	1847	1667	1516	1380	1261	1232	1179	1164	1082	1052	1011	982	966	1000	960
22	3608	3320	3010	2774	2506	2259	2044	1854	1681	1623	1532	1484	1382	1329	1263	1215	1185	1236	1191
23	4546	4214	3838	3525	3182	2887	2582	2352	2135	2057	1918	1837	1703	1624	1544	1478	1434	1486	1436
24	5434	5046	4609	4262	3863	3537	3166	2886	2639	2528	2361	2252	2074	1951	1868	1779	1723	1767	1708
25	6220	5821	5345	4971	4544	4197	3787	3454	3196	3054	2846	2702	2495	2357	2243	2146	2063	2083	2019
26	6885	6482	6010	5635	5215	4825	4390	4050	3761	3622	3392	3206	2976	2823	2694	2578	2455	2473	2387
27	7386	7015	6571	6214	5810	5418	4973	4658	4332	4217	3951	3771	3505	3364	3212	3078	2947	2954	2813
28	7766	7426	7025	6681	6331	5945	5533	5197	4904	4796	4506	4330	4062	3934	3781	3652	3485	3487	3322
29	8047	7748	7377	7059	6749	6408	6008	5718	5418	5334	5030	4889	4621	4526	4379	4247	4065	4047	3876
30	8278	7999	7648	7373	7094	6782	6416	6145	5875	5815	5502	5387	5149	5064	4958	4826	4647	4618	4435
31	8456	8215	7873	7608	7351	7104	6756	6513	6267	6212	5929	5826	5593	5566	5487	5362	5198	5158	4970
32	8581	8359	8039	7805	7557	7339	7022	6803	6581	6546	6295	6193	5958	5977	5922	5827	5679	5643	5449
33	8681	8470	8161	7960	7730	7517	7229	7030	6848	6822	6594	6486	6283	6333	6278	6219	6085	6049	5871
34	8759	8564	8265	8082	7854	7671	7383	7209	7054	7036	6833	6739	6574	6614	6579	6541	6407	6384	6230
35	8819	8630	8349	8174	7971	7800	7512	7351	7209	7196	7035	6965	6802	6848	6844	6813	6683	6673	6532
36	8860	8683	8408	8247	8057	7898	7634	7479	7330	7343	7180	7138	6993	7047	7067	7027	6911	6895	6773
37	8893	8720	8456	8298	8127	7978	7717	7570	7436	7444	7284	7245	7146	7209	7227	7212	7096	7077	6960
38	8918	8752	8489	8340	8182	8034	7776	7635	7512	7530	7379	7352	7267	7328	7367	7344	7234	7221	7107
39	8938	8773	8519	8372	8216	8069	7820	7692	7571	7597	7446	7428	7351	7418	7477	7447	7343	7338	7216
40	8954	8787	8535	8392	8239	8103	7852	7726	7618	7649	7508	7489	7412	7485	7544	7519	7423	7427	7299
41	8963	8798	8550	8406	8254	8121	7874	7756	7651	7683	7540	7531	7460	7522	7591	7567	7489	7484	7358
42	8967	8806	8558	8414	8267	8134	7885	7770	7670	7697	7563	7560	7477	7549	7623	7591	7521	7525	7398
43	8972	8810	8563	8423	8273	8144	7892	7776	7684	7711	7577	7579	7490	7565	7639	7616	7541	7554	7427
44	8975	8812	8566	8426	8277	8149	7897	7781	7690	7715	7583	7586	7500	7572	7645	7626	7554	7565	7443
45	8975	8813	8568	8427	8278	8151	7899	7784	7692	7717	7585	7588	7504	7576	7646	7631	7560	7569	7447
46	8976	8813	8568	8428	8278	8151	7900	7785	7693	7718	7586	7590	7505	7579	7649	7632	7563	7571	7450
47	8976	8814	8569	8429	8278	8152	7900	7786	7694	7719	7587	7590	7506	7580	7650	7633	7564	7571	7452

48	8976	8814	8569	8429	8278	8152	7901	7786	7695	7719	7587	7590	7506	7580	7651	7633	7565	7571	7454
49	8976	8814	8569	8430	8279	8152	7901	7786	7695	7720	7587	7591	7506	7580	7651	7633	7565	7571	7455
50	8976	8814	8570	8430	8279	8152	7901	7786	7695	7720	7587	7591	7506	7580	7651	7633	7566	7571	7455

Source: Human Fertility Database. Own elaboration.

Table A.20: Cumulative births (Sbi) in the transition to the second child in Hungary, between 1991 and 2009

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
15	1	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0
16	5	7	5	6	5	7	6	5	5	5	3	2	2	2	3	3	3	2	2
17	22	21	22	25	23	22	22	17	19	17	17	16	19	19	21	18	17	18	17
18	67	55	61	64	60	63	61	51	53	50	54	52	52	51	55	56	50	55	51
19	148	141	124	134	131	127	122	111	113	112	112	113	113	114	115	122	111	120	108
20	295	276	244	241	235	226	216	203	188	204	194	195	196	201	200	205	200	213	196
21	543	504	439	418	393	364	343	326	298	322	300	299	296	292	303	306	295	317	294
22	902	833	718	670	626	558	511	482	432	460	426	420	416	398	409	413	396	425	397
23	1398	1266	1106	1011	939	817	732	675	606	624	577	562	554	511	522	524	510	540	503
24	1992	1807	1559	1431	1317	1136	1002	907	810	824	751	720	699	649	657	656	626	668	632
25	2638	2394	2081	1902	1742	1506	1297	1183	1048	1047	958	913	866	803	802	802	760	805	759
26	3332	3027	2651	2416	2199	1901	1638	1479	1331	1297	1201	1134	1058	983	975	967	921	967	918
27	3998	3637	3228	2943	2692	2331	2012	1822	1635	1600	1474	1391	1292	1204	1186	1180	1108	1146	1091
28	4596	4212	3773	3448	3181	2764	2405	2184	1965	1926	1785	1691	1563	1454	1438	1431	1337	1371	1300
29	5100	4696	4274	3912	3625	3189	2790	2543	2311	2276	2117	2021	1861	1752	1729	1714	1613	1642	1564
30	5514	5101	4690	4292	4023	3582	3146	2897	2641	2629	2440	2363	2183	2069	2048	2035	1920	1950	1862
31	5860	5426	5022	4616	4359	3918	3456	3227	2958	2953	2751	2707	2506	2411	2379	2377	2242	2281	2174
32	6127	5683	5282	4879	4619	4191	3738	3494	3227	3242	3054	2995	2807	2734	2715	2729	2593	2613	2516
33	6321	5887	5480	5097	4825	4400	3954	3728	3462	3491	3312	3264	3065	3025	3024	3053	2921	2950	2848
34	6471	6044	5635	5265	4994	4579	4133	3905	3655	3702	3527	3489	3300	3271	3284	3337	3223	3253	3154
35	6583	6161	5762	5390	5118	4721	4268	4046	3813	3869	3704	3669	3499	3483	3514	3578	3482	3515	3410
36	6671	6253	5850	5492	5225	4827	4380	4162	3930	4004	3845	3813	3653	3653	3695	3766	3673	3722	3640
37	6729	6316	5920	5569	5301	4907	4468	4252	4022	4102	3949	3921	3768	3791	3844	3919	3834	3883	3810
38	6773	6361	5972	5621	5355	4964	4529	4320	4087	4172	4029	4004	3859	3886	3946	4035	3958	4010	3943
39	6806	6394	6006	5658	5394	5000	4568	4372	4132	4225	4086	4073	3926	3954	4017	4121	4041	4100	4043
40	6830	6418	6032	5686	5422	5026	4597	4407	4163	4257	4128	4117	3967	4005	4068	4180	4101	4165	4110
41	6845	6433	6047	5704	5440	5045	4617	4431	4188	4285	4152	4152	4002	4044	4103	4219	4140	4206	4154
42	6850	6443	6059	5717	5451	5056	4630	4445	4201	4299	4170	4169	4018	4065	4126	4242	4164	4233	4180
43	6857	6447	6063	5724	5458	5065	4636	4455	4208	4312	4180	4175	4030	4079	4139	4254	4177	4248	4199
44	6860	6451	6065	5728	5461	5068	4639	4459	4212	4314	4183	4180	4036	4083	4145	4260	4186	4255	4208
45	6861	6452	6067	5730	5462	5068	4641	4461	4214	4315	4185	4182	4039	4086	4148	4262	4190	4260	4211
46	6862	6453	6068	5731	5463	5070	4642	4463	4215	4316	4186	4183	4041	4089	4149	4263	4191	4261	4213
47	6862	6454	6068	5731	5464	5070	4643	4463	4215	4317	4186	4183	4041	4089	4150	4264	4192	4262	4213
48	6862	6454	6068	5731	5464	5070	4643	4463	4215	4318	4186	4183	4041	4090	4150	4264	4193	4262	4214
49	6862	6454	6069	5731	5464	5070	4643	4463	4215	4318	4186	4184	4041	4090	4150	4264	4193	4262	4214
50	6862	6454	6069	5731	5464	5070	4643	4464	4215	4318	4186	4184	4041	4090	4151	4264	4193	4263	4215

Source: Human Fertility Database. Own elaboration.

Table A.21: Cumulative births (Sbi) in the transition to the first child in Portugal, between 1991 and 2012

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
15	13	14	10	13	11	14	15	15	17	19	16	16	13	12	13	13	12	14	12	10	10	10
16	53	51	51	53	50	54	58	58	63	69	59	62	59	54	57	48	52	50	45	42	41	37
17	155	144	157	149	143	145	155	153	164	180	164	172	161	162	157	145	141	130	127	121	104	97
18	358	331	361	335	315	318	342	333	340	371	340	364	345	343	323	284	284	271	252	241	216	195
19	655	631	641	605	577	571	600	594	601	635	582	611	589	579	556	500	503	470	443	409	366	337
20	1073	1034	1027	952	907	917	931	917	940	971	894	923	882	864	854	774	766	732	689	634	592	534
21	1572	1524	1510	1394	1306	1313	1334	1288	1307	1364	1227	1260	1204	1170	1155	1077	1064	1037	980	899	830	760
22	2169	2073	2034	1897	1769	1759	1771	1718	1719	1791	1621	1629	1550	1510	1486	1397	1375	1359	1283	1202	1107	1011
23	2847	2695	2613	2434	2280	2259	2258	2191	2195	2251	2039	2030	1918	1871	1844	1736	1711	1711	1623	1532	1407	1289
24	3552	3381	3264	3017	2845	2807	2788	2697	2717	2759	2495	2484	2329	2248	2228	2113	2054	2083	1973	1896	1729	1592
25	4252	4078	3955	3672	3455	3410	3364	3247	3281	3334	3006	2975	2802	2682	2640	2507	2437	2465	2362	2289	2075	1935
26	4957	4794	4660	4370	4099	4060	4005	3875	3910	3955	3576	3528	3327	3167	3107	2966	2877	2893	2789	2707	2481	2320
27	5660	5494	5364	5059	4798	4742	4669	4522	4574	4612	4194	4138	3920	3732	3641	3478	3369	3372	3254	3187	2947	2777
28	6253	6126	6017	5710	5464	5424	5347	5170	5264	5294	4840	4798	4576	4347	4244	4046	3908	3915	3769	3724	3472	3300
29	6767	6673	6584	6318	6091	6053	5988	5821	5915	5951	5497	5467	5250	4998	4912	4681	4505	4522	4346	4312	4067	3866
30	7197	7137	7064	6829	6649	6612	6571	6436	6515	6541	6126	6134	5915	5657	5579	5352	5160	5138	4961	4920	4696	4499
31	7531	7495	7465	7234	7103	7079	7080	6952	7044	7079	6701	6731	6568	6282	6234	5999	5811	5781	5568	5541	5331	5155
32	7790	7760	7759	7552	7440	7442	7469	7378	7459	7526	7180	7225	7098	6856	6777	6575	6403	6388	6142	6125	5921	5745
33	7983	7972	7985	7803	7707	7715	7750	7695	7800	7880	7542	7608	7524	7314	7272	7077	6897	6883	6669	6649	6459	6277
34	8135	8122	8155	7990	7893	7931	7954	7932	8054	8148	7846	7913	7857	7689	7658	7505	7303	7311	7126	7102	6928	6760
35	8253	8247	8280	8136	8044	8090	8115	8116	8249	8351	8084	8159	8131	7974	7981	7835	7677	7674	7495	7490	7336	7161
36	8350	8352	8381	8250	8166	8217	8253	8254	8401	8515	8269	8357	8348	8202	8224	8108	7958	7971	7820	7799	7682	7516
37	8422	8427	8459	8335	8256	8315	8354	8353	8522	8632	8403	8512	8516	8369	8399	8306	8189	8207	8082	8063	7956	7807
38	8485	8488	8517	8401	8325	8382	8422	8424	8617	8720	8501	8608	8629	8491	8531	8452	8342	8380	8278	8269	8175	8027
39	8535	8528	8558	8444	8376	8437	8477	8480	8686	8784	8577	8681	8707	8586	8628	8560	8461	8510	8420	8424	8351	8199
40	8569	8561	8594	8479	8414	8475	8516	8520	8734	8832	8629	8737	8763	8654	8699	8638	8552	8600	8522	8542	8475	8342
41	8595	8587	8616	8504	8440	8503	8546	8552	8767	8862	8669	8774	8806	8694	8751	8696	8611	8668	8602	8623	8564	8447
42	8610	8604	8631	8518	8459	8523	8563	8566	8785	8882	8694	8796	8832	8728	8781	8727	8654	8708	8648	8673	8621	8512
43	8620	8614	8641	8532	8469	8534	8574	8578	8798	8898	8710	8812	8847	8748	8796	8748	8674	8729	8681	8705	8663	8546
44	8626	8621	8645	8536	8474	8540	8581	8586	8807	8905	8719	8820	8856	8759	8809	8760	8690	8742	8696	8722	8683	8568
45	8630	8625	8648	8541	8480	8545	8586	8591	8811	8911	8726	8824	8861	8764	8816	8767	8696	8747	8703	8736	8696	8582
46	8633	8626	8649	8542	8483	8547	8587	8594	8813	8914	8728	8826	8865	8767	8818	8770	8700	8751	8708	8739	8700	8589
47	8634	8627	8649	8543	8483	8548	8590	8595	8813	8916	8731	8828	8866	8770	8820	8771	8701	8753	8710	8742	8702	8593
48	8635	8627	8650	8543	8484	8549	8591	8595	8815	8918	8732	8829	8868	8772	8821	8772	8701	8754	8711	8744	8703	8594
49	8636	8627	8650	8544	8484	8549	8592	8595	8815	8919	8733	8830	8868	8773	8821	8772	8702	8754	8712	8745	8704	8595
50	8636	8627	8650	8545	8484	8549	8592	8596	8815	8919	8733	8830	8868	8774	8822	8772	8702	8755	8712	8745	8704	8596

Source: Human Fertility Database. Own elaboration

Table A.22: Cumulative births (Sbi) in the transition to the second child in Portugal, between 1991 and 2012

	1991	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	1	0
17	4	4	3	4	4	7	8	6	6	4	5	6	6	5	3	4	4	3	4	4	4	4
18	20	15	12	13	12	18	20	17	15	17	21	20	16	16	17	13	14	12	13	14	9	10
19	55	41	41	40	34	42	49	44	38	43	46	44	43	44	43	35	38	33	31	35	25	26
20	117	98	90	81	77	85	91	92	83	91	97	92	87	91	85	69	79	71	67	71	54	56
21	215	186	178	153	141	147	159	163	153	160	164	162	154	150	149	131	137	132	122	125	102	98
22	351	314	293	256	232	237	252	254	245	253	255	252	243	227	238	212	218	213	197	202	165	150
23	527	476	457	389	350	357	373	362	356	374	362	356	338	325	341	311	313	310	290	293	252	218
24	756	686	657	561	497	514	526	512	495	527	492	483	455	448	459	415	420	428	394	414	352	308
25	1047	950	900	774	685	697	716	695	679	700	645	635	601	580	591	542	542	568	518	547	466	407
26	1392	1281	1204	1028	928	930	949	911	901	927	835	820	765	737	748	685	689	726	668	697	588	525
27	1803	1674	1567	1350	1214	1217	1225	1174	1164	1193	1059	1036	959	916	928	866	864	903	839	868	738	661
28	2256	2101	1973	1730	1551	1563	1554	1487	1476	1511	1332	1300	1203	1146	1145	1070	1060	1105	1028	1064	918	820
29	2728	2573	2420	2145	1943	1945	1940	1850	1845	1887	1653	1601	1488	1408	1408	1314	1281	1340	1242	1297	1129	1009
30	3212	3057	2879	2593	2368	2376	2371	2271	2250	2299	2025	1960	1827	1711	1698	1587	1549	1611	1493	1555	1367	1224
31	3663	3534	3355	3030	2819	2842	2840	2740	2709	2748	2438	2367	2213	2063	2058	1913	1847	1913	1790	1849	1651	1469
32	4067	3955	3792	3455	3255	3286	3295	3212	3168	3223	2870	2785	2625	2444	2441	2281	2189	2250	2115	2187	1973	1768
33	4422	4317	4187	3834	3655	3703	3718	3638	3621	3681	3289	3214	3035	2855	2841	2670	2547	2614	2461	2543	2328	2085
34	4716	4634	4493	4156	3994	4057	4094	4020	4013	4100	3685	3620	3441	3246	3234	3042	2923	2996	2811	2898	2681	2421
35	4952	4881	4756	4417	4279	4362	4416	4365	4357	4468	4043	3990	3815	3617	3603	3402	3282	3359	3155	3230	3038	2768
36	5126	5073	4956	4625	4494	4591	4655	4646	4646	4762	4353	4310	4139	3940	3928	3723	3600	3689	3471	3548	3369	3070
37	5270	5211	5109	4784	4658	4775	4847	4848	4864	5003	4592	4562	4391	4193	4192	3998	3875	3961	3739	3822	3662	3336
38	5362	5299	5218	4892	4770	4904	4983	5000	5042	5172	4781	4759	4590	4391	4394	4214	4093	4171	3945	4037	3892	3560
39	5426	5371	5291	4973	4851	4989	5077	5102	5158	5300	4911	4887	4735	4538	4555	4373	4256	4341	4123	4212	4072	3746
40	5475	5416	5340	5024	4913	5041	5137	5173	5232	5385	4999	4986	4840	4643	4664	4491	4367	4470	4251	4341	4203	3875
41	5512	5450	5375	5064	4949	5079	5179	5209	5281	5445	5062	5057	4905	4708	4740	4572	4446	4547	4334	4436	4302	3965
42	5538	5471	5398	5085	4971	5103	5200	5237	5312	5479	5102	5099	4954	4758	4789	4621	4500	4600	4387	4493	4360	4026
43	5552	5484	5412	5097	4986	5117	5216	5252	5330	5498	5125	5124	4978	4790	4816	4651	4529	4630	4425	4528	4396	4061
44	5557	5492	5421	5105	4996	5126	5227	5262	5343	5508	5136	5133	4992	4806	4831	4664	4548	4647	4446	4549	4414	4082
45	5560	5495	5425	5110	5000	5132	5232	5266	5348	5513	5141	5142	4998	4815	4839	4673	4556	4655	4458	4557	4424	4092
46	5561	5498	5428	5113	5002	5135	5234	5267	5351	5515	5143	5146	5002	4820	4846	4679	4559	4660	4463	4562	4431	4098
47	5562	5498	5429	5114	5004	5136	5236	5269	5352	5517	5144	5148	5003	4821	4847	4681	4561	4662	4466	4564	4433	4101
48	5563	5498	5429	5115	5005	5136	5236	5269	5353	5518	5144	5150	5005	4822	4848	4681	4562	4663	4468	4564	4434	4101
49	5563	5498	5430	5115	5005	5136	5236	5269	5353	5518	5144	5150	5006	4823	4848	4682	4562	4663	4469	4565	4435	4102
50	5564	5498	5430	5115	5005	5136	5236	5269	5353	5519	5145	5150	5007	4825	4848	4682	4562	4663	4469	4565	4435	4102

Source: Human Fertility Database. Own elaboration.

Table A.23: Cumulative births (Sbi) in the transition to the first child in Sweden, between 1991 and 2011

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
15	1	2	1	1	2	1	1	1	2	2	1	1	1	2	1	1	1	1	1	2	1
16	9	7	7	6	8	7	6	7	6	7	8	5	7	7	7	6	6	6	6	6	5
17	34	32	30	28	29	26	27	23	25	25	28	26	25	26	23	23	24	18	20	21	21
18	108	102	90	82	85	78	76	66	65	79	72	78	76	69	63	68	63	56	59	57	53
19	273	231	222	194	185	170	158	154	158	165	155	171	159	142	137	139	135	128	124	124	119
20	572	493	462	412	376	353	326	304	313	333	317	329	300	290	289	293	282	278	267	264	252
21	1015	887	817	725	669	625	562	519	540	572	537	563	530	522	508	522	512	525	509	495	452
22	1550	1384	1269	1133	1040	960	863	813	837	881	821	865	832	819	795	818	827	846	816	800	725
23	2165	1973	1784	1613	1481	1346	1245	1157	1160	1206	1146	1205	1169	1149	1137	1177	1176	1223	1192	1157	1062
24	2865	2607	2368	2158	1967	1793	1654	1540	1525	1587	1535	1600	1536	1507	1508	1562	1591	1635	1605	1578	1454
25	3571	3307	3034	2767	2520	2291	2146	1986	1959	2008	1967	2042	1965	1942	1939	1997	2057	2115	2061	2059	1928
26	4305	4022	3733	3439	3155	2880	2683	2497	2443	2502	2461	2550	2473	2459	2429	2495	2562	2642	2584	2608	2434
27	5002	4728	4431	4125	3805	3517	3265	3067	2986	3086	3015	3100	3032	3019	2985	3065	3140	3211	3167	3203	3006
28	5649	5388	5099	4795	4469	4146	3886	3669	3578	3690	3602	3715	3658	3638	3593	3703	3769	3825	3816	3845	3618
29	6235	5972	5709	5426	5094	4754	4519	4272	4192	4328	4237	4370	4329	4314	4280	4389	4435	4508	4484	4520	4309
30	6720	6499	6263	5998	5643	5350	5097	4885	4798	4957	4884	5020	5030	5005	4959	5095	5128	5210	5187	5235	4993
31	7146	6945	6726	6502	6148	5870	5646	5444	5372	5552	5488	5674	5701	5671	5646	5772	5800	5891	5883	5889	5642
32	7491	7311	7112	6916	6573	6324	6103	5959	5886	6069	6052	6253	6284	6267	6238	6380	6414	6485	6486	6498	6247
33	7760	7605	7430	7238	6932	6688	6488	6372	6308	6503	6511	6724	6786	6772	6746	6885	6926	6986	6997	7017	6746
34	7981	7839	7679	7495	7211	6988	6799	6700	6661	6855	6895	7105	7170	7205	7151	7290	7342	7373	7389	7414	7170
35	8149	8026	7884	7701	7432	7236	7063	6980	6957	7128	7187	7418	7486	7524	7485	7628	7666	7701	7722	7734	7525
36	8288	8178	8054	7879	7628	7436	7249	7201	7192	7357	7435	7642	7739	7774	7753	7897	7927	7956	7993	8002	7802
37	8391	8291	8171	8021	7773	7595	7418	7369	7374	7538	7612	7827	7911	7977	7961	8109	8130	8168	8191	8211	8027
38	8467	8372	8268	8127	7893	7725	7544	7497	7519	7668	7751	7954	8061	8125	8108	8269	8283	8327	8352	8364	8204
39	8525	8439	8338	8206	7976	7819	7638	7598	7621	7765	7851	8054	8163	8232	8221	8383	8401	8443	8473	8488	8337
40	8564	8484	8392	8257	8042	7882	7705	7678	7701	7835	7925	8126	8238	8313	8305	8462	8487	8533	8564	8589	8436
41	8591	8517	8429	8294	8081	7924	7758	7732	7753	7882	7982	8182	8289	8368	8359	8515	8545	8591	8624	8655	8515
42	8611	8539	8450	8319	8102	7953	7789	7765	7786	7913	8021	8216	8320	8409	8395	8551	8584	8631	8668	8700	8566
43	8622	8554	8465	8334	8121	7969	7806	7784	7811	7933	8045	8236	8340	8431	8416	8572	8605	8652	8690	8728	8593
44	8628	8560	8472	8341	8131	7979	7817	7796	7823	7943	8054	8245	8350	8441	8429	8584	8617	8664	8706	8741	8608
45	8631	8565	8475	8344	8136	7984	7824	7803	7830	7948	8061	8251	8357	8447	8434	8592	8624	8672	8713	8749	8614
46	8632	8566	8476	8346	8137	7987	7827	7804	7833	-	8063	8253	8362	8450	8439	8594	8627	8675	8717	8753	8619
47	8633	8567	8477	8346	8137	7988	7828	7806	7835	-	-	8254	8364	8451	8441	8597	8629	8677	8719	8755	8621
48	8633	8567	8478	8346	8138	7988	7829	7806	7835	-	-	-	8364	8452	8441	8598	8630	8678	8720	8756	8622
49	8633	8567	8478	8346	8138	7988	7829	7806	7835	-	-	-	-	8452	8442	8598	8631	8678	8721	8757	8623
50	8633	8567	8478	8347	8138	7988	7829	7806	7836	-	-	-	-	-	8442	8599	8631	8679	8722	8757	8623

Source: Human Fertility Database. Own elaboration

Table A.24: Cumulative births (Sbi) in the transition to the second child in Sweden, between 1991 and 2011

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	1	1	0	0	0	1	0	0	1	0	2	0	1	0	1	0	1	1	0	0	0
18	6	4	3	4	2	4	4	2	2	3	2	2	2	2	3	3	2	3	2	1	2
19	18	17	14	15	14	11	12	8	9	10	9	9	8	11	9	11	8	8	7	7	7
20	58	51	45	41	40	30	34	26	28	27	26	24	23	24	26	25	27	25	22	19	23
21	152	137	122	106	96	79	75	62	67	64	67	62	63	65	63	62	62	60	61	56	58
22	319	300	271	226	208	174	159	137	145	139	137	134	134	134	135	136	140	142	135	131	125
23	594	554	505	431	385	323	287	261	269	252	258	253	260	255	253	256	269	267	257	254	235
24	969	904	828	720	629	533	477	440	443	422	420	436	420	414	424	429	437	453	440	435	400
25	1455	1368	1233	1109	950	800	727	662	654	649	642	654	641	641	642	665	682	696	680	683	631
26	2020	1893	1720	1550	1341	1152	1030	944	920	932	912	946	922	906	902	953	965	991	972	974	907
27	2627	2472	2271	2064	1791	1547	1398	1289	1255	1262	1240	1296	1251	1236	1242	1282	1312	1318	1310	1331	1228
28	3281	3085	2845	2621	2298	2006	1832	1688	1653	1664	1612	1698	1652	1625	1614	1680	1701	1733	1713	1744	1623
29	3923	3712	3452	3205	2858	2509	2316	2143	2100	2131	2045	2135	2107	2096	2085	2170	2151	2197	2172	2228	2063
30	4525	4312	4032	3788	3408	3037	2811	2621	2576	2621	2513	2647	2623	2625	2601	2694	2677	2734	2691	2756	2561
31	5077	4872	4594	4327	3929	3568	3311	3126	3073	3138	3033	3199	3179	3181	3170	3269	3244	3298	3263	3320	3103
32	5563	5373	5092	4843	4417	4067	3803	3644	3546	3638	3576	3767	3769	3778	3768	3898	3859	3910	3878	3964	3701
33	5967	5809	5545	5291	4858	4523	4253	4110	4020	4116	4091	4298	4363	4380	4364	4520	4490	4521	4503	4591	4289
34	6283	6157	5896	5661	5242	4918	4637	4520	4422	4577	4553	4780	4880	4910	4912	5088	5067	5113	5089	5173	4872
35	6536	6427	6175	5962	5562	5238	4983	4871	4784	4951	4961	5214	5324	5388	5377	5581	5573	5606	5621	5703	5401
36	6725	6630	6394	6201	5814	5499	5263	5171	5084	5266	5301	5564	5692	5754	5778	5985	5986	6018	6062	6124	5820
37	6878	6788	6575	6389	6010	5721	5475	5413	5333	5499	5569	5843	5977	6060	6089	6302	6320	6338	6403	6481	6192
38	6989	6905	6691	6520	6161	5877	5646	5589	5523	5697	5770	6061	6202	6286	6328	6542	6572	6590	6672	6745	6472
39	7061	6982	6786	6614	6270	5987	5776	5716	5663	5835	5921	6222	6362	6460	6497	6716	6752	6790	6866	6935	6674
40	7110	7037	6845	6683	6343	6068	5865	5805	5767	5936	6027	6329	6484	6577	6628	6842	6879	6925	6997	7084	6822
41	7145	7066	6884	6725	6395	6123	5921	5863	5829	6002	6100	6398	6562	6665	6707	6928	6974	7013	7091	7179	6929
42	7165	7088	6909	6749	6422	6154	5957	5897	5872	6041	6145	6446	6614	6715	6756	6978	7030	7075	7154	7244	6992
43	7177	7102	6923	6763	6436	6170	5975	5917	5893	6063	6168	6474	6638	6747	6789	7007	7064	7112	7187	7279	7030
44	7184	7109	6930	6773	6445	6179	5985	5930	5903	6075	6180	6489	6652	6765	6803	7026	7084	7133	7209	7298	7054
45	7186	7114	6933	6776	6449	6185	5990	5934	5909	6081	6187	6496	6658	6774	6810	7034	7094	7141	7218	7309	7064
46	7188	7116	6934	6779	6451	6186	5992	5937	5912	-	6190	6499	6661	6776	6814	7038	7098	7145	7223	7313	7068
47	7188	7116	6935	6780	6451	6187	5993	5938	5913	-	-	6499	6662	6777	6815	7040	7100	7148	7225	7316	7071
48	7188	7117	6935	6780	6451	6187	5993	5938	5913	-	-	-	6662	6777	6815	7041	7101	7149	7226	7318	7072
49	7188	7117	6935	6780	6452	6187	5993	5938	5913	-	-	-	-	6777	6816	7041	7102	7150	7227	7318	7073
50	7188	7117	6935	6780	6452	6187	5993	5938	5913	-	-	-	-	-	6816	7041	7102	7150	7227	7319	7073

Source: Human Fertility Database. Own elaboration.

Table A.25: TFR, PATFR and Adjusted TFRs, on the past decade in Austria, Hungary, Portugal and Sweden.

	Austria					**Hungary**					**Portugal**					**Sweden**				
	TFR	**PATFR**	**TFR***	**TFR****	**TFRp***	**TFR**	**PATFR**	**TFR***	**TFR****	**TFRp***	**TFR**	**PATFR**	**TFR***	**TFR****	**TFRp***	**TFR**	**PATFR**	**TFR***	**TFR****	**TFRp***
1990	1.46	-	1.61	1.61	-	1.87	1.92	2.00	1.98	-	1.56	-	1.93	1.92	-	2.14	2.13	2.25	2.26	-
1991	1.51	1.52	1.58	1.57	1.63	1.88	1.92	2.03	2.02	1.98	1.56	1.61	1.90	1.89	1.82	2.11	2.11	2.39	2.40	2.11
1992	1.50	1.52	1.60	1.60	1.63	1.78	1.84	1.93	1.93	1.93	1.54	1.59	1.83	1.81	1.78	2.08	2.07	2.36	2.36	2.11
1993	1.50	1.51	1.72	1.72	1.67	1.69	1.76	1.90	1.90	1.94	1.52	1.58	1.82	1.78	1.76	1.98	1.98	2.31	2.29	2.12
1994	1.47	1.47	1.80	1.79	1.71	1.64	1.72	1.89	1.87	1.92	1.45	1.52	1.77	1.76	1.74	1.88	1.90	2.22	2.21	2.10
1995	1.42	1.44	1.74	1.73	1.68	1.57	1.64	1.88	1.88	1.91	1.41	1.49	1.72	1.71	1.72	1.73	1.78	2.09	2.08	2.05
1996	1.45	1.46	1.73	1.72	1.70	1.46	1.55	1.74	1.75	1.82	1.44	1.52	1.67	1.66	1.69	1.60	1.68	1.93	1.91	1.96
1997	1.39	1.41	1.58	1.58	1.61	1.38	1.46	1.70	1.69	1.78	1.47	1.54	1.73	1.72	1.72	1.53	1.61	1.86	1.85	1.92
1998	1.37	1.39	1.56	1.57	1.58	1.33	1.41	1.76	1.73	1.80	1.47	1.54	1.86	1.84	1.78	1.52	1.60	1.83	1.81	1.90
1999	1.34	1.37	1.52	1.52	1.56	1.28	1.37	1.71	1.69	1.78	1.50	1.57	1.83	1.81	1.76	1.51	1.60	1.70	1.69	1.83
2000	1.36	1.38	1.59	1.59	1.60	1.32	1.40	1.76	1.75	1.82	1.55	1.60	1.73	1.73	1.69	1.56	1.65	1.84	1.82	1.88
2001	1.33	1.36	1.61	1.61	1.60	1.31	1.38	1.75	1.74	1.80	1.45	1.53	1.67	1.67	1.67	1.58	1.67	1.88	1.86	1.89
2002	1.39	1.41	1.68	1.67	1.64	1.30	1.37	1.72	1.71	1.74	1.46	1.54	1.78	1.78	1.70	1.67	1.74	1.94	1.94	1.90
2003	1.38	1.40	1.58	1.58	1.59	1.27	1.34	1.76	1.74	1.75	1.44	1.52	1.68	1.69	1.67	1.73	1.79	2.04	2.03	1.93
2004	1.42	1.44	1.64	1.64	1.61	1.28	1.35	1.81	1.79	1.76	1.40	1.49	1.59	1.58	1.64	1.77	1.82	1.98	1.97	1.92
2005	1.41	1.43	1.73	1.72	1.66	1.31	1.37	1.71	1.71	1.69	1.41	1.50	1.66	1.65	1.65	1.79	1.83	1.96	1.95	1.92
2006	1.40	1.43	1.69	1.67	1.64	1.34	1.40	1.70	1.69	1.70	1.37	1.47	1.55	1.55	1.60	1.87	1.89	2.02	2.01	1.95
2007	1.38	1.40	1.60	1.59	1.60	1.32	1.37	1.56	1.55	1.61	1.35	1.44	1.48	1.48	1.56	1.89	1.91	1.94	1.94	1.90
2008	1.41	1.43	1.68	1.68	1.64	1.35	1.40	1.57	1.58	1.61	1.39	1.47	1.59	1.60	1.60	1.92	1.93	2.02	2.02	1.93
2009	1.39	1.41	1.70	1.70	1.63	1.32	1.37	NA	NA	-	1.34	1.43	1.57	1.57	1.56	1.94	1.94	2.08	2.08	1.95
2010	1.44	1.45	-	-	-	-	-	-	-	-	1.39	1.46	1.77	1.76	1.64	1.99	1.98	2.07	2.08	1.96
2011	-	-	-	-	-	-	-	-	-	-	1.35	1.43	1.71	1.71	1.64	1.90	1.91	-	-	-
2012	-	-	-	-	-	-	-	-	-	-	1.28	1.37	-	-	-	-	-	-	-	-

Source: Human Fertility Database. Own elaboration.

Appendix B

To Chapter 3 – Parenthood transition: from Individualization to family formation

Table B. 1: Covariates, recorded number of events, median and respective confidence interval and p-value

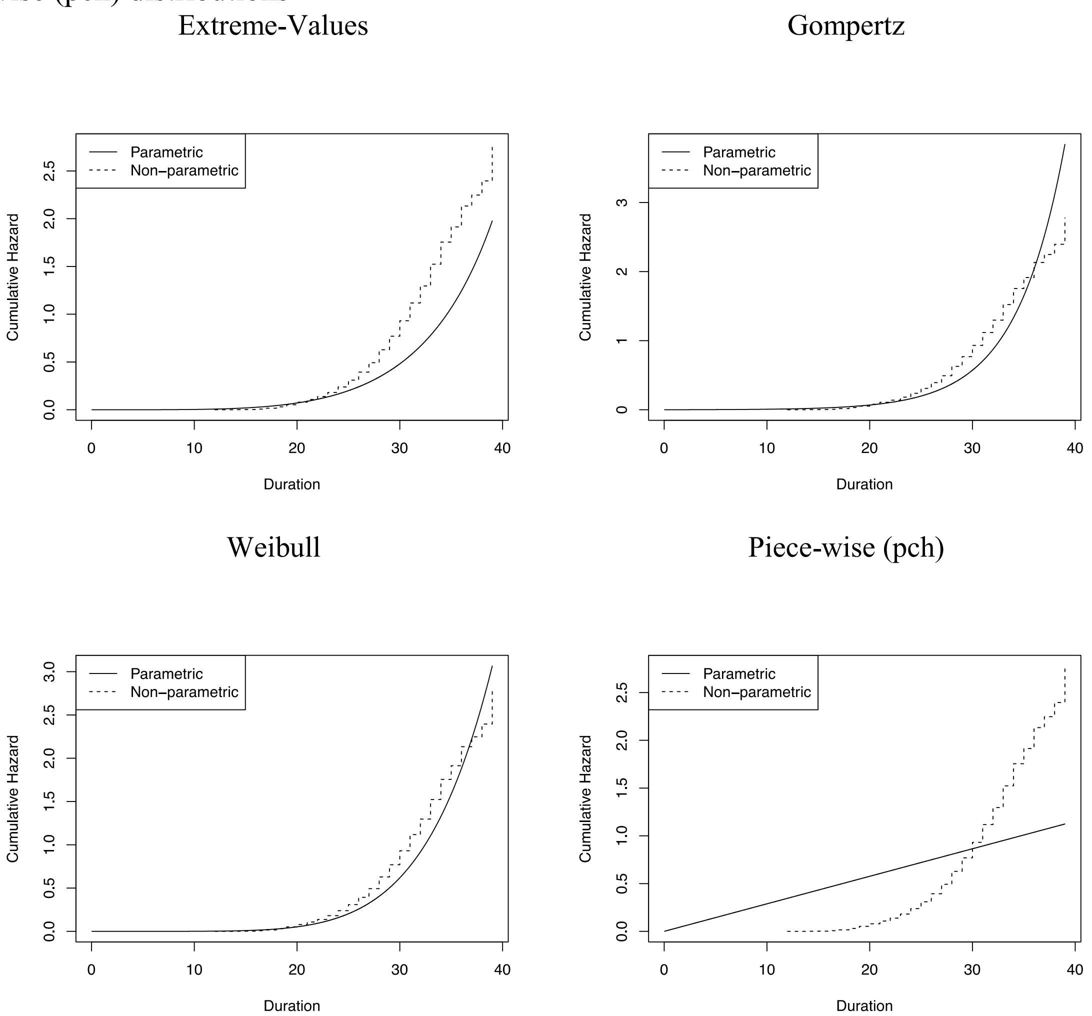
	records	n.max	n.start	events	median	0.95 LCL	0.95 UCL	p-value
Sex								
Male	1324	1216	1216	562	31	31	32	***
Female	3143	1266	1266	730	28	28	29	
Nationality								
Portuguese	3971	2221	2221	1120	30	29	30	
Other	496	260	260	171	29	28	31	.
Educational Level								
Higher Education	1165	615	615	298	33	32	33	***
Until Upper Secondary level	3302	1866	1866	994	28	28	29	
Father Educational Level								
Lower than Sec. Educ.	3666	1964	1964	1093	29	29	30	
Upper Sec. & Higher Education	679	441	441	162	32	31	33	.
Mother Educational Level								
Lower than Sec	3707	1990	1990	1122	29	29	30	***
Upper Sec. & Higher Education	716	468	468	151	33	32	33	
Ideal number of children for a family								
Until 1	2901	1618	1618	751	30	30	31	
2 or more	1503	835	835	522	29	28	29	.
Desired number of children								
Max of 2	2985	1659	1659	822	30	30	31	***
More than 2	1451	802	802	461	29	28	29	
Age at first job								
After age 18	1748	916	916	461	32	31	32	**
Not work./Never work/ Before age 18	2719	1566	1566	831	28	28	29	
Age at first cohabitation								
After age 22	1755	939	939	689	31	30	31	***
Before age 22/Not before	2712	1542	1542	603	28	27	29	
Age of leaving parental household								
After age 21	1849	982	982	726	30	30	31	
Until age 21	1185	563	563	406	25	25	26	.
Never leaved	1337	889	889	136	NA	36	NA	
Siblings								
Until 1	2288	1396	1396	626	31	30	31	***
2 or more	2179	1086	1086	666	28	27	28	
Cohort								
Before April 25th	812	391	391	358	28	28	29	**
After April 25th	3655	2090	2090	934	30	30	31	
Parent's divorce								
Never	693	390	390	168	30	29	31	
Divorced	3582	1988	1988	1068	30	29	30	.
Never lived together	45	23	23	9	28	26	NA	
Other	147	80	80	47	28	25	30	
Maternal Conciliation								
Working	3721	2075	2075	1015	30	30	31	***
Not working	736	398	398	273	28	27	28	
Paternal Conciliation								
Working	2843	1551	1551	822	29	29	30	
Not working	1616	924	924	465	31	30	31	.
Maternal Presence								
Agree	1674	940	940	527	29	28	29	***
Disagree	2783	1532	1532	759	30	30	31	
Paternal Presence								
Agree	708	435	435	216	30	29	31	***
Disagree	3753	2042	2042	1073	30	29	30	
Female autonomy								
Entirely agree	2577	1375	1375	676	30	30	31	

Partially disagree	1890	1106	1106	616	29	28	29	
Postponement								
Entirely agree	3393	1893	1893	1005	30	29	30	
Partially disagree	1069	584	584	283	30	29	31	.
Family significance								
Agree	3069	1712	1712	981	29	29	30	***
Disagree	1378	757	757	304	31	31	33	
Personal fulfilment								
Entirely agree	1847	1029	1029	623	29	28	29	***
Partially disagree	2601	1440	1440	661	31	30	31	
Offspring balance								
Agree	2594	1478	1478	665	30	30	31	***
Disagree	1847	987	987	620	29	28	29	

Notes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Source: 2013 PFS. Own elaboration.

Figure B. 1: Adjusted Model 3 to the Extreme-values, Gompertz, Weibull and Piece-wise (pch) distributions



Source: 2013 PFS. Own elaboration.

Appendix C

<u>To Chapter 4</u> – The impact of women's education in the transition to motherhood: a cohort perspective

Table C.1: Fertility table for the first birth for the 1950 cohort for Austria

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	3	4761	0.001	100000	63	99968	0.001
16	11	4758	0.002	99937	231	99821	0.003
17	42	4747	0.009	99706	882	99265	0.012
18	129	4705	0.027	98824	2710	97469	0.039
19	259	4576	0.057	96114	5440	93394	0.093
20	322	4317	0.075	90674	6763	87293	0.161
21	409	3995	0.102	83911	8591	79616	0.247
22	432	3586	0.120	75320	9074	70783	0.338
23	359	3154	0.114	66247	7540	62476	0.413
24	354	2795	0.127	58706	7435	54988	0.487
25	276	2441	0.113	51271	5797	48372	0.545
26	235	2165	0.109	45474	4936	43006	0.595
27	191	1930	0.099	40538	4012	38532	0.635
28	158	1739	0.091	36526	3319	34867	0.668
29	156	1581	0.099	33207	3277	31569	0.701
30	107	1425	0.075	29931	2247	28807	0.723
31	95	1318	0.072	27683	1995	26686	0.743
32	69	1223	0.056	25688	1449	24963	0.758
33	72	1154	0.062	24239	1512	23482	0.773
34	54	1082	0.050	22726	1134	22159	0.784
35	33	1028	0.032	21592	693	21246	0.791
36	27	995	0.027	20899	567	20615	0.797
37	20	968	0.021	20332	420	20122	0.801
38	13	948	0.014	19912	273	19775	0.804
39	24	935	0.026	19639	504	19387	0.809
40	14	911	0.015	19135	294	18988	0.812
41	5	897	0.006	18841	105	18841	0.813

Source: Own elaboration; IPUMS

Table C.2: Fertility table for the first birth for the 1960 cohort for Austria

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	2	5872	0.000	100000	34	99983	0.000
16	12	5870	0.002	99966	204	99864	0.002
17	38	5858	0.006	99762	647	99438	0.009
18	81	5820	0.014	99114	1379	98425	0.023
19	145	5739	0.025	97735	2469	96500	0.047
20	210	5594	0.038	95266	3576	93478	0.083
21	327	5384	0.061	91689	5569	88905	0.139
22	381	5057	0.075	86121	6488	82876	0.204
23	415	4676	0.089	79632	7067	76098	0.274
24	402	4261	0.094	72565	6846	69142	0.343
25	384	3859	0.100	65719	6540	62449	0.408
26	337	3475	0.097	59179	5739	56310	0.466
27	291	3138	0.093	53440	4956	50962	0.515
28	277	2847	0.097	48484	4717	46126	0.562
29	222	2570	0.086	43767	3781	41877	0.600
30	225	2348	0.096	39986	3832	38071	0.638
31	180	2123	0.085	36155	3065	34622	0.669
32	164	1943	0.084	33089	2793	31693	0.697
33	119	1779	0.067	30296	2027	29283	0.717
34	102	1660	0.061	28270	1737	27401	0.735
35	106	1558	0.068	26533	1805	25630	0.753
36	58	1452	0.040	24728	988	24234	0.763
37	54	1394	0.039	23740	920	23280	0.772
38	39	1340	0.029	22820	664	22488	0.778
39	39	1301	0.030	22156	664	21824	0.785
40	28	1262	0.022	21492	477	21253	0.790
41	13	1234	0.011	21015	221	21015	0.792

Source: Own elaboration; IPUMS

Table C.3: Fertility table for the first birth for the 1950 cohort for Hungary

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	6	3721	0.002	100000	161	99919	0.002
16	7	3715	0.002	99839	188	99745	0.003
17	19	3708	0.005	99651	511	99395	0.009
18	64	3689	0.017	99140	1720	98280	0.026
19	129	3625	0.036	97420	3467	95687	0.060
20	268	3496	0.077	93953	7202	90352	0.132
21	344	3228	0.107	86751	9245	82128	0.225
22	339	2884	0.118	77506	9110	72951	0.316
23	325	2545	0.128	68396	8734	64028	0.403
24	303	2220	0.136	59661	8143	55590	0.485
25	264	1917	0.138	51518	7095	47971	0.556
26	253	1653	0.153	44424	6799	41024	0.624
27	226	1400	0.161	37624	6074	34587	0.684
28	168	1174	0.143	31551	4515	29293	0.730
29	137	1006	0.136	27036	3682	25195	0.766
30	89	869	0.102	23354	2392	22158	0.790
31	52	780	0.067	20962	1397	20263	0.804
32	62	728	0.085	19565	1666	18732	0.821
33	37	666	0.056	17898	994	17401	0.831
34	28	629	0.045	16904	752	16528	0.838
35	28	601	0.047	16152	752	15775	0.846
36	19	573	0.033	15399	511	15144	0.851
37	18	554	0.032	14888	484	14647	0.856
38	20	536	0.037	14405	537	14136	0.861
39	11	516	0.021	13867	296	13719	0.864
40	4	505	0.008	13572	107	13518	0.865
41		501	0.000	13464	0	13464	0.865

Source: Own elaboration; IPUMS

Table C.4: Fertility table for the first birth for the 1960 cohort for Hungary

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	5	3204	0.002	100000	156	99922	0.002
16	6	3199	0.002	99844	187	99750	0.003
17	36	3193	0.011	99657	1124	99095	0.015
18	78	3157	0.025	98533	2434	97316	0.039
19	155	3079	0.050	96099	4838	93680	0.087
20	230	2924	0.079	91261	7179	87672	0.159
21	243	2694	0.090	84082	7584	80290	0.235
22	276	2451	0.113	76498	8614	72191	0.321
23	230	2175	0.106	67884	7179	64295	0.393
24	244	1945	0.125	60705	7615	56898	0.469
25	234	1701	0.138	53090	7303	49438	0.542
26	212	1467	0.145	45787	6617	42478	0.608
27	167	1255	0.133	39170	5212	36564	0.660
28	131	1088	0.120	33958	4089	31913	0.701
29	124	957	0.130	29869	3870	27934	0.740
30	90	833	0.108	25999	2809	24594	0.768
31	62	743	0.083	23190	1935	22222	0.787
32	58	681	0.085	21255	1810	20350	0.806
33	44	623	0.071	19444	1373	18758	0.819
34	40	579	0.069	18071	1248	17447	0.832
35	30	539	0.056	16823	936	16355	0.841
36	22	509	0.043	15886	687	15543	0.848
37	24	487	0.049	15200	749	14825	0.855
38	17	463	0.037	14451	531	14185	0.861
39	7	446	0.016	13920	218	13811	0.863
40	11	439	0.025	13702	343	13530	0.866
41	9	428	0.021	13358	281	13358	0.869

Source: Own elaboration; IPUMS

Table C.5: Fertility table for the first birth for the 1950 cohort for Portugal

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	4	3001	0.001	100000	133	99933	0.001
16	8	2997	0.003	99867	267	99733	0.004
17	13	2989	0.004	99600	433	99384	0.008
18	44	2976	0.015	99167	1466	98434	0.023
19	81	2932	0.028	97701	2699	96351	0.050
20	133	2851	0.047	95002	4432	92786	0.094
21	162	2718	0.060	90570	5398	87871	0.148
22	261	2556	0.102	85172	8697	80823	0.235
23	272	2295	0.119	76475	9064	71943	0.326
24	312	2023	0.154	67411	10397	62213	0.430
25	294	1711	0.172	57014	9797	52116	0.528
26	272	1417	0.192	47218	9064	42686	0.618
27	210	1145	0.183	38154	6998	34655	0.688
28	163	935	0.174	31156	5432	28441	0.743
29	127	772	0.165	25725	4232	23609	0.785
30	84	645	0.130	21493	2799	20093	0.813
31	62	561	0.111	18694	2066	17661	0.834
32	49	499	0.098	16628	1633	15811	0.850
33	34	450	0.076	14995	1133	14429	0.861
34	26	416	0.063	13862	866	13429	0.870
35	26	390	0.067	12996	866	12562	0.879
36	20	364	0.055	12129	666	11796	0.885
37	9	344	0.026	11463	300	11313	0.888
38	16	335	0.048	11163	533	10896	0.894
39	5	319	0.016	10630	167	10546	0.895
40	10	314	0.032	10463	333	10297	0.899
41	9	304	0.030	10130	300	10130	0.902

Source: Own elaboration; IPUMS

Table C.6: Fertility table for the first birth for the 1950 cohort for Spain

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	13	11091	0.001	100000	117	99941	0.001
16	24	11078	0.002	99883	216	99775	0.003
17	47	11054	0.004	99666	424	99455	0.008
18	93	11007	0.008	99243	839	98823	0.016
19	196	10914	0.018	98404	1767	97521	0.034
20	363	10718	0.034	96637	3273	95000	0.066
21	626	10355	0.060	93364	5644	90542	0.123
22	921	9729	0.095	87720	8304	83568	0.206
23	1195	8808	0.136	79416	10775	74028	0.314
24	1286	7613	0.169	68641	11595	62844	0.430
25	1303	6327	0.206	57046	11748	51172	0.547
26	1140	5024	0.227	45298	10279	40159	0.650
27	853	3884	0.220	35019	7691	31174	0.727
28	575	3031	0.190	27328	5184	24736	0.779
29	436	2456	0.178	22144	3931	20179	0.818
30	319	2020	0.158	18213	2876	16775	0.847
31	228	1701	0.134	15337	2056	14309	0.867
32	194	1473	0.132	13281	1749	12406	0.885
33	139	1279	0.109	11532	1253	10905	0.897
34	90	1140	0.079	10279	811	9873	0.905
35	90	1050	0.086	9467	811	9061	0.913
36	63	960	0.066	8656	568	8372	0.919
37	36	897	0.040	8088	325	7925	0.922
38	37	861	0.043	7763	334	7596	0.926
39	32	824	0.039	7429	289	7285	0.929
40	19	792	0.024	7141	171	7055	0.930
41	19	773	0.025	6970	171	6970	0.932

Source: Own elaboration; IPUMS

Table C.7: Fertility table for the first birth for the 1960 cohort for Spain

Age	$B_1(x)$	$E_0(x)$	$q_1(x)$	$l_0(x)$	$b_1(x)$	$L_1(x)$	$z_1(x)$
15	9	14116	0.001	100000	64	99968	0.001
16	28	14107	0.002	99936	198	99837	0.003
17	86	14079	0.006	99738	609	99433	0.009
18	174	13993	0.012	99129	1233	98512	0.021
19	317	13819	0.023	97896	2246	96773	0.043
20	531	13502	0.039	95650	3762	93769	0.081
21	678	12971	0.052	91889	4803	89487	0.129
22	790	12293	0.064	87086	5596	84287	0.185
23	882	11503	0.077	81489	6248	78365	0.248
24	833	10621	0.078	75241	5901	72290	0.307
25	793	9788	0.081	69340	5618	66531	0.363
26	832	8995	0.092	63722	5894	60775	0.422
27	813	8163	0.100	57828	5759	54948	0.479
28	774	7350	0.105	52069	5483	49327	0.534
29	735	6576	0.112	46585	5207	43982	0.586
30	702	5841	0.120	41379	4973	38892	0.636
31	641	5139	0.125	36405	4541	34135	0.681
32	542	4498	0.120	31865	3840	29945	0.720
33	463	3956	0.117	28025	3280	26385	0.753
34	425	3493	0.122	24745	3011	23240	0.783
35	357	3068	0.116	21734	2529	20470	0.808
36	295	2711	0.109	19205	2090	18160	0.829
37	222	2416	0.092	17115	1573	16329	0.845
38	188	2194	0.086	15543	1332	14877	0.858
39	144	2006	0.072	14211	1020	13701	0.868
40	126	1862	0.068	13191	893	12744	0.877
41	85	1736	0.049	12298	602	12298	0.883

Source: Own elaboration; IPUMS

Table C.8: Estimated probabilities to become a mother by age and educational level, for Austria, Hungary, Portugal and Spain in the 1950 cohort

	Less than primary				**Primary**				**Upper Secondary**				**University Completed**			
	Austria	Hungary	Portugal	Spain	Austria	Hungary	Portugal	Spain	Austria	Hungary	Portugal	Spain	Austria	Hungary	Portugal	Spain
15	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	-	1	0.99810	0.99814	0.99894	0.99652	1	0.99873	0.99963	0.99952	1	1	1	1	1	1
17	-	0.98592	0.99430	0.99207	0.99469	0.99374	1	0.99718	0.99851	0.99855	1	1	1	1	1	1
18	-	0.95775	0.98812	0.98368	0.97930	0.98679	1	0.99336	0.99367	0.99515	0.99905	0.99905	1	1	1	0.99877
19	-	0.92958	0.97007	0.96690	0.94268	0.95828	0.99239	0.98602	0.97134	0.98497	0.99432	0.99432	1	1	0.99422	0.99877
20	-	0.87324	0.93539	0.93660	0.87155	0.90056	0.97462	0.96864	0.92520	0.96508	0.98674	0.98674	0.99474	0.99333	0.98844	0.99877
21	-	0.78873	0.88266	0.87692	0.79512	0.80946	0.94416	0.93955	0.85969	0.90155	0.96591	0.96591	0.98421	0.99333	0.98266	0.99012
22	-	0.71831	0.82090	0.79534	0.69851	0.69263	0.90863	0.88178	0.77633	0.81911	0.94034	0.94034	0.96842	0.98667	0.97110	0.97160
23	-	0.56338	0.72114	0.69138	0.59236	0.59249	0.85025	0.79506	0.69036	0.73327	0.88447	0.88447	0.96316	0.94000	0.92486	0.94074
24	-	0.47887	0.61948	0.56317	0.51486	0.50348	0.78426	0.68263	0.61258	0.64258	0.80682	0.80682	0.94211	0.91333	0.86127	0.88889
25	-	0.35211	0.51639	0.44009	0.45011	0.43046	0.65228	0.55805	0.53145	0.55577	0.72254	0.72254	0.86842	0.84667	0.81503	0.82593
26	-	0.33803	0.41663	0.33939	0.39597	0.38387	0.55838	0.43107	0.46855	0.46945	0.61837	0.61837	0.84211	0.72667	0.72254	0.72963
27	-	0.26761	0.33064	0.25221	0.35350	0.33032	0.46954	0.32260	0.41682	0.39234	0.51799	0.51799	0.75789	0.64667	0.63584	0.63210
28	-	0.22535	0.26508	0.19301	0.31953	0.28164	0.40102	0.24266	0.37253	0.32347	0.43087	0.43087	0.71579	0.57333	0.56647	0.54815
29	-	0.18310	0.21805	0.14965	0.29087	0.24409	0.32741	0.19435	0.34016	0.27401	0.36174	0.36174	0.62632	0.51333	0.45665	0.46543
30	-	0.15493	0.18052	0.11795	0.26964	0.21836	0.27665	0.15692	0.30145	0.23327	0.31629	0.31629	0.56316	0.42000	0.39306	0.39753
31	-	0.14085	0.15487	0.09977	0.25372	0.20097	0.24873	0.13107	0.27503	0.20514	0.27462	0.27462	0.53158	0.38667	0.35260	0.33210
32	-	0.11268	0.13682	0.08112	0.24045	0.19193	0.23350	0.11243	0.25121	0.19011	0.24716	0.24716	0.50000	0.34667	0.31214	0.29877
33	-	0.09859	0.12162	0.06900	0.23248	0.17803	0.21066	0.09675	0.23372	0.17362	0.22064	0.22064	0.46316	0.30000	0.30636	0.26296
34	-	0.09859	0.11069	0.06107	0.21868	0.17177	0.19543	0.08559	0.21846	0.16198	0.19981	0.19981	0.43684	0.27333	0.28324	0.23704
35	-	0.09859	0.10071	0.05641	0.21072	0.16203	0.19543	0.07839	0.20692	0.15664	0.18561	0.18561	0.39474	0.25333	0.26012	0.21975
36	-	0.09859	0.09359	0.05082	0.20594	0.15090	0.17513	0.07076	0.19836	0.15276	0.17614	0.17614	0.38947	0.22667	0.25434	0.20247
37	-	0.08451	0.08789	0.04709	0.20223	0.14882	0.16244	0.06540	0.19204	0.14646	0.16572	0.16572	0.37368	0.21333	0.24855	0.19506
38	-	0.07042	0.08504	0.04476	0.19639	0.14534	0.16244	0.06243	0.18869	0.14161	0.16098	0.16098	0.37368	0.20000	0.24855	0.18889
39	-	0.07042	0.08171	0.04382	0.19480	0.14186	0.15736	0.05960	0.18608	0.13482	0.15625	0.15625	0.35789	0.19333	0.23121	0.17654
40	-	0.07042	0.07933	0.04196	0.19108	0.13839	0.15736	0.05720	0.18124	0.13240	0.15057	0.15057	0.33684	0.18667	0.23121	0.17037
41	-	0.07042	0.07601	0.04149	0.18843	0.13769	0.15482	0.05551	0.17827	0.13143	0.14678	0.14678	0.33158	0.18000	0.21965	0.16790

Source: Own elaboration; IPUMS

Table C.9: Estimated probabilities to become a mother by age and educational level, for Austria, Hungary, Portugal and Spain in the 1960 cohort

	Less than primary				Primary				Upper Secondary				University Completed			
	Austria	Hungary	Portugal	Spain	Austria	Hungary	Portugal	Spain	Austria	Hungary	Portugal	Spain	Austria	Hungary	Portugal	Spain
15	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16	-	0.97727	0.99658	0.99866	1	0.99656	0.99907	0.99935	1	1	1	0.99866	0.99866	0.99935	0.99977	0.99843
17	-	0.96591	0.98975	0.99199	0.99879	0.99313	0.99445	0.99727	0.99921	0.99882	0.99573	0.99199	0.99199	0.99727	0.99840	0.99765
18	-	0.93182	0.97539	0.97997	0.99333	0.96907	0.98612	0.98871	0.99580	0.99177	0.99359	0.97997	0.97997	0.98871	0.99590	0.99765
19	-	0.89773	0.94258	0.95995	0.97818	0.92440	0.95282	0.97119	0.98452	0.97180	0.98932	0.95995	0.95282	0.98291	1.00000	0.99530
20	-	0.84091	0.89337	0.91188	0.95576	0.85911	0.91304	0.94315	0.96143	0.92009	0.98291	0.91188	0.99757	0.99630	0.99256	0.99373
21	-	0.76136	0.83732	0.83845	0.92182	0.76289	0.85384	0.89384	0.92600	0.84371	0.96795	0.83845	0.99513	0.98706	0.97519	0.98589
22	-	0.70455	0.74846	0.76769	0.87697	0.67354	0.76688	0.83063	0.87038	0.75617	0.93162	0.76769	0.99270	0.97043	0.95285	0.97806
23	-	0.63636	0.64730	0.69559	0.80909	0.58648	0.67068	0.75496	0.80609	0.65864	0.88675	0.69559	0.98540	0.95009	0.91563	0.97257
24	-	0.60227	0.55639	0.60748	0.73030	0.53150	0.58094	0.67670	0.73708	0.57756	0.82479	0.60748	0.97080	0.89834	0.87097	0.96160
25	-	0.55682	0.45660	0.54072	0.64121	0.46163	0.48936	0.60688	0.66597	0.49765	0.74573	0.54072	0.95864	0.82255	0.84119	0.93809
26	-	0.53409	0.39234	0.48331	0.57030	0.41123	0.40703	0.53965	0.59328	0.42127	0.68162	0.48331	0.92457	0.74307	0.79404	0.92085
27	-	0.51136	0.34313	0.42190	0.51030	0.35166	0.34690	0.47463	0.52821	0.35899	0.60684	0.42190	0.90511	0.63586	0.76427	0.88323
28	-	0.45455	0.29187	0.36582	0.46545	0.32073	0.30805	0.41428	0.47179	0.30729	0.53205	0.36582	0.86861	0.53974	0.69231	0.84561
29	-	0.42045	0.25154	0.33645	0.43030	0.28179	0.25902	0.36288	0.41905	0.27908	0.46795	0.33645	0.82482	0.45287	0.62035	0.79702
30	-	0.37500	0.21463	0.30040	0.39273	0.25659	0.22109	0.31343	0.38153	0.24148	0.41667	0.30040	0.79075	0.36784	0.56079	0.73746
31	-	0.37500	0.18524	0.26969	0.36061	0.23940	0.19704	0.26879	0.34086	0.21093	0.37393	0.26969	0.72749	0.30499	0.50372	0.67868
32	-	0.34091	0.17020	0.23498	0.33636	0.22566	0.17391	0.22946	0.31199	0.18978	0.33120	0.23498	0.65450	0.26248	0.45658	0.61912
33	-	0.30682	0.15448	0.20828	0.31212	0.20848	0.16096	0.19676	0.28575	0.17509	0.29060	0.20828	0.58151	0.24214	0.42184	0.56191
34	-	0.29545	0.14149	0.18558	0.28667	0.19473	0.14431	0.17300	0.26686	0.16099	0.26282	0.18558	0.52798	0.21442	0.37469	0.50235
35	-	0.29545	0.12919	0.16422	0.26727	0.18328	0.13136	0.14848	0.24954	0.14982	0.23504	0.16422	0.49148	0.20148	0.34739	0.45611
36	-	0.26136	0.11620	0.15354	0.25636	0.17526	0.12118	0.12927	0.23327	0.14277	0.20727	0.15354	0.44769	0.18115	0.32010	0.41144
37	-	0.26136	0.10731	0.13885	0.24364	0.17068	0.11193	0.11538	0.22461	0.13631	0.18376	0.13885	0.39173	0.16636	0.28536	0.36599
38	-	0.25000	0.09911	0.13084	0.23455	0.16266	0.10361	0.10409	0.21727	0.12867	0.16667	0.13084	0.36740	0.15342	0.25806	0.33542
39	-	0.25000	0.09364	0.12150	0.22667	0.15693	0.09528	0.09513	0.21176	0.12280	0.14957	0.12150	0.33577	0.14787	0.22829	0.30486
40	-	0.25000	0.08612	0.10948	0.22061	0.15349	0.08881	0.08799	0.20546	0.12103	0.14316	0.10948	0.31630	0.14418	0.20844	0.28370
41	-	0.23864	0.08339	0.10547	0.21636	0.14891	0.08603	0.08267	0.20257	0.11810	0.12607	0.10547	0.29684	0.14233	0.20099	0.26254

Source: Own elaboration; IPUMS

Table C.10: Average age at childbearing by marital status and educational level for the selected countries in 1950 and 1960 cohorts

	Austria		Hungary		Portugal		Spain	
	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort
Less than Primary								
Single/never married	-	-	25.8	28.5	27.3	27.3	26.7	27.6
Married/in union	-	-	26.4	26.7	26.9	26.1	26.3	26.6
Separated/divorced/spouse absent/Widowed	-	-	24.6	27.8	26.1	24.8	26.5	24.9
Primary								
Single/never married	26.8	28.2	25.2	27.2	31	27.5	28.8	29.4
Married/in union	26.0	26.3	25.3	25.4	27.3	26.2	27.5	27
Separated/divorced/spouse absent/Widowed	25.1	26.8	25.0	25.2	24.9	25.6	26.3	26
Upper Secondary								
Single/never married	28.1	29.2	30.3	30.7	38	24.5	30.3	31.4
Married/in union	26.6	27.2	26.0	25.7	27.7	28.2	28.5	29.3
Separated/divorced/spouse absent/Widowed	25.4	27.1	25.9	25.6	26.2	28.8	26.3	27.7
University completed								
Single/never married	34.4	33.1	32.0	28.7	-	36.3	30.7	33.8
Married/in union	30.2	31.7	28.6	28	29.2	30.6	29.6	31.6
Separated/divorced/spouse absent/Widowed	28.6	30.3	29.0	27.3	26.1	28.5	27.3	30.8

Notes: For Austria there is no data for the educational level *less than primary*
Source: Own elaboration; IPUMS

Table C.11: Average age at childbearing by employment and educational level for the selected countries in 1950 and 1960 cohorts

	Austria		Hungary		Portugal		Spain	
	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort	1950 Cohort	1960 Cohort
Less than Primary	-	-	26.5	22.6	26.7	25.6	26.9	26.1
Employed	-	-	-	27.2	26.6	26.0	26.9	26.0
Unemployed	-	-	-	-	27	26.5	27.3	26.8
Homemakers	-	-	25.4	27.5	27.1	26.9	26.7	27.2
Others								
Primary	25.0	26.0	24.9	24.3	27.1	26.3	27.4	26.7
Employed	26.4	26.9	26.3	26.4	27.9	26.2	27.7	27.3
Unemployed	26.1	27.3	-	-	27.3	25.9	27.4	27.2
Homemakers	26.5	29.1	26.8	27.8	27.9	25.7	27.1	26.8
Others								
Upper Secondary	26.1	27.0	25.9	25.2	27.5	28.1	28.5	29.4
Employed	27.1	28.4	24.9	27.2	27.8	27	28.4	29.4
Unemployed	27.1	27.9	-	-	27.7	29.1	28.3	28.8
Homemakers	26.9	27.7	28.4	27.5	27	26.7	27.8	29.1
Others								
University Completed	30	31.6	28.5	27.7	28.9	30.5	29.5	31.7
Employed	28	34.1	-	27.1	-	30.8	28.4	31.2
Unemployed	30.1	32	-	-	27.9	31.9	29.5	31.6
Homemakers	28.4	31.8	36	30.6	38	28.9	29.5	31.7
Others	-	-	26.5	22.6	26.7	25.6	26.9	26.1

Notes: 1) For Austria there is no data for the educational level *less than primary;* 2)The Hungarian data had no information to the employment category *Homemakers*. 2)At the covariate employment status the category *Others* include students. pension or capital income recipients and unemployed that never worked before.
Source: Own elaboration; IPUMS

Table C.12: Sample distribution of women exposed to transition to motherhood by educational level, in the selected countries in 1950 and 1960 cohorts

	Less than primary	Primary	Upper Secondary	University Completed
Austria cohort 50	-	40.0	56.0	4.0
Austria cohort 60	-	28.0	65.0	7.0
Hungary cohort 50	1.9	38.6	55.4	4.0
Hungary cohort 60	2.7	27.2	53.1	16.9
Portugal cohort 50	70.1	13.1	11.0	5.8
Portugal cohort 60	42.8	31.7	13.7	11.8
Spain cohort 50	19.3	63.8	9.5	7.3
Spain cohort 60	5.3	54.6	31.1	9.0

Source: Own elaboration; IPUMS

Appendix D

To Chapter 5 – The interplay of employment and economic instability and its impact on fertility decline

Table D.1: Average total fertility rates by decades

	Austria	France	Hungary	Portugal	Spain	Sweden
1960s	2.7	2.8	1.9	3.2	2.9	2.3
1970s	1.9	2.1	2.1	2.7	2.8	1.8
1980s	1.5	1.8	1.8	1.9	1.7	1.8
1990s	1.4	1.7	1.6	1.5	1.2	1.8
2000s	1.4	1.9	1.3	1.4	1.3	1.8

Source: Human Fertility Database. Own elaboration.

Table D.2: Change in the total fertility rate between decades

	Austria	France	Hungary	Portugal	Spain	Sweden
60s-70s	-30.4	-23.5	8.7	-15.1	-4.7	-20.6
70s-80s	-18.4	-12.7	-12.2	-31.4	-37.3	-1.7
80s-90s	-5.9	-6.0	-13.9	-20.2	-28.6	2.8
90s-00s	-3.4	12.0	-17.3	-6.2	7.6	-0.5

Source: Human Fertility Database. Own elaboration.

Table D.3: Change in the fertility rate by age between 2008 and 2012, in Portugal (as benchmark country), France, Spain and Sweden

Age	France	Portugal	Sweden	Spain
15	14.46	-27.30	-21.31	-26.85
16	8.09	-21.05	27.62	-28.61
17	-1.21	-30.27	-17.89	-28.61
18	-10.07	-27.78	-7.61	-33.53
19	-7.95	-22.72	-11.29	-33.89
20	-7.95	-25.88	-15.46	-30.88
21	-10.15	-23.59	-13.87	-25.88
22	-6.72	-21.82	-8.82	-22.24
23	-5.98	-18.16	-4.38	-18.50
24	-2.27	-13.99	-0.59	-18.84
25	-1.75	-15.28	-3.59	-15.66
26	-3.63	-10.17	0.32	-15.44
27	-2.94	-10.21	-0.34	-14.02
28	-2.68	-12.70	-2.42	-13.68
29	-1.49	-7.28	-5.54	-11.69
30	-0.17	-5.78	-5.51	-11.53
31	-0.64	-6.40	-3.32	-9.40
32	2.15	-2.10	-2.16	-6.92
33	5.03	-1.56	1.72	-6.95
34	6.11	1.12	4.04	-5.24
35	7.45	-0.49	1.35	-1.43
36	7.74	3.38	7.82	0.24
37	8.88	6.28	12.81	3.04
38	9.38	7.88	1.98	10.86
39	8.01	5.93	6.17	14.04
40	9.36	14.66	16.97	23.80

Source: Human Fertility Database. Own elaboration.

Table D.4: Women employment rate by educational level at the age group 20-24 for the selected countries, between 1992 and 2013

	ISCED level 0-2						ISCED level 3-4						ISCED level 5-8					
	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden
1992	43.3	-	-	-	70.7	-	23.6	-	-	-	35.9	-	53.6	-	-	-	63.7	-
1993	38.7	40.3	-	-	66.1	-	23.5	44.3	-	-	33.1	-	34.4	45.5	-	-	51.3	-
1994	40.3	37.4	-	-	62.6	-	21.5	41.5	-	-	32.1	-	32.8	40.5	-	-	61.5	-
1995	42.6	34.6	-	66.6	62.7	46.2	20.8	41.1	-	71.5	26.9	54.2	33.0	41.5	-	84.3	63.5	62.9
1996	42.9	32.0	-	63.9	62.7	33.4	19.0	40.2	-	70.6	27.5	51.4	34.1	46.4	-	80.9	56.7	50.0
1997	45.5	28.8	30.9	54.5	63.4	-	19.8	38.3	44.2	71.8	31.4	50.1	36.5	49.6	80.9	-	62.5	44.3
1998	47.5	35.0	26.8	59.6	69.4	-	22.4	41.1	49.5	72.6	33.7	52.9	34.9	41.6	71.8	88.5	77.5	44.6
1999	52.6	35.1	29.2	54.6	63.5	36.7	23.0	42.5	48.9	70.2	35.2	57.2	41.5	42.8	79.6	74.6	74.3	42.7
2000	54.9	36.1	28.1	48.4	64.1	43.2	28.5	44.8	45.1	67.9	34.0	57.1	42.8	48.0	77.9	71.9	78.1	49.4
2001	56.5	35.2	31.5	48.3	69.2	56.2	29.0	44.9	42.0	65.1	32.2	63.9	46.1	48.3	78.0	72.2	71.7	62.2
2002	53.6	35.0	31.5	46.9	67.0	52.6	31.0	46.3	42.9	66.2	38.1	63.8	48.5	47.6	75.6	72.5	72.1	57.1
2003	54.1	39.8	20.9	49.8	65.2	51.0	33.0	48.0	42.5	65.4	36.6	63.0	49.9	49.6	68.3	70.9	70.4	58.7
2004	53.3	37.5	25.1	47.7	63.8	42.5	35.6	46.5	35.4	66.8	31.7	59.3	50.6	48.7	66.3	57.1	67.1	58.1
2005	57.0	36.5	20.8	45.6	63.6	42.2	40.5	45.6	33.4	67.9	29.9	61.5	54.6	49.8	69.7	74.0	59.8	53.7
2006	61.3	38.7	22.5	51.1	65.9	41.7	43.1	43.8	32.3	67.3	32.4	61.7	55.9	48.8	67.8	68.3	54.2	56.3
2007	58.6	36.9	20.8	56.9	62.2	47.0	42.3	47.0	30.2	66.9	35.6	64.3	56.9	52.9	72.1	71.6	57.0	59.4
2008	56.6	38.6	20.8	54.7	64.9	40.1	42.3	45.0	29.4	68.3	36.3	64.2	56.0	56.4	67.3	70.5	59.4	58.0
2009	45.5	37.9	17.3	51.9	59.8	31.8	37.1	45.0	29.2	69.5	38.0	59.8	50.0	55.9	60.3	58.6	57.1	57.2
2010	42.3	34.4	20.0	50.9	54.1	34.8	34.4	43.5	28.8	68.0	35.4	59.0	47.3	53.9	60.4	60.2	51.0	59.6
2011	39.9	37.1	17.3	52.2	50.6	34.7	29.9	42.6	28.8	68.3	34.1	61.3	43.0	51.6	59.1	66.2	52.0	61.9
2012	32.7	37.7	16.8	46.7	45.1	35.7	25.5	41.6	30.6	68.0	32.5	61.2	38.6	50.6	57.1	69.9	40.4	57.9
2013	28.5	33.7	15.3	48.9	43.0	30.2	22.4	41.3	30.1	69.0	29.9	63.0	37.5	50.9	53.6	68.7	39.6	59.0

Notes: The ISCED educational levels 0-2 refer to "*Less than primary. primary and lower secondary education*"; ISCED levels 3-4 refer to "*Upper secondary and post-secondary non-tertiary education*"; and ISCED levels 5-6 refer to "*Tertiary education*".
Source: Eurostat

Table D.5: Women employment rate by educational level at the age group 25-29 for the selected countries, between 1992 and 2013

	ISCED level 0-2						ISCED level 3-4						ISCED level 5-8					
	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden
1992	37.0	-	-	-	70.0	-	45.9	-	-	-	73.9	-	66.1	-	-	-	91.3	-
1993	33.1	46.0	-	-	69.6	-	51.1	69.7	-	-	69.1	-	57.0	78.8	-	-	87.8	-
1994	33.7	45.2	-	-	65.5	-	50.1	68.6	-	-	64.1	-	53.8	78.8	-	-	89.4	-
1995	36.1	48.2	-	65.7	70.1	41.3	48.3	67.1	-	77.2	63.5	78.0	53.8	77.3	-	87.2	83.7	80.6
1996	37.2	46.7	-	67.9	70.8	52.6	51.7	67.0	-	78.9	69.2	71.4	56.8	76.3	-	83.0	85.1	78.9
1997	41.0	45.8	28.6	60.8	69.3	51.3	50.6	66.4	49.6	78.5	67.2	71.1	59.1	76.4	67.5	88.6	87.8	76.0
1998	41.5	43.7	34.5	62.6	74.7	48.8	53.1	66.2	53.9	78.9	68.4	67.1	59.0	76.7	67.2	88.6	85.3	69.9
1999	46.4	43.0	31.7	62.9	72.1	49.4	56.4	67.4	56.2	80.3	70.2	70.4	62.2	78.4	72.6	87.8	87.6	77.7
2000	48.8	41.8	32.6	63.4	75.8	53.4	61.8	70.4	57.9	76.3	78.0	78.7	68.4	81.5	75.2	88.5	86.4	70.7
2001	49.3	42.2	33.4	61.1	75.1	60.0	59.4	69.0	59.8	79.0	74.3	75.8	71.0	81.8	76.6	85.8	85.4	81.1
2002	52.3	44.3	33.0	59.5	75.8	59.8	61.8	70.2	60.9	78.0	71.8	75.2	70.6	83.2	74.3	88.8	87.0	80.0
2003	54.9	47.2	35.8	52.9	74.3	54.7	63.8	67.8	60.1	78.3	76.7	75.9	72.8	82.8	74.6	84.9	83.2	82.4
2004	57.6	48.3	29.2	55.1	72.3	50.3	65.9	69.2	59.0	77.2	72.8	73.1	74.1	82.7	80.5	83.1	85.7	80.0
2005	57.7	42.1	26.3	48.5	71.6	52.3	69.7	70.4	59.3	78.0	69.6	74.9	77.3	82.5	78.9	83.0	82.9	78.6
2006	59.2	44.7	27.2	50.3	70.5	54.0	71.2	71.0	60.1	77.3	68.5	75.9	78.4	82.6	78.8	84.2	82.3	79.8
2007	60.5	43.8	29.9	56.0	69.1	51.5	73.7	70.8	59.3	74.5	70.1	77.4	80.6	82.9	76.5	84.0	79.1	81.7
2008	59.6	44.2	28.2	47.6	67.9	52.2	73.7	70.5	58.2	77.1	75.6	76.9	79.7	85.0	78.8	82.7	79.8	82.7
2009	53.7	45.6	27.3	46.9	68.4	50.6	67.3	69.9	55.9	78.9	71.3	73.8	76.4	82.5	77.6	81.5	85.1	80.2
2010	53.8	44.1	24.6	46.4	60.8	44.5	64.4	68.7	57.2	79.9	73.1	71.9	73.1	84.2	73.5	81.6	82.6	79.9
2011	50.8	42.9	22.2	49.0	61.2	45.1	62.6	67.0	55.5	80.3	77.1	75.6	71.0	82.9	74.9	81.7	77.5	81.2
2012	45.7	38.9	22.1	52.8	61.9	41.3	60.2	66.5	58.0	82.0	75.0	74.3	68.4	82.8	74.5	83.0	73.4	82.1
2013	44.8	37.4	23.2	51.5	55.6	40.9	57.9	65.9	59.5	81.7	71.3	74.9	65.7	82.7	78.8	84.2	71.5	82.3

Notes: The ISCED educational levels 0-2 refer to "*Less than primary. primary and lower secondary education*"; ISCED levels 3-4 refer to "*Upper secondary and post-secondary non-tertiary education*"; and ISCED levels 5-6 refer to "*Tertiary education*".
Source: Eurostat

Table D.6: Women employment rate by educational level at the age group 30-34 for the selected countries, between 1992 and 2013

	ISCED level 0-2						ISCED level 3-4						ISCED level 5-8					
	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden
1992	32.1	-	-	-	66.5	-	55.1	-	-	-	80.7	-	73.9	-	-	-	94.4	-
1993	32.7	49.1	-	-	67.3	-	50.4	70.4	-	-	81.5	-	70.4	80.8	-	-	93.1	-
1994	31.6	49.0	-	-	66.8	-	46.8	68.2	-	-	77.9	-	68.7	81.1	-	-	93.5	-
1995	32.5	49.4	-	64.5	67.6	68.0	49.9	70.9	-	74.7	73.0	76.0	67.6	80.4	-	93.4	93.8	85.3
1996	31.4	51.6	-	64.0	66.7	63.3	49.7	69.4	-	73.7	84.3	77.7	67.6	81.3	-	92.0	93.0	85.3
1997	32.6	50.0	36.3	60.7	69.7	51.7	51.8	68.2	61.7	72.9	82.3	76.7	67.9	80.7	65.2	87.7	95.8	81.9
1998	35.0	48.9	40.1	57.3	71.6	53.5	53.2	67.4	65.7	76.7	82.4	74.9	69.1	81.2	80.1	91.4	93.5	83.4
1999	38.0	48.9	35.7	56.3	72.0	48.9	56.6	67.6	66.5	75.7	89.4	80.3	73.4	82.2	76.3	87.3	95.8	82.7
2000	39.2	49.1	42.3	59.3	72.1	53.3	60.2	68.9	65.0	78.7	84.3	80.6	76.0	83.6	70.9	91.1	95.8	87.8
2001	42.8	48.3	41.4	63.0	72.2	64.0	61.0	70.9	67.7	76.8	92.0	78.9	74.7	84.4	67.4	87.4	95.7	88.3
2002	48.8	47.2	40.5	58.1	75.9	61.2	63.3	69.4	64.3	78.9	86.1	82.5	76.3	83.7	73.5	89.7	89.1	87.8
2003	47.2	54.3	38.9	62.3	75.2	57.0	66.5	70.2	64.4	79.8	85.1	79.7	78.1	86.3	72.7	87.8	91.0	86.3
2004	47.9	52.3	40.8	56.1	73.2	58.3	68.5	69.5	63.2	79.6	85.8	77.8	78.9	80.4	66.6	84.9	92.5	85.6
2005	51.2	49.4	39.1	51.3	74.6	52.3	69.5	71.0	63.2	75.2	86.2	78.1	80.3	83.5	72.4	83.3	92.5	84.0
2006	53.8	42.5	31.9	54.0	74.5	57.2	69.6	68.6	65.3	75.4	84.4	81.5	82.4	83.8	76.8	83.8	88.7	87.1
2007	56.5	45.9	35.6	56.2	72.8	55.9	70.7	72.6	65.6	75.6	84.9	83.2	83.0	85.2	71.6	84.8	89.3	88.9
2008	56.0	47.3	34.2	52.7	74.5	56.6	71.3	75.4	62.0	79.8	84.2	83.0	82.7	87.1	70.3	86.9	89.6	90.0
2009	50.9	45.3	34.6	54.4	69.2	51.5	68.6	70.8	59.0	81.1	84.3	81.3	80.5	85.2	67.4	84.1	87.6	88.4
2010	50.6	43.0	29.9	53.7	67.6	49.8	65.4	71.2	60.0	80.2	80.4	81.3	80.1	85.9	68.3	82.2	89.2	86.8
2011	51.2	43.5	28.0	54.3	70.3	52.4	63.8	70.8	60.1	80.5	80.7	82.9	78.8	85.5	69.1	86.0	88.7	87.7
2012	51.4	43.8	32.9	56.8	67.7	50.2	61.9	71.1	62.8	81.4	73.5	80.9	75.6	85.4	66.8	86.4	83.9	87.7
2013	49.3	44.7	33.6	53.8	69.5	43.8	61.1	70.5	64.8	79.8	77.5	80.4	75.0	86.3	67.9	83.2	78.9	87.4

Notes: The ISCED educational levels 0-2 refer to "*Less than primary. primary and lower secondary education*"; ISCED levels 3-4 refer to "*Upper secondary and post-secondary non-tertiary education*"; and ISCED levels 5-6 refer to "*Tertiary education*".
Source: Eurostat

Table D.7: Women employment rate by educational level at the age group 35-39 for the selected countries, between 1992 and 201

	ISCED level 0-2						ISCED level 3-4						ISCED level 5-8					
	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden
1992	32.0	-	-	-	67.0	-	57.8	-	-	-	86.8	-	79.3	-	-	-	97.3	-
1993	33.2	56.8	-	-	70.3	-	55.7	75.8	-	-	88.3	-	77.7	82.6	-	-	94.0	-
1994	34.5	54.7	-	-	68.3	-	49.5	73.9	-	-	85.3	-	75.9	81.6	-	-	95.2	-
1995	32.8	54.7	-	64.5	68.3	70.9	46.4	74.9	-	74.2	82.0	84.8	75.7	82.5	-	88.8	97.0	88.3
1996	35.9	55.7	-	65.6	70.1	66.0	49.6	73.4	-	74.4	83.0	82.8	73.9	83.2	-	86.4	91.8	86.0
1997	34.7	54.5	51.3	64.3	68.4	67.8	52.8	71.9	73.7	75.6	80.3	79.1	74.5	82.8	85.5	82.7	96.7	82.8
1998	34.8	55.2	49.5	64.4	70.2	64.0	51.0	73.0	72.2	75.0	86.9	79.2	71.2	81.9	86.1	87.3	93.2	85.1
1999	38.0	56.9	44.3	63.6	71.3	64.7	54.1	72.5	76.4	76.7	80.2	82.3	73.8	81.6	87.6	83.8	94.8	90.6
2000	39.1	56.3	45.2	65.9	75.0	66.5	55.8	74.6	76.6	79.2	93.8	83.0	75.7	83.0	88.4	84.2	97.6	88.7
2001	40.9	56.9	48.2	64.5	73.7	71.0	59.0	75.6	75.9	77.7	88.6	84.2	76.2	82.9	86.3	92.6	95.9	89.5
2002	42.4	57.7	49.3	69.6	70.6	66.2	59.4	75.9	74.4	79.0	88.7	84.4	76.2	83.8	89.3	88.9	95.3	90.8
2003	43.5	59.6	48.8	67.5	73.8	61.6	62.1	78.9	76.1	80.7	84.1	82.1	78.8	83.9	87.1	88.3	95.6	89.9
2004	46.1	61.3	47.2	64.9	73.5	62.6	63.6	75.4	73.0	76.1	84.9	83.0	79.5	83.8	84.6	84.5	94.9	87.9
2005	48.0	55.8	46.0	61.2	70.5	59.9	65.4	77.4	72.3	79.6	86.4	83.5	80.5	83.9	85.5	86.8	92.1	87.6
2006	50.3	58.8	43.8	64.7	74.8	61.8	70.3	78.0	71.9	80.8	89.1	83.4	81.7	83.4	83.6	82.2	92.3	88.9
2007	52.0	63.3	45.5	67.9	74.5	66.8	70.6	77.0	72.0	81.7	88.2	85.1	82.1	84.4	78.9	83.3	89.2	90.5
2008	53.3	60.4	42.9	64.6	75.8	63.2	70.3	78.6	72.1	82.7	86.1	87.1	81.8	87.8	82.4	85.1	92.3	91.5
2009	51.3	58.7	41.0	62.5	70.4	56.5	66.8	78.4	72.8	82.8	88.5	84.1	80.2	87.2	78.4	88.0	93.1	90.6
2010	49.2	55.8	41.4	64.7	70.5	54.3	65.3	78.5	70.7	83.6	85.6	83.0	78.4	87.6	77.6	83.8	91.8	90.1
2011	50.6	52.2	36.6	65.1	69.2	51.9	64.1	77.1	69.5	84.0	84.3	82.9	79.0	87.2	77.1	84.6	91.5	90.1
2012	48.5	48.0	38.7	63.0	67.7	58.1	66.0	77.4	70.9	84.2	78.6	83.9	76.3	87.8	76.5	86.2	87.0	90.8
2013	47.7	46.5	43.0	58.0	68.3	57.6	62.7	77.4	71.2	84.2	78.5	86.3	75.4	87.2	74.7	85.8	84.1	91.5

Notes: The ISCED educational levels 0-2 refer to "*Less than primary. primary and lower secondary education*"; ISCED levels 3-4 refer to "*Upper secondary and post-secondary non-tertiary education*"; and ISCED levels 5-6 refer to "*Tertiary education*".
Source: Eurostat

L

Table D.8: Women employment rate by educational level at the age group 40-44 for the selected countries, between 1992 and 201

	ISCED level 0-2						**ISCED level 3-4**						**ISCED level 5-8**					
	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden	Spain	France	Hungary	Austria	Portugal	Sweden
1992	31.6	-	-	-	63.2	-	55.2	-	-	-	84.2	-	81.6	-	-	-	92.7	-
1993	30.8	61.2	-	-	63.8	-	54.3	75.5	-	-	89.3	-	80.9	85.1	-	-	95.1	-
1994	31.9	60.8	-	-	64.6	-	51.7	74.8	-	-	85.3	-	77.0	83.7	-	-	95.9	-
1995	32.6	61.5	-	68.3	65.7	82.5	54.6	76.7	-	73.8	82.0	90.2	79.9	83.7	-	81.5	95.7	93.6
1996	32.4	60.3	-	62.8	67.6	70.5	58.5	78.0	-	75.4	78.8	83.8	78.3	84.1	-	85.9	94.9	92.5
1997	33.9	60.7	57.8	69.1	69.9	65.7	55.8	78.4	79.0	76.6	84.8	83.5	81.2	83.6	86.6	87.9	94.7	92.6
1998	37.1	62.7	58.2	62.3	68.3	67.0	58.7	77.8	78.8	77.7	91.0	82.5	79.8	83.6	91.0	90.5	97.7	88.2
1999	38.7	61.1	54.9	66.8	70.9	70.4	56.2	78.1	79.6	75.4	85.0	85.7	79.0	84.6	90.7	88.2	92.7	91.6
2000	42.0	60.7	54.6	64.5	71.8	67.0	59.5	78.0	80.4	76.8	82.5	85.8	78.6	85.3	92.3	84.0	90.5	92.0
2001	42.3	62.0	57.7	66.5	72.4	72.0	60.3	79.7	81.2	77.3	85.0	87.0	77.4	84.6	89.8	85.4	93.7	92.2
2002	45.1	63.1	54.4	71.3	70.6	75.8	61.4	80.2	80.2	77.7	85.1	85.4	78.8	85.3	93.6	90.3	95.4	91.5
2003	45.4	65.7	51.6	70.4	69.8	76.0	61.6	82.7	79.8	80.7	86.9	84.1	81.3	82.7	94.0	92.3	92.1	91.0
2004	45.8	67.0	47.2	65.9	74.2	69.4	64.0	80.2	79.8	80.3	87.2	84.1	78.9	83.3	94.4	92.4	92.7	89.8
2005	49.2	65.4	45.6	65.4	71.6	67.2	68.3	79.7	79.7	80.3	84.2	84.0	79.4	84.5	90.6	89.2	93.8	90.7
2006	51.3	67.2	47.8	66.0	70.7	65.7	68.5	81.1	76.7	82.8	85.6	85.1	80.2	84.1	91.0	89.0	91.8	89.2
2007	53.8	68.1	49.2	67.2	73.4	62.9	70.2	83.2	78.2	84.6	84.2	87.0	81.2	84.8	89.6	87.9	93.3	91.5
2008	53.4	67.2	47.0	68.6	72.9	67.4	68.6	82.0	80.4	84.5	80.3	87.5	80.9	86.8	89.9	90.7	91.0	91.7
2009	50.8	65.2	42.8	67.6	72.5	63.5	69.4	81.4	79.6	85.3	82.6	87.6	80.6	88.2	90.8	90.9	94.0	91.9
2010	51.0	65.8	46.2	69.4	70.5	59.5	65.1	80.7	77.9	85.9	77.1	85.3	79.0	86.7	90.9	87.6	93.2	91.4
2011	49.2	63.9	46.6	68.6	70.0	63.7	64.2	80.7	77.8	86.6	80.7	87.2	78.9	88.5	87.6	87.5	90.3	91.2
2012	48.2	60.7	49.3	69.4	68.4	60.3	62.7	81.4	80.1	84.8	78.0	88.3	77.4	88.6	89.5	88.5	92.6	92.1
2013	48.8	56.5	48.8	67.1	67.7	59.2	63.4	81.3	80.1	85.4	77.2	87.3	74.9	89.3	84.6	90.3	86.2	92.7

Notes: The ISCED educational levels 0-2 refer to "*Less than primary. primary and lower secondary education*"; ISCED levels 3-4 refer to "*Upper secondary and post-secondary non-tertiary education*"; and ISCED levels 5-6 refer to "*Tertiary education*".
Source: Eurostat

Appendix E

<u>To Chapter 6</u> – Prospective Total Fertility Rates: a robust forecast of past tendencies.

Table E. 1: Forecasted age-specific fertility rates in Austria, between 2011 and 2020

Age	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
15	0.00117	0.00115	0.00110	0.00106	0.00102	0.00099	0.00095	0.00092	0.00088	0.00085
16	0.00377	0.00352	0.00347	0.00333	0.00324	0.00313	0.00304	0.00294	0.00284	0.00275
17	0.00783	0.00759	0.00729	0.00704	0.00678	0.00654	0.00629	0.00605	0.00582	0.00559
18	0.01439	0.01407	0.01352	0.01306	0.01257	0.01212	0.01166	0.01122	0.01079	0.01037
19	0.02289	0.02230	0.02158	0.02080	0.02008	0.01936	0.01866	0.01797	0.01730	0.01664
20	0.03079	0.02988	0.02878	0.02771	0.02667	0.02565	0.02465	0.02368	0.02273	0.02180
21	0.03794	0.03669	0.03521	0.03394	0.03262	0.03137	0.03013	0.02893	0.02775	0.02661
22	0.04557	0.04389	0.04227	0.04080	0.03930	0.03786	0.03644	0.03506	0.03371	0.03240
23	0.05335	0.05126	0.04955	0.04782	0.04616	0.04452	0.04292	0.04135	0.03982	0.03833
24	0.06171	0.05953	0.05773	0.05589	0.05412	0.05237	0.05067	0.04899	0.04735	0.04574
25	0.07017	0.06845	0.06655	0.06484	0.06307	0.06138	0.05969	0.05804	0.05641	0.05481
26	0.07877	0.07775	0.07595	0.07456	0.07299	0.07154	0.07005	0.06861	0.06718	0.06577
27	0.08758	0.08702	0.08578	0.08484	0.08376	0.08275	0.08172	0.08072	0.07971	0.07872
28	0.09528	0.09501	0.09462	0.09423	0.09385	0.09346	0.09308	0.09270	0.09231	0.09193
29	0.10077	0.10076	0.10138	0.10172	0.10222	0.10263	0.10309	0.10352	0.10397	0.10442
30	0.10293	0.10361	0.10529	0.10654	0.10803	0.10942	0.11087	0.11231	0.11377	0.11524
31	0.10015	0.10228	0.10461	0.10677	0.10907	0.11134	0.11366	0.11600	0.11837	0.12077
32	0.09392	0.09721	0.10001	0.10288	0.10579	0.10875	0.11176	0.11482	0.11793	0.12109
33	0.08582	0.08933	0.09246	0.09570	0.09898	0.10234	0.10576	0.10926	0.11281	0.11644
34	0.07615	0.07927	0.08237	0.08560	0.08887	0.09223	0.09566	0.09917	0.10276	0.10642
35	0.06569	0.06835	0.07133	0.07439	0.07753	0.08075	0.08405	0.08742	0.09088	0.09441
36	0.05480	0.05724	0.06000	0.06283	0.06574	0.06873	0.07181	0.07496	0.07819	0.08151
37	0.04389	0.04606	0.04837	0.05078	0.05324	0.05579	0.05840	0.06109	0.06384	0.06667
38	0.03380	0.03556	0.03731	0.03919	0.04109	0.04306	0.04508	0.04716	0.04929	0.05148
39	0.02478	0.02613	0.02734	0.02869	0.03002	0.03143	0.03285	0.03432	0.03583	0.03737
40	0.01727	0.01830	0.01913	0.02007	0.02099	0.02196	0.02294	0.02395	0.02499	0.02606
41	0.01158	0.01225	0.01284	0.01350	0.01415	0.01484	0.01553	0.01625	0.01699	0.01775
42	0.00722	0.00758	0.00798	0.00841	0.00884	0.00928	0.00974	0.01022	0.01070	0.01120
43	0.00403	0.00423	0.00446	0.00469	0.00493	0.00518	0.00543	0.00570	0.00597	0.00625
44	0.00208	0.00221	0.00232	0.00244	0.00256	0.00269	0.00282	0.00296	0.00310	0.00324
45	0.00105	0.00113	0.00119	0.00126	0.00132	0.00139	0.00147	0.00154	0.00162	0.00169
46	0.00053	0.00058	0.00061	0.00066	0.00069	0.00074	0.00078	0.00082	0.00087	0.00092
47	0.00027	0.00030	0.00032	0.00034	0.00036	0.00039	0.00042	0.00045	0.00048	0.00051
48	0.00012	0.00013	0.00014	0.00016	0.00017	0.00018	0.00020	0.00021	0.00023	0.00025
49	0.00004	0.00005	0.00005	0.00006	0.00006	0.00007	0.00008	0.00008	0.00009	0.00010

Source: Human Fertility Database. Own elaboration.

Table E. 2: Forecasted age-specific fertility rates in France, between 2013 and 2020

Age	2013	2014	2015	2016	2017	2018	2019	2020
15	0.00099	0.00099	0.00100	0.00101	0.00101	0.00102	0.00102	0.00103
16	0.00293	0.00296	0.00299	0.00301	0.00303	0.00305	0.00306	0.00308
17	0.00642	0.00649	0.00654	0.00659	0.00662	0.00665	0.00666	0.00668
18	0.01290	0.01306	0.01319	0.01328	0.01335	0.01340	0.01343	0.01345
19	0.02272	0.02302	0.02325	0.02343	0.02357	0.02367	0.02374	0.02379
20	0.03341	0.03380	0.03412	0.03437	0.03457	0.03472	0.03484	0.03493
21	0.04421	0.04462	0.04495	0.04521	0.04543	0.04560	0.04574	0.04585
22	0.05685	0.05716	0.05741	0.05760	0.05775	0.05786	0.05794	0.05800
23	0.07152	0.07157	0.07157	0.07155	0.07149	0.07141	0.07132	0.07121
24	0.08797	0.08767	0.08736	0.08704	0.08672	0.08639	0.08605	0.08571
25	0.10499	0.10451	0.10401	0.10351	0.10300	0.10248	0.10196	0.10144
26	0.12144	0.12104	0.12060	0.12013	0.11965	0.11914	0.11862	0.11809
27	0.13599	0.13599	0.13594	0.13584	0.13571	0.13554	0.13535	0.13514
28	0.14661	0.14728	0.14788	0.14841	0.14890	0.14934	0.14976	0.15015
29	0.15138	0.15280	0.15414	0.15541	0.15662	0.15778	0.15891	0.16002
30	0.15047	0.15256	0.15457	0.15653	0.15843	0.16030	0.16214	0.16397
31	0.14470	0.14723	0.14972	0.15218	0.15462	0.15706	0.15950	0.16193
32	0.13346	0.13616	0.13886	0.14157	0.14429	0.14703	0.14978	0.15256
33	0.11921	0.12188	0.12457	0.12729	0.13003	0.13280	0.13560	0.13842
34	0.10503	0.10753	0.11008	0.11266	0.11527	0.11793	0.12062	0.12335
35	0.09003	0.09229	0.09459	0.09694	0.09932	0.10174	0.10420	0.10670
36	0.07404	0.07601	0.07802	0.08006	0.08213	0.08423	0.08637	0.08855
37	0.05938	0.06105	0.06275	0.06448	0.06624	0.06802	0.06983	0.07167
38	0.04717	0.04858	0.05001	0.05146	0.05294	0.05444	0.05597	0.05752
39	0.03618	0.03731	0.03845	0.03962	0.04081	0.04202	0.04325	0.04450
40	0.02613	0.02695	0.02780	0.02866	0.02954	0.03044	0.03136	0.03230

41	0.01786	0.01846	0.01908	0.01971	0.02035	0.02100	0.02167	0.02236
42	0.01141	0.01181	0.01223	0.01265	0.01309	0.01353	0.01399	0.01445
43	0.00666	0.00688	0.00711	0.00735	0.00760	0.00786	0.00812	0.00839
44	0.00360	0.00371	0.00383	0.00396	0.00409	0.00423	0.00437	0.00452
45	0.00183	0.00189	0.00195	0.00202	0.00209	0.00216	0.00224	0.00232
46	0.00091	0.00094	0.00097	0.00101	0.00104	0.00109	0.00113	0.00117
47	0.00045	0.00046	0.00048	0.00050	0.00053	0.00055	0.00058	0.00060
48	0.00019	0.00020	0.00021	0.00022	0.00023	0.00024	0.00025	0.00026
49	0.00006	0.00007	0.00007	0.00007	0.00007	0.00008	0.00008	0.00009

Source: Human Fertility Database. Own elaboration.

Table E. 3: Forecasted age-specific fertility rates in Hungary, between 2010 and 2020

Age	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
15	0.00545	0.00547	0.00548	0.00549	0.00551	0.00552	0.00553	0.00554	0.00556	0.00557	0.00558
16	0.01236	0.01240	0.01244	0.01247	0.01251	0.01254	0.01258	0.01262	0.01265	0.01269	0.01272
17	0.01965	0.01969	0.01965	0.01963	0.01960	0.01957	0.01954	0.01952	0.01949	0.01946	0.01943
18	0.02518	0.02484	0.02431	0.02389	0.02341	0.02297	0.02251	0.02208	0.02164	0.02121	0.02078
19	0.02868	0.02777	0.02654	0.02556	0.02446	0.02348	0.02247	0.02152	0.02057	0.01966	0.01876
20	0.03234	0.03106	0.02935	0.02801	0.02651	0.02517	0.02381	0.02254	0.02128	0.02008	0.01891
21	0.03638	0.03490	0.03290	0.03132	0.02957	0.02801	0.02642	0.02494	0.02347	0.02208	0.02073
22	0.04100	0.03932	0.03700	0.03517	0.03315	0.03136	0.02953	0.02782	0.02614	0.02454	0.02299
23	0.04638	0.04448	0.04184	0.03976	0.03746	0.03541	0.03333	0.03138	0.02947	0.02765	0.02589
24	0.05290	0.05082	0.04793	0.04565	0.04312	0.04087	0.03858	0.03643	0.03432	0.03230	0.03035
25	0.06088	0.05874	0.05578	0.05345	0.05084	0.04852	0.04613	0.04389	0.04167	0.03955	0.03748
26	0.07065	0.06873	0.06609	0.06399	0.06164	0.05952	0.05733	0.05526	0.05319	0.05120	0.04923
27	0.08258	0.08136	0.07969	0.07835	0.07683	0.07545	0.07400	0.07263	0.07123	0.06987	0.06852
28	0.09393	0.09385	0.09374	0.09364	0.09354	0.09344	0.09334	0.09324	0.09314	0.09304	0.09294
29	0.10018	0.10134	0.10293	0.10423	0.10574	0.10713	0.10862	0.11006	0.11155	0.11303	0.11454
30	0.10059	0.10277	0.10582	0.10833	0.11126	0.11400	0.11693	0.11980	0.12278	0.12576	0.12882
31	0.09602	0.09880	0.10282	0.10616	0.11008	0.11374	0.11769	0.12159	0.12565	0.12973	0.13393
32	0.08766	0.09063	0.09505	0.09873	0.10305	0.10712	0.11153	0.11588	0.12044	0.12504	0.12979
33	0.07699	0.07984	0.08412	0.08770	0.09192	0.09590	0.10021	0.10449	0.10897	0.11350	0.11819
34	0.06521	0.06775	0.07153	0.07468	0.07841	0.08192	0.08574	0.08952	0.09350	0.09751	0.10167
35	0.05350	0.05563	0.05874	0.06134	0.06440	0.06730	0.07044	0.07356	0.07683	0.08014	0.08356
36	0.04278	0.04450	0.04696	0.04902	0.05145	0.05375	0.05624	0.05871	0.06130	0.06392	0.06664
37	0.03320	0.03451	0.03637	0.03792	0.03976	0.04148	0.04336	0.04521	0.04716	0.04913	0.05116
38	0.02487	0.02581	0.02711	0.02819	0.02947	0.03067	0.03198	0.03326	0.03461	0.03598	0.03738
39	0.01799	0.01863	0.01949	0.02020	0.02103	0.02181	0.02266	0.02350	0.02437	0.02525	0.02616
40	0.01253	0.01297	0.01351	0.01396	0.01448	0.01498	0.01551	0.01603	0.01658	0.01713	0.01769
41	0.00840	0.00867	0.00903	0.00933	0.00969	0.01002	0.01037	0.01073	0.01109	0.01146	0.01184
42	0.00521	0.00535	0.00558	0.00577	0.00599	0.00620	0.00643	0.00665	0.00689	0.00712	0.00736
43	0.00288	0.00294	0.00305	0.00315	0.00326	0.00337	0.00348	0.00359	0.00371	0.00382	0.00394
44	0.00148	0.00151	0.00156	0.00160	0.00165	0.00170	0.00175	0.00180	0.00186	0.00191	0.00196
45	0.00074	0.00075	0.00077	0.00079	0.00082	0.00084	0.00087	0.00089	0.00091	0.00094	0.00096
46	0.00033	0.00034	0.00034	0.00035	0.00036	0.00036	0.00037	0.00038	0.00039	0.00039	0.00040
47	0.00013	0.00013	0.00013	0.00012	0.00012	0.00012	0.00012	0.00012	0.00012	0.00012	0.00012
48	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00002	0.00002	0.00002	0.00002
49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Source: Human Fertility Database. Own elaboration.

Table E. 4: Forecasted age-specific fertility rates in Portugal, between 2013 and 2020

Age	2013	2014	2015	2016	2017	2018	2019	2020
15	0.00273	0.00258	0.00243	0.00229	0.00215	0.00201	0.00189	0.00176
16	0.00651	0.00613	0.00577	0.00542	0.00509	0.00476	0.00445	0.00416
17	0.01040	0.00969	0.00901	0.00836	0.00774	0.00714	0.00658	0.00604
18	0.01612	0.01516	0.01424	0.01335	0.01249	0.01167	0.01089	0.01013
19	0.02293	0.02188	0.02086	0.01988	0.01892	0.01799	0.01708	0.01621
20	0.02846	0.02731	0.02619	0.02509	0.02403	0.02299	0.02198	0.02099
21	0.03276	0.03147	0.03020	0.02897	0.02777	0.02659	0.02545	0.02434
22	0.03715	0.03570	0.03427	0.03289	0.03153	0.03021	0.02893	0.02768
23	0.04172	0.04008	0.03848	0.03692	0.03540	0.03391	0.03246	0.03105
24	0.04679	0.04494	0.04313	0.04137	0.03966	0.03798	0.03635	0.03476
25	0.05252	0.05045	0.04842	0.04645	0.04452	0.04264	0.04082	0.03904
26	0.05922	0.05697	0.05478	0.05264	0.05055	0.04850	0.04651	0.04457
27	0.06731	0.06504	0.06282	0.06065	0.05852	0.05643	0.05440	0.05240
28	0.07620	0.07414	0.07212	0.07013	0.06818	0.06626	0.06437	0.06252
29	0.08488	0.08334	0.08183	0.08033	0.07884	0.07737	0.07592	0.07449
30	0.09078	0.08993	0.08908	0.08824	0.08740	0.08657	0.08574	0.08491
31	0.09112	0.09086	0.09060	0.09034	0.09008	0.08982	0.08956	0.08930
32	0.08771	0.08802	0.08832	0.08863	0.08894	0.08925	0.08955	0.08986
33	0.08262	0.08346	0.08429	0.08514	0.08599	0.08684	0.08770	0.08856
34	0.07612	0.07732	0.07852	0.07973	0.08095	0.08219	0.08344	0.08469
35	0.06737	0.06873	0.07011	0.07151	0.07292	0.07435	0.07579	0.07726

36	0.05621	0.05756	0.05892	0.06031	0.06171	0.06313	0.06457	0.06604
37	0.04502	0.04623	0.04745	0.04869	0.04996	0.05124	0.05254	0.05386
38	0.03524	0.03625	0.03728	0.03832	0.03938	0.04046	0.04156	0.04267
39	0.02658	0.02736	0.02817	0.02898	0.02981	0.03066	0.03151	0.03239
40	0.01903	0.01960	0.02017	0.02076	0.02136	0.02197	0.02258	0.02321
41	0.01269	0.01306	0.01344	0.01383	0.01423	0.01463	0.01504	0.01545
42	0.00785	0.00808	0.00831	0.00854	0.00878	0.00902	0.00927	0.00952
43	0.00458	0.00471	0.00483	0.00496	0.00509	0.00523	0.00536	0.00550
44	0.00248	0.00253	0.00259	0.00265	0.00270	0.00276	0.00282	0.00288
45	0.00121	0.00123	0.00124	0.00126	0.00127	0.00129	0.00130	0.00132
46	0.00057	0.00057	0.00057	0.00057	0.00057	0.00057	0.00057	0.00057
47	0.00027	0.00026	0.00026	0.00026	0.00026	0.00026	0.00026	0.00025
48	0.00009	0.00008	0.00008	0.00008	0.00008	0.00007	0.00007	0.00007
49	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001

Source: Human Fertility Database. Own elaboration.

Table E. 5: Forecasted age-specific fertility rates in Spain, between 2013 and 2020

Age	2013	2014	2015	2016	2017	2018	2019	2020
15	0.00110	0.00106	0.00102	0.00099	0.00095	0.00092	0.00088	0.00085
16	0.00347	0.00333	0.00324	0.00313	0.00304	0.00294	0.00284	0.00275
17	0.00729	0.00704	0.00678	0.00654	0.00629	0.00605	0.00582	0.00559
18	0.01352	0.01306	0.01257	0.01212	0.01166	0.01122	0.01079	0.01037
19	0.02158	0.02080	0.02008	0.01936	0.01866	0.01797	0.01730	0.01664
20	0.02878	0.02771	0.02667	0.02565	0.02465	0.02368	0.02273	0.02180
21	0.03521	0.03394	0.03262	0.03137	0.03013	0.02893	0.02775	0.02661
22	0.04227	0.04080	0.03930	0.03786	0.03644	0.03506	0.03371	0.03240
23	0.04955	0.04782	0.04616	0.04452	0.04292	0.04135	0.03982	0.03833
24	0.05773	0.05589	0.05412	0.05237	0.05067	0.04899	0.04735	0.04574
25	0.06655	0.06484	0.06307	0.06138	0.05969	0.05804	0.05641	0.05481
26	0.07595	0.07456	0.07299	0.07154	0.07005	0.06861	0.06718	0.06577
27	0.08578	0.08484	0.08376	0.08275	0.08172	0.08072	0.07971	0.07872
28	0.09462	0.09423	0.09385	0.09346	0.09308	0.09270	0.09231	0.09193
29	0.10138	0.10172	0.10222	0.10263	0.10309	0.10352	0.10397	0.10442
30	0.10529	0.10654	0.10803	0.10942	0.11087	0.11231	0.11377	0.11524
31	0.10461	0.10677	0.10907	0.11134	0.11366	0.11600	0.11837	0.12077
32	0.10001	0.10288	0.10579	0.10875	0.11176	0.11482	0.11793	0.12109
33	0.09246	0.09570	0.09898	0.10234	0.10576	0.10926	0.11281	0.11644
34	0.08237	0.08560	0.08887	0.09223	0.09566	0.09917	0.10276	0.10642
35	0.07133	0.07439	0.07753	0.08075	0.08405	0.08742	0.09088	0.09441
36	0.06000	0.06283	0.06574	0.06873	0.07181	0.07496	0.07819	0.08151
37	0.04837	0.05078	0.05324	0.05579	0.05840	0.06109	0.06384	0.06667
38	0.03731	0.03919	0.04109	0.04306	0.04508	0.04716	0.04929	0.05148
39	0.02734	0.02869	0.03002	0.03143	0.03285	0.03432	0.03583	0.03737
40	0.01913	0.02007	0.02099	0.02196	0.02294	0.02395	0.02499	0.02606
41	0.01284	0.01350	0.01415	0.01484	0.01553	0.01625	0.01699	0.01775
42	0.00798	0.00841	0.00884	0.00928	0.00974	0.01022	0.01070	0.01120
43	0.00446	0.00469	0.00493	0.00518	0.00543	0.00570	0.00597	0.00625
44	0.00232	0.00244	0.00256	0.00269	0.00282	0.00296	0.00310	0.00324
45	0.00119	0.00126	0.00132	0.00139	0.00147	0.00154	0.00162	0.00169
46	0.00061	0.00066	0.00069	0.00074	0.00078	0.00082	0.00087	0.00092
47	0.00032	0.00034	0.00036	0.00039	0.00042	0.00045	0.00048	0.00051
48	0.00014	0.00016	0.00017	0.00018	0.00020	0.00021	0.00023	0.00025
49	0.00005	0.00006	0.00006	0.00007	0.00008	0.00008	0.00009	0.00010

Source: Human Fertility Database. Own elaboration.

Table E. 6: Forecasted age-specific fertility rates in Sweden, between 2012 and 2020

Age	2012	2013	2014	2015	2016	2017	2018	2019	2020
15	0.00047	0.00046	0.00046	0.00046	0.00045	0.00045	0.00044	0.00044	0.00043
16	0.00146	0.00144	0.00143	0.00140	0.00138	0.00136	0.00133	0.00130	0.00128
17	0.00319	0.00320	0.00319	0.00316	0.00313	0.00308	0.00303	0.00298	0.00292
18	0.00726	0.00727	0.00724	0.00720	0.00714	0.00706	0.00697	0.00687	0.00677
19	0.01518	0.01513	0.01506	0.01498	0.01489	0.01479	0.01468	0.01457	0.01445
20	0.02587	0.02588	0.02588	0.02587	0.02586	0.02584	0.02581	0.02578	0.02574
21	0.03790	0.03809	0.03827	0.03843	0.03858	0.03872	0.03885	0.03898	0.03910
22	0.05023	0.05041	0.05060	0.05079	0.05098	0.05117	0.05137	0.05157	0.05176
23	0.06272	0.06274	0.06280	0.06291	0.06304	0.06320	0.06338	0.06357	0.06378
24	0.07613	0.07604	0.07603	0.07608	0.07618	0.07632	0.07649	0.07668	0.07690
25	0.08898	0.08888	0.08885	0.08888	0.08895	0.08906	0.08920	0.08936	0.08955
26	0.10177	0.10188	0.10203	0.10220	0.10239	0.10260	0.10282	0.10305	0.10329
27	0.11577	0.11649	0.11718	0.11786	0.11852	0.11917	0.11980	0.12043	0.12106
28	0.12920	0.13086	0.13244	0.13395	0.13540	0.13680	0.13818	0.13952	0.14085

29	0.13948	0.14224	0.14486	0.14737	0.14978	0.15213	0.15442	0.15667	0.15888
30	0.14578	0.14960	0.15326	0.15679	0.16022	0.16357	0.16686	0.17011	0.17333
31	0.14754	0.15219	0.15671	0.16112	0.16546	0.16973	0.17397	0.17819	0.18241
32	0.14199	0.14692	0.15176	0.15655	0.16131	0.16605	0.17080	0.17555	0.18033
33	0.13073	0.13536	0.13997	0.14459	0.14922	0.15387	0.15856	0.16330	0.16808
34	0.11792	0.12198	0.12609	0.13026	0.13449	0.13878	0.14314	0.14756	0.15206
35	0.10309	0.10647	0.10995	0.11353	0.11721	0.12097	0.12482	0.12875	0.13278
36	0.08642	0.08913	0.09197	0.09492	0.09798	0.10115	0.10441	0.10776	0.11120
37	0.06951	0.07163	0.07387	0.07623	0.07869	0.08124	0.08388	0.08660	0.08941
38	0.05368	0.05533	0.05707	0.05890	0.06080	0.06278	0.06482	0.06693	0.06909
39	0.03987	0.04112	0.04244	0.04382	0.04526	0.04674	0.04827	0.04985	0.05147
40	0.02852	0.02944	0.03041	0.03143	0.03248	0.03357	0.03470	0.03587	0.03706
41	0.01908	0.01970	0.02036	0.02105	0.02177	0.02252	0.02329	0.02409	0.02491
42	0.01174	0.01212	0.01253	0.01296	0.01341	0.01387	0.01436	0.01486	0.01538
43	0.00673	0.00695	0.00719	0.00744	0.00770	0.00798	0.00826	0.00856	0.00886
44	0.00366	0.00378	0.00391	0.00405	0.00419	0.00435	0.00451	0.00467	0.00485
45	0.00192	0.00198	0.00205	0.00212	0.00220	0.00228	0.00236	0.00245	0.00255
46	0.00094	0.00098	0.00102	0.00106	0.00110	0.00115	0.00120	0.00125	0.00131
47	0.00042	0.00044	0.00047	0.00050	0.00053	0.00056	0.00059	0.00062	0.00065
48	0.00017	0.00018	0.00019	0.00020	0.00022	0.00023	0.00024	0.00026	0.00027
49	0.00006	0.00006	0.00007	0.00007	0.00007	0.00008	0.00008	0.00009	0.00009

Source: Human Fertility Database. Own elaboration.