Universitat Pompeu Fabra
Departmentof Political and Social Sciences

Fertility and Family Ties in Times of Demographic Changes

Roberta Rutigliano

Director de la tesi: Gøsta ESPING-ANDERSEN and Bruno ARPINO

TESI DOCTORAL UPF 2017

Declaration of Authorship

I certify that the thesis I have presented for examination for the PhD degree of the Pompeu Fabra University is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

I declare that my thesis consists of 42530 words.

Statement of co-joint work

I confirm that Chapter 2 was jointly co-authored with Professor Gosta Esping-Andersen and I contributed 60% of this work.

Roberta Rutigliano

Alla mia famiglia: mamma, papà, Sara e Rossella

Acknowledgements

At the beginning of my PhD, an old scholar toldme that during the PhD you learn to keep researching in spite of your life. At the end of my PhD, I have learned to keep living in spite of my research (andself-esteem). Of course, I would have never learned this lesson on my own and I feel very grateful to all those persons who madethese years of my life worth it. (I am sorry these acknowledgments are quite long. There are different reasons. The first one is that I am surrounded by a lot of wonderful persons. The last one is that the fact I am from the South of Italy does not help.)

I am enormously grateful to Gosta Esping Andersen; this thesis would not have been possible without his generous financial support throughout these years. I am greatly thankful to my supervisors Gosta Esping-Andersen and Bruno Arpino. I would like to thank Gosta for his constant encouragement and for teaching me honest thinking. He taught me to hypothesize different mechanisms for a single phenomenon and, most importantly, not to discard any of them ex-ante. He always encouraged and trusted me during these years, also when I was not sure I could trust myself.This was a priceless human support. I would like to thank Bruno for his insightful suggestions on how to improve both my arguments and my analysis. I have now learned the importance of being simple, without beingsimplistic, while tackling complex questions. Thanks to him, I have learned to be meticulous, not only in implementing a statistical method but especially in acknowledging what exactly can be measured, under which conditions and to what extent a research question is generalizable. I will never forget his full support (and irony) during my "I don't know whether this makes sense any longer" moments (academic-and personal-wise). They both believed in me and gave me a great example to follow.Of course, I am still a little *sprout,* butI have been very lucky to have, in my early academic life, the most passionate, kind, careful and capable *gardeners* ever.

I will be forever grateful to Professor Arnstein Aassve, Professor Francesco Billari and Professor Daniel Devolder to let me discover Demography but, most importantly, social demographers: the nicest and kind scientific community ever.

My initial love for Demography would not have been so strongwithout the beautiful experience of European Doctoral School of Demography. I will always remember that year between the Max Planck Institute, in Rostock and the Centre for Demographic Studies, in Barcelona. I have met very capable researchers and made wonderful friends.

Thanks to them, I have never felt alone or afraid at any conference. Thanks to Alda Azvedo, Carlo Lallo, Daniel Herbers, Alessandra Trimarchi and Pilar Zueras.

I would also like to thank Professor Aart Liefbroer, Professor Jan Van Bavel and Professor Clara Cortina, for spending their time carefully reading and revising my thesis.This manuscript has improved thanks to their comments.

In addition to my dissertation committee, I would like to thank Pau Baizán, Clara Cortina, Maria José Gonzales, Luis Ortiz and Aida Solé for guiding my research during these years. A special thanks goes to Meritxell Canals, Cristina Capilla, Carmen Casanova, Blanca Ribera, Imma Romero, Ana Salas and Sergi Vich for the fully and unconditioned support throughout all the PhD. I would like to thank Albert Alcarons, Iñigo Fernandez, Juan Ramón Jimenez, Lisa Kraus, Mariona Leitz, Francesca Luppi, Natalia Malancu, Ana Safranoff, Alina Vranceanu, Sander Wagner that during these years support me with beers, parties, coffees and a lot of smiles.

I also want to thank Luisa Faustini and Bolivar Gerardo Portugal for being my academic family in the last tough year. I am very grateful to my ex office mates too. Luïze Ratniece for constantly providing me with the best Latvian sweets ever (among other things). Lesia Nedoluzhko for teaching me, with her sweetness,that also pigeons have a soul and for talking so much about her country that I will certainly go to visit her. Un graciasespecial aJorge Cimentada, por ser siempre tan feliz y por enseñarme que un modelo difícil se puede solucionar con una buena música y un momento difícil con un buen escritor. Grazie a Daniela Bellani che spesso con la sua ironia mi ha aiutato a sdrammatizzare tantissimi momenti critici. Ora ho più fiducia nei Milanesi, anche in quelli senza origini terrone.

As everyone knows,Italians quite often looks for Italians. I am enormously grateful to the "*International Italian Community for Demography*" made byNicola Barban, Anna Barbuscia, Valeria Bordone, Nicolò Cavalli, Elisabetta De Cao, Giulia Ferrari, Alice Goisis, Benedetta Pongiglione, Cecilia Potente, Maria Sironi and Agnese Vitali. A special thanks goes to Agnese, I know I will never get lost as long as she is by my side.

During my research stay at Nuffield, I met wonderful people. I would like to thank Professor Billari and his family and all the students at Nuffield. Thanks to Arthur Doshchyn for letting me in his film club. I would like to thank also my flat/office mates

Synne Almaas, Noha Carl, Chiara Cipolletti, Andrea De Angelis, Robert Hellpub, Aldo Pignataro and Nico Stawarz for making me feel at home since the first moment. Super grazie a la “Camera (pranzo e) caffe” di Oxford: a Maria Anna e Nicolòper le chiacchierate sul futuro. A Maria perchè è la persona più spontanea che conosco e quando sto con lei mi diverto tantissimo. Per avermi concesso il lusso di avere una bicicletta a Oxford. A Nicola e Betta per tutte le cose belle fatte(e mangiate) insieme. Perché sono la mia coppia di accademici preferita. Perché anche se lavorano insieme non si dimenticano mai di ridere a crepapelle. Alla piccola Alice-*polpettina* per essere stata la prima a scalciare sulla mia mano quando ancora era in pancia e per avermi fatto cambiare idea sui bambini con un solo sorrisetto.

Francesco Pasetti, Rocío Machuca, Antonina Levatino, Raffaele Grottigrazie di cuore per essere stati, in questi anni, più che colleghi, amici.

Healthy habits outside academiaare very important for mental health during a PhD. Therefore, I would like to thank my veggie cooperative, my book club and my group for dreams. Un gracias muy muy especial para mis vecinos, Arnau, Andrés, Carlos, Raquel, Gloria, Roberto, Sara, Josè, Anxela y Zoe. Pediros de compartir el wi-fi hace tres años fue una de las cosas más acertadas de mi vida. Gracias para las cenitas improvisadas después de un día malo, para los domingos en la terraza, para las charlas nocturnas y para todo el amor y el cariño.

En estos últimos tres años he tenido que subir y bajar de muchos trenes. A veces porque quería bajarme, a veces porque me hicieron bajar. En todos estos movimientos, encontré compañeros de viaje con los que he seguido en contacto. Ahora sé que, a pesar de cuál es el tren en el que estoy, ellos siempre podrán alcanzarme. Y siempre tendrán un lugar para quedarse por si acaso su tren se estropee. Gracias Cecilia Chavez, Julia Cordero, Ana De la Vega, Joan Pau Jordà, Anna Kyriazi, Daniele Pezzatini, Stefano Zelco.

Gracias a mi grupo “Demosalida”, Toni Lopez y Diederik Boertien,para aliviar siempre esta sensación de domingo por la tarde cuando no quieres que sea lunes (también cuando no es domingo). Desde que estáis en mi vida siempre quiero que sea lunes.

A Francesc para todas las veces que, como mi doctor–arqueólogo personal, me ha ordenado terapia de piscina y bicicleta. Porqué “Roberts, el doctorado es solo una parte de tu vida”.

A Roger Barres que sigue queriéndome aunque siempre le lleve la contraria y por todas “las reflexiones que me ha hecho” a lo largo de estos años.

A Queralt Capsada la meva amiga moderna que tothom voldria. Perquè en la vida, com en els Festivals, si estic amb ella ho passofantàstic!

Cuando llegué a Catalunya quería volver a Italia. Echaba de menos mi gente y mi País. Nunca hubiera imaginado que, después seis años, Catalunya hubiera conquistado tanta parte de mi corazón. Como siempre, los sitios “los hacen” las personas y en estos seis años tuve la suerte de encontrar amigos muy especiales que considero parte fundamental en la “geografía de mi corazón”. Thanks to László Németh because he is always with me, also when he does not realize it. Because, apart from one sister, we also share two beautiful twins.Grazie a AlessandroBorghi (o B) per i consigli su patii vari, le passeggiate e i gelati. A Silvia Pi para ser más que una compañera de piso, una hermana mayor. Porque nuestra conexión nunca la perderemos a pesar de la distancia geográfica. Para Barbara, Juan y Jeroni para ser mi familia catalana. Para Juan Galeano porqué es “la primera persona que conocí en Barcelona” y nunca quise perderlo. Porqué seguirá siendo el primero en muchas otras cosas como los asados y los mapas.

Para América mi cura más grande. Porque es un gran ejemplo de cómo, a pesar de que la vida puede ser muy dura, siempre puedes llevarla con una sonrisa.

A Alessandro di Nallo per essere una delle mie persone speciali. Abbiamo provato tutti i tipi di distanza e siamo ancora ben “saldati”.

Para Maricia Fisher-Souan mi investigadora cualitativa favorita que aún no sabe lo buena que es. Para haberme enseñado el máximo respecto por cada punto de vista diferente. Porque nunca es agresiva en las discusiones y siempre es muy dulce. Sé que siempre seguiremos siendo como Maite y Micheline y esta es una gran suerte y un gran honor.

Per una persona un po’ insicura, come me, questo dottorato avrebbe potuto essere un incubo, una continua gara nel sentirsi inadeguata. Se non è successo è grazie al constante supporto (accademico e non) della mia amica Léa Pessin. Ora so che non devo aver paura quando sono sulle montagne russe perchè prima o poi il giro di giostra finisce. E, perchè, al secondo giro già sarò più esperta.

Para Matias que me enseño que el plan de “en la vida, cuando menos te lo esperas…” existe. Porqué es mi pastilla de optimismo cada vez que me enfermo. Porqué me sorprendió y espero que nunca dejara de hacerlo.

Ringrazio infine, tutte le persone che facevano già parte della mia identità quando ho intrapreso questo viaggio. Poter contare su uno “zoccolo duro” così bello e forte è stato fondamentale in tutte le esperienze, soprattutto una, troppo buia per essere affrontata da soli. Un grazie dal profondo del mio cuore al “Casale”, quello allargato. Davide, Carl, Annina, Mariella, Robina, Checco, Fabrizioe Patrick per avermi fatto sentire sempre amata. Perché so che non sarò mai sola. Alla mia amica biologa Valentina, perchè non c’è nulla di male a dire che non vogliamo stare soli e per la nostra “telepavia” che non si interrompe mai nonostante terremoti, inondazioni e Brexit vari. A Francesca e Marina, le mie “amiche ritrovate” perché dopo quello che ci è successo, un anno e mezzo fa, so che non le ho mai perse. Perché condividiamo un vuoto enorme, senza di loro andare avanti sarebbe stato molto più duro e incerto. Alla mia famiglia allargata, a Rosa Lello e Michele che, nonostante non abbiano ben chiaro che razza di carriera abbia scelto…si fidano. A Michele, Luisa, Anna e Romolo fondamentali, in questi anni, nell’intermediazione culturale con papà. Ai miei zii e cugini. A zio Piero e zia Lilia ispirazione diretta per lo studio dei nonni.A zio Marcello che mi ha trasmesso la cultura della curiosità. A zio Adriano e Anna Maria per essere stati portatori di pace e per il supporto a base di cenette e pranzi squisiti. A zia Anna che è stata fortissima in questidue anni e che non sa quanto è bella quando sorride. A zia Ivana,il mio esempio di donna indipendente (a volte un po’ pessimista), la mia fan numero uno, che mi fa sentiresempre un genio, comunque vada.L’unica sostenitrice dello studio ad oltranza in tutto il parentado.

A mia mamma e mio papà, grazie ai quali sono una accanita sostenitrice del caso. Mi sono stati assegnati random e, da quando sono uscita dall’adolescenza, non ho mai smesso di essere più felice ed orgogliosa di questa assegnazione. Una combinazione migliore non esiste. Grazie per tutto il supporto e l’entusiasmo, siete i genitori che tutti vorrebbero.

A Sara (e a Livio che supporta Sara, e me) che “è mia sorella da quando sono nata” e che continua ad esserlo, e non solo anagraficamente, nel migliore dei modi possibili. È forse l’unica persona che mi accetta pienamente. Nonostante le discussioni, è oramai

assuefatta ad ogni mio difetto. La mia coperta di Linus, che non mi fa sentire mai spiazzata.

L'ultimo ringraziamento va a te. Che da unannetto mi guardi da lassù. Che mi hai sempre incoraggiata e spronata a fare meglio. Mi hai insegnato che non è importante se gli altri pensino che sia strana, che si deve rincorrere ciò che ci piace. Il primo giorno insieme non lo ricordo, ero forse troppo piccola. Purtroppo, l'ultimo non lo dimenticherò mai. In questa tesi c'è molto di te. Da quando non ci sei più, tutte le volte che ho ripreso a scrivere o a lavorare è stato solo grazie a te.

Abstract

This thesis investigates how big economic and demographic changes over the past century influence fertility dynamics with a particular focus on family ties. The first chapter investigates the role of type of partnership in shaping fertility behaviors. Comparing two orthogonally different countries like Norway and Spain, we analyze differences in fertility behaviors between cohabiting and married couples in both countries. For Norway, we find a significant association between selection into either partnership type and fertility, whereas for Spain, a newcomer to cohabitation, we find a significant association between fertility and selection into marriage. The second chapter analyses the role of the so called "bean-pole" family on fertility. It investigates whether would-be grandparents' propensity to care for their grandchildren influences their transition into parenthood. Considering national context, I estimate distinct models for different groups of countries. Comparison across 11 countries from the first two waves of the Survey of Health, Aging, and Retirement in Europe reveal that grandparental childcare propensity has a positive and significant effect on the transition into parenthood for both pronatalist (Belgium, France) and protraditional countries(Austria, Germany, Greece, Italy, Spain, and Switzerland). The third chapter focuses on grandparental childcare provision. By using an instrumental variable approach, it explores the effect of grandparental childcare, during the first year of the first born, on the risk of a second birth transition among UK couples. The analysis is carried out using the first five waves of the Millennium Cohort Study (MCS). Results show a positive and significant effect of grandparental childcare on the risk of second birth. This effect is slightly weakened by level of income

Keywords: Fertility; Grandparenting; Cohabitation; Marriage; Multilevel multistate model; SHARE, UK

Resum

Aquesta tesi investiga com els grans canvis econòmics i demogràfics ocorreguts durant l'últim segle han influenciat les dinàmiques de fertilitat, amb especial èmfasi en els vincles familiars. El primer capítol investiga el rol del tipus de parella en la configuració dels patrons de fertilitat. Mitjançant la comparació de dos països ortogònicament diferents, Noruega i Espanya, analitzem les diferències d'aquests dos països en els comportaments de fertilitat entre la cohabitació i el matrimoni. A Noruega trobem una associació significativa entre la selecció en qualsevol tipus de parella i la fertilitat, mentre que per a Espanya, a on el fenomen de la cohabitació és més recent, trobem una associació significativa entre la fertilitat i la selecció al matrimoni. El segon capítol analitza el paper de l'anomenada família *bean-pole* en la fertilitat, analitzant en detall si la propensió dels futurs avis a cuidar els seus néts influeix en la transició cap a la paternitat dels seus fills. En aquest cas, i tenint en compte el context nacional, es calculen diferents models per a diferents grups de països. La comparació entre 11 països de les dues primeres ones de l'Enquesta de Salut, Envelliment i Jubilació a Europa (SHARE) revela que la propensió a cuidar els néts té un efecte positiu i significatiu sobre la transició cap a la paternitat, tant per als països pro-natalistes (Bèlgica, França) com per als països pro-tradicionals (Àustria, Alemanya, Grècia, Itàlia, Espanya i Suïssa). Per últim, el tercer capítol es centra en l'efecte que produeix l'atenció als primer néts per part dels avis sobre un possible segon naixement entre les parelles del Regne Unit. Mitjançant l'ús d'un enfocament de la variable instrumental, l'anàlisi es

realitza mitjançant les primeres cinc ones del *Millennium Cohort Study* (MCS). Els resultats mostren un efecte positiu i significatiu dels avis en el risc d'un segon naixement. Aquest efecte està lleugerament debilitat pel nivell d'ingressos.

Paraules clau: Fertilitat; Avi; Cohabitació; Matrimoni; Model de multi-nivell i multi-estat; SHARE, Regne Unit

Table of Contents

List of Figure

List of Tables

Chapter 1
Introduction

Introduction

Fertility dynamics are becoming more heterogeneous in tandem with the growing complexity of individuals' life course trajectories. The decision to have a child is, of course, very much a personal one, but the determinants of births involve also social and contextual factors. Therefore, studying fertility over time provides us with a powerful indicator about society itself. The main aim of this thesis is to study how economic and demographic changes over the past century have influenced fertility dynamics with a particular focus on family ties.

The general aim of this thesis is to investigate how the massive entrance of women into education (and into the labor market) and the substantial increase in life expectancy influence fertility behavior. These two transformations have led to both new family models (i.e. the rise of new type of partnership as cohabitation) as well as new family structure (i.e. the bean-pole family). How these new family settings influence fertility is the main general object of the dissertation (Figure1.1). On the one hand, women's new role, and the consequent difficulties of reconciling motherhood and career, initially led to "less family", i.e. low fertility, marital instability and the rise of cohabitation, which is broadly interpreted as requiring weaker long-term commitments. On the other hand, increasing life expectancy gives a great potential to inter-generational exchanges. Specifically, as more generations are alive at the same time, the family reconciliation dilemma might be softened by a greater availability of informal childcare provision[1].

Industrialized countries have experienced two major social changes in the second half of the 20th century: firstly, the massive entrance of women into education and, consequently, into the labor market, and secondly, a substantial increase in life expectancy.

Women's new role challenged institutions and traditional family behavior across developed societies. Nonetheless, the transition from a male breadwinner to a dual earner model was not instantaneous. As a first reaction, around the 1970s advanced

[1]Of course, as living longer does not always mean enjoying better health conditions, new intergenerational structure might also worsen reconciliation dilemma due to an increasing demand of upward transfers by the oldest generation. Nonetheless, I will not face this complex this debate that lies outside the main interest of this dissertation.

societies experienced a substantial decline in fertility levels (Caldwell and Schindlmayr 2003), a postponement in the age at first birth (Kohler et al. 2002), and increasing partnership instability. All these consequences are a direct product of the incompatibility between motherhood and career (Esping-Andersen, 2009).

Several theories from different fields have tried to explain these dynamics. From the perspective of economics (Becker, 1981), the massive entrance of women in the labor market influences the perceived opportunity cost of children. In particular, women have less time to devote to household chores and leisure time has become more expensive. As a result, exiting the labor market to care for children would be costly and, to some extent, be perceived as a disutility (Becker, 1981). As far as the retreat from marriage is concerned, Becker (1981) views the gender role convergence as making the "specialization model" inefficient and, consequently, the returns to marriage decline.

The so-called Second Demographic Transition (SDT) represents an alternative theoretical framework to the economics perspective to understand demographic change (Lesthaeghe, 1995). This theory argues that society has experienced a profound change in ideational values, i.e. the post-modern values, which emphasize individualism and lead to prefer self-realization to family building. One direct consequence of this shift in values is low fertility but also the rise of cohabitation as an increasingly "normative" form of partnership. According to the SDT, the spread of cohabitation is motivated by its weaker commitment to family values and its adhesion to principles of individualism. Overall, the beginning of the "women's revolution" led to what Esping-Andersen and Billari described a shift toward "less family" (2015).

As Esping-Andersen and Billari (2015) argue, these theories are convincing in explaining what happened in the second half of the 20th century, but they do not predict well recent demographic trends. As a matter of fact, in recent decades, the initial negative relationship between fertility and female labor force participation has turned positive in countries, like the Scandinavian, in which the majority of women participate in the labor market (Goldstein, Sobotka, & Jasilioniene, 2009; Hoem, 2005). The divorce rate also stabilizes within most advanced societies (Cherlin, 2010; Goldstein, 1999; Harkonen, 2014; Raley & Bumpass, 2003) and nonmarital childbearing has increased (Bumpass & Lu, 2000; Smock, 2000).

McDonald (2000) develops a theory, which links the two dimensions of women's life: family and career. According to his argument, the low fertility is the product of a conflict between the family level and the social-institutional level. The labor market gives women a role almost identical to that of men, whereas the family and social institutions continue to follow a gender-biased model. This contrast exacerbates the compatibility dilemma and leads to low fertility levels (McDonald, 2004) and to greater marital instability. Building on this theory, Esping-Andersen and Billari (2015) provide a dynamic explanation. The key idea is that the contrast explained by McDonald (2000) is not constant over time, but varies according to the level of diffusion of egalitarian gender norms. In other words, the greater the diffusion of gender egalitarian norms, the less is the conflict between the family level and social-institutional level. As a result, fertility will become positively related to female labor force participation, and partnership's instability will decrease. Thus, this second part of the "women's revolution" could lead to a "return of the family".

The second notable demographic change of the second half of the 20th century is the sharp increase in life expectancy. From the 1950s onward, life expectancy advances were driven mostly by prolonged survival in older ages (Oeppen & Vaupel, 2002). In advanced societies, recent studies argue that the cause of this increase in human longevity resides in a "slowing senescence" (Goldstein and Cassidy, 2010), which implies that the onset of the aging process is postponed: people age later and the survival probability starts to decrease significantly later in life. Consequently, for the first time in the history of developed countries a long overlap of three living generations has emerged (MacInnes & Díaz, 2009). How is this related to fertility? Aging populations and more longevity have changed the way generations overlap and hence the structure of the extended family which, jointly with informal networks, such as grandparents, represent one of the possible channels women can use to reduce work-family conflicts.

Although the welfare state and the national context can play an important role in shaping individual choices (Gauthier, 2007), the undeniable strength of the family resides in motives that push the exchanges and the flexibility of potential help, comparable only partially to private market services. By providing additional childcare, a young and available grandmother– can reduce work-family conflict and thus

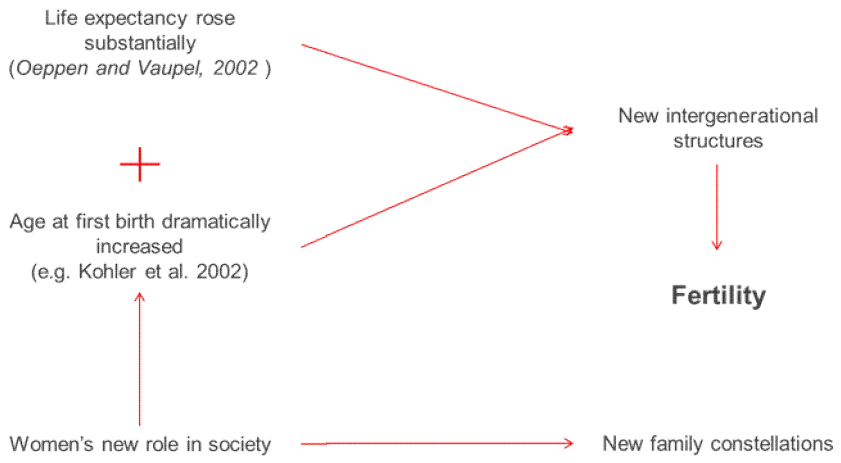
represents a great incentive for own children's fertility. Grandparental childcare supply, indeed, would certainly adjust faster and better than the welfare state to new family needs.

Ceteris paribus, by increasing only well-being and better health conditions –such as in the last decades – grandparents will benefit from better health conditions compared to the older cohorts. Therefore, children born at the beginning of this century are more likely to have at least four healthy grandparents available for childcare provision (daily as well as occasional). In the U.S., for instance, the percentage of individuals with all four grandparents alive has changed from around 6% at the beginning of the 1990 to around 41% in 2000 (Uhlenberg, 2004). Furthermore, as the number of available grandparents has increased, the burden of free childcare may be shared among more persons. And the duration of this relationship is extending as grandparents live longer. The latter may influence adult children's expectations and, hence, positively affect their fertility behavior. In recent cohorts, the spacing between parents and grandparents is determined by the simultaneous level of postponement of two different generations. The slower senescence makes grandparents healthier, thus increasing their survival probability (Hank & Buber, 2008; Livi-Bacci, 2001; Wheelock & Jones, 2002). As a result, on the one hand, more grandparents are potentially available for each grandchild. On the other hand, more heterogeneous grandparents' preferences become because of their increasingly active life. A young grandmother may still work or she may be so active as to refuse the role of caregiver. At the same time, a young grandmother who is highly committed to her family would provide childcare longer. The number of grandparents available for each child is positive correlated with fertility (Kaptijn et al., 2010; Thomese & Liefbroer, 2013) and working grandparents have less time available (Gray, 2005). In this framework, understanding the role of grandparents is at the base of an extended literature, especially focused on the U.S. (Dunifon & Kowaleski-Jones, 2007; B. L. Guzman, 2004; L. Guzman, 1999; Hayslip & Kaminski, 2005; Hughes, Waite, LaPierre, & Luo, 2007; Matthews & Sun, 2006; Vandell & McCartney, 2003).

The first part of this thesis (Chapter 2) examines the difference in terms of fertility outcomes within different types of partnerships. More in detail, it focuses on the relationship between fertility and new type of unions like cohabitation and investigates whether cohabitation results to be preferred to marriage as context for fertility. In this

chapter, my co-author and I analyze two countries that are at two different stages, i.e. low fertility setting (Spain) and one in the stable fertility setting (Norway). The second part of the thesis (chapter 3 and chapter 4) focuses more on the influence of informal care, viewed as possible solutions to women's work-career reconciliation on fertility. Informal grandparental childcare represents a possible solution to lessen women's incompatibility dilemma. Specifically, in this second part of the dissertation I investigate, in first place, how the grandparents influence adult children's transition into parenthood across different European welfare regimes, and, in second place, the relative effect of grandparental informal childcare in boosting second birth transition in the UK.

Figure1.1 Relationship between fertility, women's new role and increase in life expectancy



Overview of the dissertation

In this dissertation, I try to answer the following research questions: (1) Do women show different fertility behaviors according to the type of union they choose? Are cohabiting women different from married women in terms of fertility outcomes? (2) Is adult children's transition into parenthood influenced by the characteristics of their parents, as would-be grandparents, inasmuch as they signal the likelihood of future childcare provision? Is there any cross-country variation in such a relationship? (3) Does the use of grandparental care for the first born, as a regular source of childcare, influence the transition to second birth?

The second chapter, co-authored with Gøsta Esping-Andersen, entitled "Partnership Choice and Childbearing in Norway and Spain" focuses on the relationship between

fertility and new type of unions. Specifically, in a number of countries cohabitation has become a genuine alternative to marriage. However, historically there is a close fit between cohabitation and divorce. If cohabitation represents weaker commitments, one would expect it to be associated with lower fertility. But is that necessarily the case? Although an extensive literature has investigated the meaning of cohabitation with a particular focus on its consequences for fertility (Rindfuss and VandenHeuvel 1990; Raley 2001; Kiernan 2002; Heuveline and Timberlake, 2004; Dominguez-Folgueras and Castro-Martín 2013; Hiekel, Liefbroer and Poortman 2014; Perelli-Harris, 2014; Lappegard and Norak 2015), a consensus has not been reached. The main contribution of this chapter is to analyze the relationship between fertility and transition into partnership by taking into account both the possible interdependency between the two processes and the selection on time invariant unobservables.

In this chapter (i.e. the second), we analyze two opposite contexts, namely Norway and Spain. Using data from the Family and Fertility Survey 2006 (FFS) for Spain, and the Generation and Gender Survey 2007 (GGS) for Norway, we implement a multi-state multi-level discrete time hazard model. We find that in both countries marriage remains the preferred context for fertility. Further, in Norway a fertility transition is positively correlated with any type of union, whereas in Spain only with marriage or pre-marital cohabitation. In Norway, indeed, there is a full acceptance of cohabitation as both a type of partnership and a context for fertility. However, childbearing still shows some connections to marriage. In Spain, even if cohabitation appears to enjoy broad social acceptance as a union option, this does not imply that it has gained normative acceptance for childbearing.

In the third chapter, “Counting on Potential Grandparents? Adult Children’s Entry into Parenthood across European Countries”, I explore the relationship between fertility and the new extended family structure. Using the first two waves of the Survey of Health, Aging and Retirement in Europe (SHARE) data, I implement two-step estimation in order to test whether parental characteristics influence the adult child's transition into parenthood.

The contribution this study makes is threefold. First, it looks specifically at the role played by the characteristics of would-be grandparents. Second, by focusing on first-birth transitions, it contributes to the literature on determinants of the transition into

parenthood (Myrskylä & Margolis, 2014; Margolis & Myrskylä, 2015). Third, given the interplay between institutional context and individual fertility behavior, the study adopts a cross-national comparative design. It provides an indirect test of how intergenerational relationships across different welfare regimes influence fertility. Firstly, I find that grandparents play a role in their adult children's entry into parenthood, and that the relationship between grandparental childcare propensity and first-birth transitions varies according to the context. In particular, grandparental propensity to care has a stronger effect on an adult child's fertility in those countries in which, in addition to some level of familialism, the public childcare system is stronger.

The fourth chapter is entitled "Grandparental fertility dividend?" In this chapter, I study the relationship between fertility and informal childcare from a closer perspective, focusing on the United Kingdom. The UK choice is justified for two main reasons. Fertility outcomes show a distinctive pattern according to different maternal characteristics.

In the UK, higher educated women –once they enter into motherhood- are more likely to accelerate second birth transitions compared to their lower educated counterparts (Smallwood and Rendall, 2003). Nevertheless, the postponement of entry into motherhood does not always allow higher educated women fertility recuperation despite desired fertility (Berrington, 2004; Berrington et al., 2015). Ethnicity represents an additional source of fertility heterogeneity. As explained by Coleman and Dubuc (2010), fertility of Blacks, Caribbeans, Indian and Chinese has only recently approached the lower UK levels, and there are groups like the Pakistani and Bangladeshi that show still higher fertility levels compared to natives.

Second, the UK has a childcare system that allows families to combine private with public provision according to their monetary resources. By using the first two waves of the Millennium Cohort Study (MCS), I test whether grandparental childcare used in the early childcare of the first born influences the second birth transition. The key idea is that in this initial period of parenthood, when the child is very young and the mother inexperienced, an external help, such as that of grandparents, might improve the experience of parenthood and encourage women's return to work (Arpino et al., 2013). In order to address endogeneity, I implement an IV strategy. Specifically, whether individuals benefit from grandparental childcare is instrumented via a variable that

measures whether the grandmother is still alive. The results suggest that grandparental childcare has a positive and significant effect on the second birth transition. This effect remains positive and significant also after controlling for maternal educational level, maternal traditional values, and the level of household income.

Finally, the fifth chapter summarizes the contributions and main findings of chapters 2-4. Then, I discuss the limitations of each study and provide some possible directions for future research.

References

Arpino, B., Pronzato, C. D., & Tavares, L. P. (2014). The effect of grandparental support on mothers' labour market participation: An instrumental variable approach. European Journal of Population, 30(4), 369-390.

Becker, G. S. (1981). Altruism in the Family and Selfishness in the Market Place. Economica, 48(189), 1-15.

Billari, F., & Kohler, H. P. (2004).Patterns of low and lowest-low fertility in Europe. Population studies, 58(2), 161-176.

Bumpass, L., & Lu, H. H. (2000).Trends in cohabitation and implications for children s family contexts in the United States. Population studies, 54(1), 29-41.

Caldwell, J. C., & Schindlmayr, T. (2003). Explanations of the fertility crisis in modern societies: A search for commonalities. Population studies, 57(3), 241-263.

Cherlin, A. J. (2010). Demographic trends in the United States: A review of research in the 2000s. Journal of Marriage and Family, 72(3), 403-419.

Dominguez-Folgueras, M., & Castro-Martín, T. (2013).Cohabitation in Spain: no longer a marginal path to family formation. Journal of Marriage and Family, 75(2), 422-437.

Esping-Andersen, G. (2009). Incomplete revolution: Adapting welfare states to women's new roles. Polity.

Esping-Andersen, G., & Billari, F. C. (2015).Re-theorizing Family Demographics. Population and Development Review, 41(1), 1-31.

Goldstein, J. R. (1999). The leveling of divorce in the United States. Demography, 36(3), 409-414.

Goldstein, J. R., & Cassidy, T. (2010). How slowing senescence changes life expectancy, 49(0), 0–13.

Harkonen, J. (2014). Divorce trends, patterns, causes, consequences. In J. Treas, J. Scott, & M. Richards (Eds.), The Wiley-Blackwell Companion to the Sociology of Families. Chichester: John Wiley & Sons.

Heuveline, P., & Timberlake, J. M. (2004). The role of cohabitation in family formation: The United States in comparative perspective. Journal of Marriage and Family, 66(5), 1214-1230.

Hiekel, N., Liefbroer, A. C., & Poortman, A. R. (2014).Understanding diversity in the meaning of cohabitation across Europe. European Journal of Population,30(4), 391-410

Hoem, J. M. (2005). Why does Sweden have such high fertility?.Demographic research, 13, 559-572.

Kiernan, K. (2001). The rise of cohabitation and childbearing outside marriage in Western Europe. International Journal of Law, Policy and the Family, 15(1), 1-21.

Kohler, H. P., Billari, F. C., & Ortega, J. A. (2002).The emergence of lowest-low fertility in Europe during the 1990s. Population and development review, 28(4), 641-680.

Lappegaard, T and Norak, T. (2015) The link between parenthood and partnership in contemporary Norway. Demographic Research, 32: 287-310

Lesthaeghe, R. (1995). The second demographic transition in Western countries: An interpretation. Gender and family change in industrialized countries, 17-62.

Margolis, R. & Myrskylä, M. (2015).Parental well-being surrounding first birth as a determinant of further parity progression.Demography, 52(4).doi: 10.1007/s13524-015-0413-2

McDonald, P. (2000). Gender equity, social institutions and the future of fertility.Journal of population research.

McDonald, P. (2004). Theory pertaining to low fertility. Made available in DSpace on 2011-01-05T08: 36: 27Z (GMT).

MacInnes, J., & Díaz, J. (2009).The reproductive revolution.The Sociological Review, 2.

Myrskylä, M. & Margolis, R. (2014). Happiness: Before and after the kids. Demography, 51(5), 1843–1866. doi: 10.1007/s13524-014-0321-x

Oeppen, J., & Vaupel, J. (2002). Broken limits to life expectancy. Science, 296(May), 2001–2002. doi:10.1097/01.NPR.0000429896.41373.a5

Perelli-Harris, B, Mynarska, M, Berrington, A, Berghammer, C, Evans, A, Isupova, O, Keizer, R, Klarner, A, Lappegaard, T and Vignoli, D (2014) Towards a new understanding of cohabitation. Demographic Research, 31: 1043-78

Smock, P. J. (2000). Cohabitation in the United States: An appraisal of research themes, findings, and implications. Annual review of Sociology, 26(1), 1-20.

Raley, R. K. (2001). Increasing fertility in cohabiting unions: Evidence for the second demographic transition in the United States? Demography, 38(1), 59-66.

Raley, R. K., & Bumpass, L. L. (2003). The topography of the divorce plateau: Levels and trends in union stability in the United States after 1980. Demographic Research, 8, 245-260.

Rindfuss, R. R., & VandenHeuvel, A. (1990). Cohabitation: A precursor to marriage or an alternative to being single?. Population and Development Review, 703-726.

Uhlenberg, P. (2004). Relationships. Annual Review of Gerontology and Geriatrics, Volume 24, 2004: Intergenerational Relations Across Time and Place, 23, 77.

Vaupel, J. W. (2005). Lifesaving, lifetimes and lifetables. Demographic Research, 13(December), 597–614.

Chapter 2
Partnership Choice and Childbearing in Norway and Spain

Abstract

Cohabitation has in a number of countries become a genuine alternative to marriage. Where this occurs, will we see a convergence in fertility behavior between the two partnership options? We address this question by comparing two societies, Norway and Spain, that contrast sharply not only in the evolution of cohabitation, but also in overall birth rates and public support for families. Using the Generation and Gender Survey for Norway(2007/8) and the most recent Family, Fertility and Values Survey for Spain (2006), we estimate a three-equation multi-process model for selection into a union and fertility in order to take into account unobserved heterogeneity. For Norway, we find a significant association between selection into either partnership type and fertility, whereas for Spain, a newcomer to cohabitation, we find a significant association between fertility and selection into marriage.

1. Introduction

Demographic research has produced no clear evidence as regards the influence of partnership types on fertility. The Second Demographic Transition thesis sees cohabitation as a key marker of postmodern values which stress individualism and self-realization (Lesthaeghe 2010). In this framework one would assume that cohabitation is a favored option among those who are less inclined to enter into long-term and binding commitments.

Historically, there is a close fit between the surge in divorce and cohabitation – although here Latin America is an exception (Laplante et al. 2015). Cohabitation gained ground especially in high-divorce societies, like Scandinavia and France, while remaining more marginal in low-divorce settings, like Italy.[2] If cohabitation represents weaker commitments, one would expect it to be associated with lower fertility. But is that necessarily the case?

There are three reasons why we should question this prediction. Firstly, the link between couple (in) stability and fertility is inherently ambiguous. We would expect that stable partnerships are more likely to have children. And yet, couples may also have children as a way to shore up a shaky relationship. There is empirical support for both views (Malpas and Lambert 1993;European Commission1997; Testa2007). Similar findings emerge for Germany (Berninger et al. 2011). Earlier US studies found that the risk of relationship disruption decreases the likelihood of births (Lillard and Waite 1993; Myers 1997; Manning 2004), and this appears also to hold for Italy and Spain (Coppola and Cesare2008). Union stability also predicts higher overall fertility in France (Thomson et al. 2012) and in the Netherlands (Rijken and Thomson 2011).

The 'births induce stability' perspective argues that childbearing, given that it is irreversible and shared, increases marital satisfaction and strengthens relationships (Lillard and Waite 1993). This argument, too, enjoys empirical support. Relationships stabilize after the first or early higher-parity births in the US (Waite and Lillard 1991) as well as in Italy and Spain (Coppola and Cesare 2008). Steele et al. (2007) compare

[2] A partial exception is the US where divorce rates are exceptionally high while cohabitation remains more infrequent (but is growing) (Cherlin 2009; Rindfuss and VandenHeuvel 1990; Smock 2000).

across two UK cohorts (born 1958 and 1970, respectively) and find that births cemented cohabiting relationships within the younger, but not the older, cohort (see also Rijken and Liefbroer2009).

The second reason lies in the multifaceted nature of cohabitation. In some societies, like Germany, the US or UK, it is largely a temporary testing-ground prior to committing oneself, or simply an alternative to singlehood (Rindfuss and VandenHeuvel 1990; Hiekel, Liefbroer and Poortman 2014); in others, like France and Scandinavia, it has become a de facto equivalent to marriage (Raley 2001; Kiernan 2002). To this we should add that Scandinavian cohabitation includes also a lot of 'shacking up' among young adults and, furthermore, cohabiters often marry after the birth of the first child. Youth emancipation from the parental home occurs exceptionally early here. [3]

All told, we would assume that fertility in cohabitation and marriage will begin to converge the more that cohabitation becomes normative and legally sanctioned. This is how Kiernan (2001) defines its mature state. And yet, the link between the diffusion of cohabitation and fertility may not be linear. As Perelli-Harris (2014) concludes, it is more likely curvilinear: as cohabitation becomes normatively enshrined, it is associated with lower fertility compared to married couples. This is explained by a selection-effect: those (ever fewer) who opt for marriage from the start are more likely to espouse more traditional family values.

This raises an important point, namely that fertility differentials between cohabiting and married couples are likely to be driven by underlying selection mechanisms. There are surprisingly few studies which address this conundrum explicitly (an exception is Steele et al. 2005).

The third reason is that citizens may select themselves into cohabitation for reasons other than reluctance to commit themselves. Motives may be pecuniary, such as avoiding double taxation; an anti-clerical ideology in societies where marriage is closely associated with the church (Dominguez-Folgueras and Castro-Martín 2013); or the embrace of postmodernist values so much stressed byLesthaeghe (2010); finally, any

[3]Perelli-Harris et.al (2014)find that the transition from cohabitation to marriage in Scandinavia is often a symbolic manifestation of a loving relationship.

given person's choice may simply be a function of what significant others in his-her social environment do.

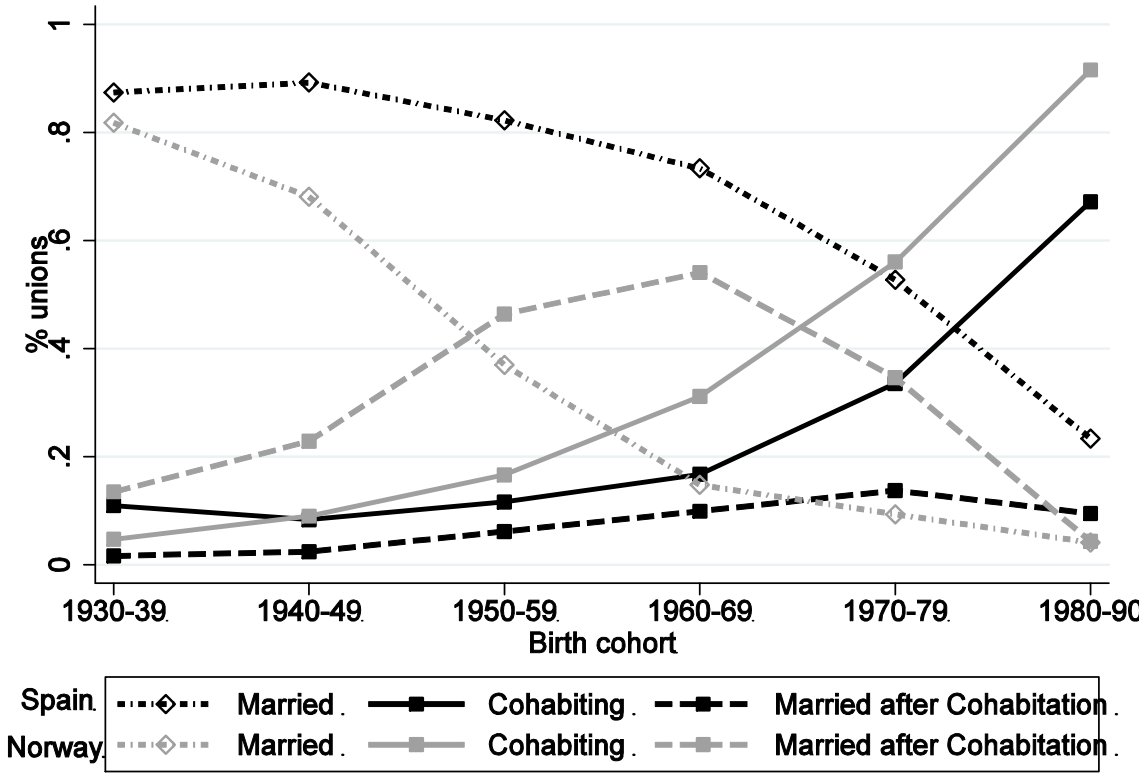
2. A Norwegian-Spanish Comparison

We analyze fertility within cohabiting and married couples, comparing Norway and Spain which represent the polar ends as regards European fertility, with Norway at the high end, (a quite stable TFR around 1.9-2.0), and Spain with lowest-low fertility (for more than two decades, the Spanish TFR has been below 1.4).

Our choice of comparison was, however, primarily motivated by clear contrasts in the two countries' cohabitation and divorce profiles. Norway represents the Scandinavian model where cohabitation has been firmly entrenched for many decades. And Norway exhibits relatively high and stable divorce rates (a crude divorce rate of ca. 2.3).

Spain is a newcomer on both counts. And, yet, the pace of change has been truly explosive. Since divorce was legalized in 1981, Spain has moved from the bottom to the top in the divorce league (from a CDR of 0.5 in 1990 to 2.2 in 2010)Note, however, that until 2005 legal separation was a prerequisite for divorce in Spain. Our data treat both as equivalent to 'divorce'. In tandem, cohabitation rose from practically nil in 1990 to 17 percent of all unions in the mid-2000s. This might lead us to think that Spain represents the phase in which cohabitation is a response to rising union instability(See Figure 2.1.)

Figure 2.1 Type of union trends (as percent of all unions)*



*estimated from GGS (FFVS for Spain) using weights

However, Spanish cohabiters are extraordinarily stable: after 180 months of partnering, the share of intact couples is about twice as large as in Norway (or elsewhere seeFigure2.2). This suggests that the Spanish cohabitation boom may not be fueled by any reluctance to commit.[4] In this regard Spain, at first glance, appears more Scandinavian than even the Scandinavians can muster.Nonetheless, Spain follows a very different path to cohabitation. As Vitali et al. (2015) show, the rise of women's education has been the principal driver in the diffusion of childbearing within cohabitation in Norway. In contrast, Spanish fertility within cohabitation is not related

[4]Our portrait of Spanish cohabiters differs markedly from the evidence presented in Baizan et al. (2003). Analyzing 1995 data, i.e. in the very early stages of cohabitation, they found that it was strongly biased towards the higher educated and was associated with low fertility. As also highlighted in the Dominguez-Folgueras and Castro-Martín (2013) study (which is based on the same 2006 data we use), all this has changed in the past decades. The stable nature of Spanish cohabiters must be understood also in the context of late youth emancipation from the parental home, i.e. youthful 'shacking-up' is far less common than in Scandinavia.

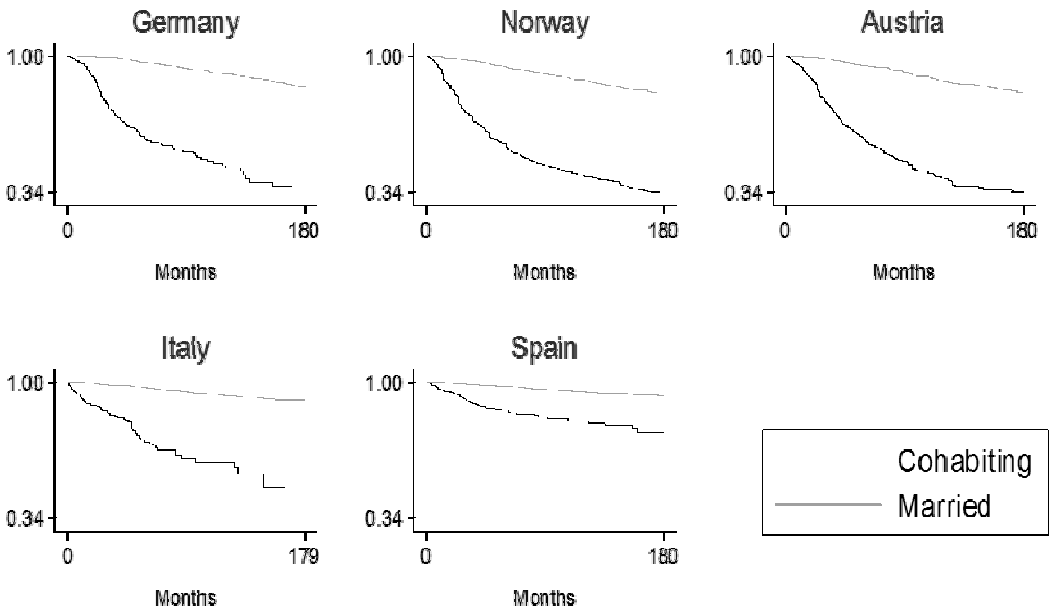
to educationfor the cohort born after 1960 (Dominguez-Folgueras and Castro-Martín 2013).

In Norway, cohabitation is well-enshrined, both normatively and legally. It comprises, however, two very different logics: on one hand, a large proportion of (mainly young) partnerships that tend to be short-lived and, on the other hand, more mature and long-lasting arrangements in which childbearing is common (Wiijk et.al 2009; Lyngstad et.al. 2010). In Spain, cohabitation has become socially accepted but it still does not enjoy the degree of legal sanctioning that marriage does (Dominguez-Folgueras and Castro-Martín 2013).

Spain represents therefore an interesting case. In terms of cohabitation, it clearly deviates from the Catholic-dominated Southern European 'familialist' model, as depicted in Reher (1998) and, more recently, in Perelli-Harris (2014). Spain deviation from the Southern European familialist model is however framed in terms of a break with the past, as also argued by Requena (2005), and not in terms of breaking away from trends shared with other countries.The features of Spanish cohabitation are partially related to late independence and to the difficulties of gaining a foothold in the labor market. Leaving the parental home usually coincides with union and family formation.[5]But unique to the Spanish case is the intense secularization experienced after the Franco dictatorship (Requena, 2005), which encourages cohabitation diffusion (see also Dominguez-Folgueras and Castro-Martin, 2013). The differences and similarities in the two countries raise two questions. One, what are the mechanisms that select citizens into cohabitation? And, two, how do they influence childbearing?

[5]Examining the age distribution, Norwegian cohabitation includes also a sizable group of youth who simply shack-up. Since the under-25s are far less likely to enter into parenthood (in both countries), this age-bias must be kept in mind when we interpret fertility effects.

Figure2.2 Kaplan Meier survival curve for cohabiting and married couples (event=divorce/separation)

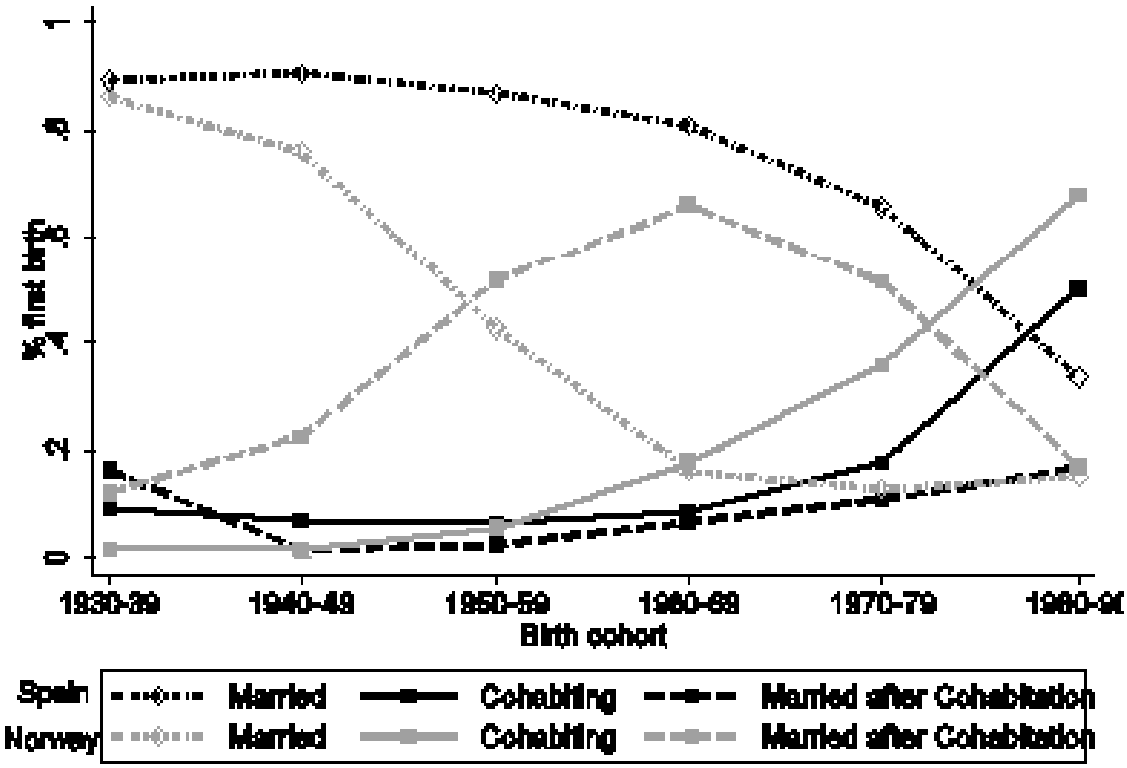


Source: GGS data and the 2006 FFVS survey for Spain

One would, all else constant, expect that birth propensities within married and cohabiting unions will converge as the latter become broadly diffused across the population. But where cohabitation is viewed as little more than a trial partnership, we should expect a substantial fertility gap between the two (Kiernan 2001; Perelli-Harris 2014; Raley 2001; Heuveline and Timberlake 2004).

Considerable evidence supports this. Non-marital childbearing has risen in almost all advanced nations (Billari and Kohler 2004; Buchmann and Kriesi 2011). Nonetheless, cohabiting couples may be less likely to become parents (Brien et al. 1999; Speder and Kapitany 2009). Here nation differences are substantial: in the US and Germany, cohabiting couples have a significantly lower probability of giving birth; in France and Scandinavia there is no real difference (Baizan et al. 2003; Heaton et al. 1999; Heuveline and Timberlake 2004; Toulemon and Testa 2005).

Figure2.3 First birth by type of union (as percent of all first births)*



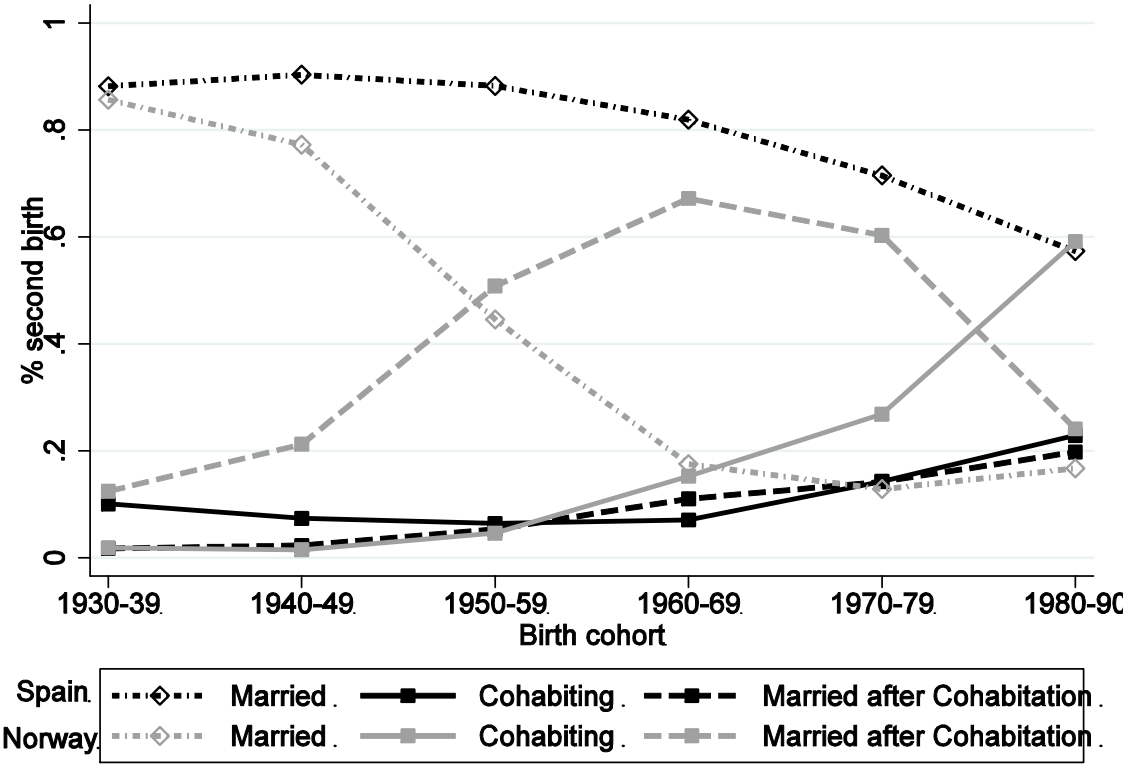
*estimated from GGS (FFVS for Spain) using weights

Figure2.3 and Figure2.4show, for Norway and Spain,the proportion of first and second births in each type of union. The graphs are based on the weighted sample for the sake of representativeness. Specifically, the weights are standardized weight based on country specific population weights. In the GGS/FFS country specific technical annex they are strongly suggested for descriptives statistics. We distinguish three casespermanent cohabitation, marriage, and cohabitation followed by marriage.

Figure2.3shows the proportion of first births in each type of union across six birth cohorts. In Norway, apart from the two oldest cohorts,between 40 and 70 percent of first births occur either within premarital cohabitation or cohabitation. For the younger cohorts, marriage accounts for a minority of births (about 20%). This is pretty much in line with previous studies which show that Norwegian cohabiting couples with one child account for 40-50% of all in 2000. However, here cohabiting couples are four times more likely to break up than are married couples (Hyggen and Skevik 2002).

In Spain, except for the youngest cohort, marriage remains the main channel for first births. And yetover the past decades the share of births inmarriage has dropped from 90to almost 65%. In parallel,first births within cohabitation haverisenfrom nil to 30%.And within the youngest cohort we observe that first births in cohabitation now exceed those inmarriage.[6]

Figure2.4 Second birth by type of union (as percent of all second births)*



*estimated from GGS (FFVS for Spain) using weights

Figure2.4shows the proportion of second births for each type of union across six birth cohorts.In Spain, marriage is the principal option for second births. This has decreased over time but still accounts forabout 60% of all births. As regards cohabiting couples, we see a slight increase in second births over the recent decades.

[6]Note, however, that our data may overestimate first births within cohabitation. Spanish vital statistics, in fact, report that 30% of first births occur within cohabitation. This discrepancy may be due to the fact that we cannot observe completed fertility for the youngest cohort.

Note that the data in Figure2.4do not take into account successive unions. It is possible that a second childwas conceived with the sameor with a different partner. Norway exhibits a completely different pattern. Here it is far more likely that the second birth will also occur within cohabitation. Indeed, for the youngest cohort, only 20% of second births occurred in marriage.

3. Methods

Union formation and childbearing can be mutually related. Individuals may partner because they desire to have children or, reversely, they decide to form a union because they already expect a child. Furthermore, unobservable characteristics such as preferences or peer group influence may drive both processes. Applying multi-process models to event history data is a powerful tool in such situations(Steele et al. 2005).The advantage lies in their ability to provide unbiased estimates of the covariates by taking into account both selection on time invariant unobservables and correlations across different processes(via random effects correlation-- see below).

Analyzing monthly data, we implement a multistate multilevel model, modeling each process with a discrete-time hazard. We estimate a two-level random intercept logit, the two levels corresponding to the random effect related to different time spells for the same individual, and to the random effect between women. Following (Steele et al. 2004), durations are grouped into six month intervals if no event occurs. Repeated events are necessary in order to identify multi-process models, (i.e. multiple partnerships and multi-partnership fertility). This ensures the presence of two-level variation (across time for the individual, and between women) which is required in order to estimate the variance-covariance matrix (Steele et al. 2005).

Unbiased estimates, however, do not come without a price since we are compelled to make a number of assumptions. Firstly, in each equation we assume that the vector of covariates X (only those that are not related to either fertility or partnership) is exogenous, i.e. not correlated with either the level one residual orwith the level 2 random effect.

Our model includes two main components: the first addresses partnership formation and the second fertility transitions. We estimate partnering with two different competing risk models. The firstestimates the risk of enteringinto either cohabitation or marriage

for a single woman.The secondestimates the risk of marriagewith (or separation from)the same partner for cohabiting women. In other words, we take into account both those who change status from *single* to *married/cohabiting* and those who, after entry into cohabitation, marry the same partner or exit from cohabitation.

Selection into either outcome may be driven by individual characteristics (e.g. preferences). For instance, those who marry may see marriage as more stable than those who remain cohabiting.The variance-covariance matrix gives us a measure of the correlation between these processeswhich, in turn, helps us to better interpret these relationships. In modelling partnership dynamics we take into account repeated events, i.e.those partnerships a woman experiences in life as well as possible partnership ruptures. A woman who experiences a divorce will automatically be assigned the status of singlehood.

Similarly to Steele et al. (2004), we define the competing risk of partnering for a single woman as follows. We denote by r the type of union in which individual j enters at each t-th month (of episode i), where r_1=1 is cohabitation and r_1=2 is marriage. To estimate the first equation we use a competing risks framework, with $h_{ij}^{(r1)}$ representing the hazard for a woman j, in the state of singlehood, of experiencing the transition of type r_1, at the time spell i of the month t[7]. The risk of a transition from single to each r_1 state (from single to marriage, cohabitation, or remaining single), given the condition that no event has occurred before, can be written as:

$$\log\left(\frac{h_{ij}^{(r1)}}{h_{ij}^{(0)}}\right) = \alpha^{(r1)}\mathbf{D}_{ij}^{(r1)} + \beta^{(r1)}x_{ij}^{(r1)} + u_j^{P\,(r1)} \qquad (1)$$

$$u_j^{P\,(r1)} \sim N(0, \boldsymbol{\Omega}^{R1})$$

where R_1=2

[7]The time intervals are grouped into 6-month periods and the risk of experiencing a transition is weighted by the number of months of the interval in which the event occurs (Steele et al. 2004). For instance, if an individual remains single 7 months before getting married, the time intervals will be two: the first one will be weighted by a factor of one and the second one by a factor of 1/6.Monthly data were too demanding computationally speaking

Where$\alpha^{(r1)}D_{ij}^{(r1)}$ is a function of the duration of the state as "single" and $x_{ij}^{(r1)}$is a vector of covariates. $u_j^{P\,(r1)}u_j^{P\,(r)}$ is the random effect at the individual level. The dependent variable assumes the value of 1when women either marryor start cohabitationand 0 if they remain single.

In the second model transitions are from the state of "cohabiting" to each r state "married" (with the same partner) or "separated". Thus, adopting the same notation of equation (1), the hazard $h_{ij}^{(r2)}$ for a woman j, of experiencing the transition of type r2, at the time spell i of the month t may be expressed as:

$$\log\left(\frac{h_{ij}^{(r2)}}{h_{ij}^{(0)}}\right) = \alpha^{(r2)}\mathbf{T}_{ij}^{(r2)} + \beta^{(r2)}c_{ij}^{(r2)} + v_j^{P\,(r2)} \qquad (2)$$

$$v_j^{P\,(r2)} \sim N(0, \boldsymbol{\Omega}^{R2}) \qquad \text{where } R_2=2$$

Where$\alpha^{(r2)}T_{ij}^{(r2)}$ is a function of the duration of the state as a "cohabiting" and $c_{ij}^{(r2)}$is a vector of covariates. $u_j^{P\,(r)}$ is the individual level random effect. The dependent variable is dichotomous, equal to one when women either marry their cohabiting partner or separate, or zero if they remaincohabiting.

The second main component of the model focuses on fertility transitions from the date of union formation onwards.[8]Our aim is to identify whether different union types exhibit different normative perceptions via both the coefficients and the variance- covariance matrix. We limit our analyses to first and second births because we expect that the transition to the second is crucial for a cross-country comparison. Spain belongs to lowest low fertility group and we know from the literature that the crucial transition is between first and second birth (Sobotka, 2008; Van Bavel and Putek, 2010). We include both births in a unique equation and treat them as repeated events. Parities are defined in terms of a woman's fertility history, regardless of re-partnering.

This entails that a woman can have her first and second birth with two different partners. In fact, in higher-order relationships, women may self-select into a different

[8]We take into account conception time.

type of union compared to women who enter into their first. It has been shown that re-partnered mothers are more likely to opt for cohabitation (Heuveline and Timberlake 2004). In contrast, women who have both the first and second child with the same partner may represent a different kind of self-selection.

Further, since the same covariate may have a different effect at different parities, we includeone indicator variable foreach parity, interactingit with every other covariatein the model as well as with the duration function. This implies that we have two parallel embedded equations.

Formally, by denoting h_{ij}^{F} as the risk of a birth for the woman j in her i-th episode, in the t-th month, the two-level random effects logit model can be written as:

$$h_{ijt}^{F} = \log\left(\frac{p_{ijt}^{F}}{1-p_{ijt}^{F}}\right) = \alpha^{F} D_{tij}^{F} + \beta^{F} z_{tij}^{F} + \delta^{F} c_{tij}^{F} + \gamma^{F} c_{tij}^{F} * z_{tij}^{F} + \beta^{F} x_{tij}^{F} + u_{j}^{F} \quad (3)$$

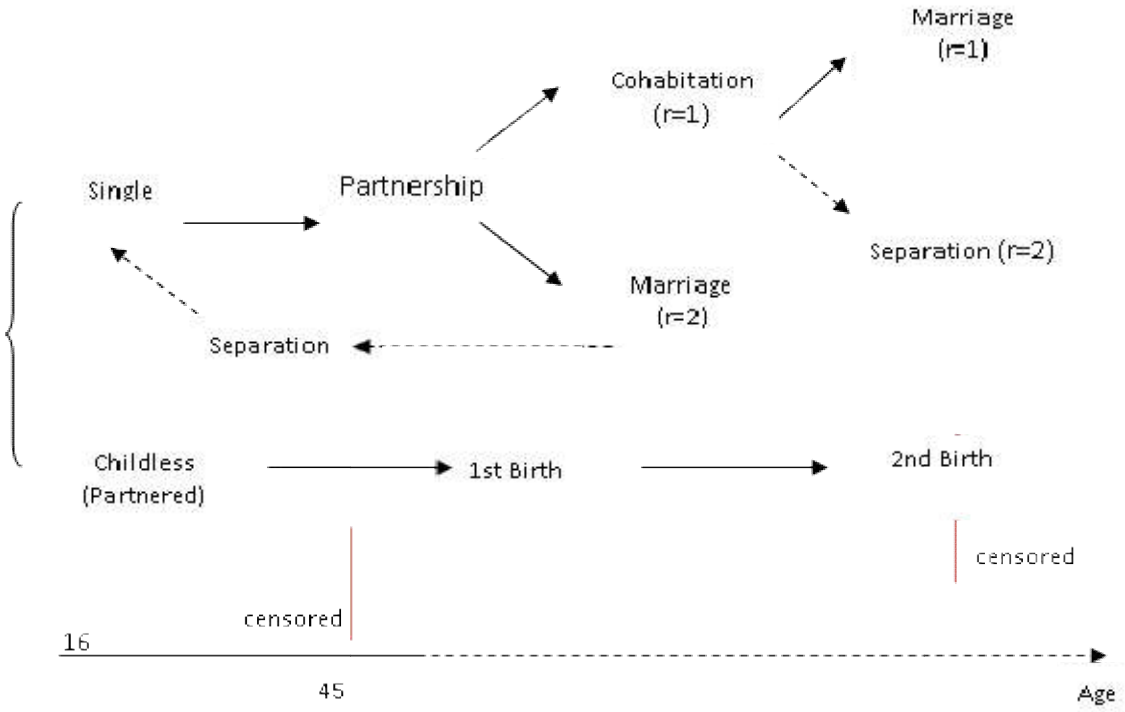
$$e_{j}^{F} \sim N(0, \sigma_{C}^{2})$$

Here$m_{ij}^{F} x_{tij}^{F}$ is a vector of covariates includingbirth cohort, education level and background characteristics of the women (i.e. country of birth, whether they experienced partnership dissolutions, whether their parents separated before the age of 16, and age at partnership).z_{tij}^{F} is a dummy identifying the current type of union at each spell i; it is one for married couples and zero for cohabiters. c_{tij}^{F} is a dummy for parities that equal zero for childless women and one for those who already have a child. Finally, $c_{ij}^{F} * p_{ij}^{F}$ and $c_{tij}^{F} * z_{tij}^{F}$ are the interactions identifying, respectively, the effect of the covariates for each birth order and type of union in which each birth transition occurs. This allows us to isolate the effect of the covariates for every fertility transition within each type of union,as the same covariates may influence the first and second birth

differently. The dependent variable is binary, assuming the value of one when the partnered woman experiences a first, respectively, second birth.

To sum up, in equation 1 women may partner, be it in cohabitation or marriage, in every spell of singlehood. The second equation estimates fertility transitions within partnerships[9].Figure2.5 depicts the full multi-process model.

Figure2.5 Full model



We include an individual random effect that allows us to identify selection, i.e. unobserved heterogeneity shared between the different processes. The model allows these individual-level random effects to be correlated across equations. From these we obtain a variance-covariance matrix which informs us about the interrelation between the different processes, and also about the level of unobserved heterogeneity within each. The diagonal represents the variance which, if statistically significant, can be interpreted as the presence of unobserved heterogeneity at the woman level. In the lower

[9] We initially wanted to distinguish between married and previously cohabiting, cohabiting, cohabiting and previously married and married with a different partner. But this proved to be impossible due to inadequate N's.

quadrant we find covariance estimates which represent the correlation between different processes due to unobserved heterogeneity. This matrix provides us with a measure that would be unavailable using other methods. It allows us to interpret the coefficients of the regression model by providing both a sign and a direction of the correlation between selection into different processes. Note, however, that we must assume that attitudes and preferences, not captured by control variables, are time-invariant and also normally distributed.[10]

4. Data

For Norway we use the Generations and Gender Survey (GGS) 2007/8; for Spain, the Fertility and Family Survey (FFVS) from 2006- the best recent source of data for Spain. Both include retrospective information that allows intergenerational and longitudinal analysis. We include all women in their reproductive years (15-45), censoring at their 45th birthday or at the second birth[11]. We follow women born 1960-1990. In Spain these cohorts coincide with the surge in cohabitation. Since we also focus on changes in the type of union between births, we select all partnered women for whom we may observe a first and second birth. For the fertility equation our sample size is2797for Spain and 3142 for Norway.

Appendix Table 2.5-8 present descriptive statistics for the fertility equation sample. Although we focus only on recent cohorts, we present descriptive statistics for older birth cohorts (born 1930-1959) to trace how selection into different types of unions changes over time. In order to properly identify shifts in partnering behavior across the different cohorts, we should have estimated two models for the two periods. However, due to the low number of cohabitants in the old cohorts, multi-process models cannot be identified. We include the standard covariates in the partnering models; the fertility equation, which is our main focus, includes the following covariates:

---

[10]Most of the empirical evidence suggests that family-related preferences are quite volatile in late youth and very early adulthood, but become quite stable as individuals mature (see Alwin and Krosnick, 1991; and also Axiin et.al, 1994)

[11] Women who remain childless are censored at their 45th birthday.

- parental divorce before the age of 16; country of birth, age at partnership, and possible previous partnerships (time-varying).
- A set of dummies for level of education (including a category for missing values in order not to lose too many observations). In both countries, the intermediate category ("upper secondary") is the largest. Dummies for birth cohort and current partnership duration(time-varying)are included. As to the former, the distribution by birth cohort is fairly homogeneous in both countries.

We model each process with a discrete-time hazard. We estimate a two-level, random intercept logit, the two levels corresponding to the random effects related to different time spells for the same individual, and to the random effects between women. Durations are grouped into six month intervals if no event occurs. The results are obtained using MCMC estimation in MLwiN through STATA 13 with the runmlwin command (Leckie and Charlton 2011).

5. Results

For the sake of brevity, we shall focus on the variance-covariance matrix, on predicted probabilities, and when needed we highlight the difference in estimates between multi and single process estimates.[12] Results for the partnership equations are presented in Appendix Table 2.9 and Table 2.10.

The key difference between the single and multi-process model is that the latter reduces the risk of estimation bias. The relationships are summarized in the variance-covariance matrix for Spain and Norway, respectively (Table 2.1 and Table 2.2). The variance represents individual-level heterogeneity, and the covariance(on the sub-diagonal) identifies selection dynamics.

[12]The detailed results from the multi-process fertility equations, and also the diagnostic checks for the multi-process estimates are included in the appendix (Appendix Table 2.11, Table 2.12and in Fig. 8 and Fig.9)

Table 2.1 Random Effects Variance-Covariance Matrix from the Multi-process Models for Spain

	Single to married	Single to cohabitating	Cohabiting to married	Cohabiting to separated	Fertility transition
Single to married	0.82*** [0.22]				
Single to cohabiting	0.08 [0.16]	1.97*** [0.29]			
Cohabiting to married	0.10 [0.17]	-0.40* [0.20]	1.24*** [0.33]		
Cohabiting to separated	0.56** [0.27]	-0.59+ [0.31]	0.71+ [0.39]	3.08** [1.02]	
Fertility transition	0.17* [0.07]	-0.07 [0.08]	0.64*** [0.11]	0.58** [0.21]	0.81*** [0.05]

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

For Spain, we observe a substantial degree of unobserved heterogeneity driving all five processes. We find anegative association (-0.40) between entry into cohabitation and subsequently getting married.Similarly, those women who have an above average risk of getting married have also an above average risk of exiting cohabitation. This may reflect different unobservable characteristics - for instance, those who get married may experience shorter cohabitation periods.Turning to fertility, we find a positive and slightly significant correlation between entry into marriage and fertility (0.17). Additionally, we find a positive and significant coefficient (0.64) for the interrelation between fertility transitions and entry into marriage (with the same partner) after cohabitation.

This suggests that individuals with an above-average risk of getting married have also an above-average risk of childbirth. We find a negative (butnot significant)correlation between fertility and entry into cohabitation from the status of single (-0.07). In other

words, women who select themselves into cohabitation do not exhibitastronger childbirth propensity (unless the cohabitation leads to marriage).

To summarize: first, entry into parenthood is endogenous with respect to entry into marriage; second, women who are more likely to enter into marriage share unobserved characteristics with those who are more likely to have children. It is important to note that we find no significant negative correlation between entry into cohabitation and childbearing. Women who select themselves into cohabitation are more likely to have children only if that cohabitation precedes a marriage. This is a crucial finding for understanding the Spanish context in terms of childbirth within cohabitation.

Table 2.2 Random Effects Variance-Covariance Matrix from the Multi-process Model for Norway

	Single to married	Single to cohabitating	Cohabiting to Married	Cohabiting to Separated	Fertility transition
Single to married	1.93***				
	[0.47]				
Single to cohabiting	-0.07	0.46***			
	[0.13]	[0.06]			
Cohabiting to married	0.04	0.08^{+}	0.60***		
	[0.14]	[0.04]	[0.10]		
Cohabiting to separated	0.06	0.08+	0.35***	0.28**	
	[0.18]	[0.04]	[0.06]	[0.09]	
Fertility transition	-0.02	0.13***	0.69***	0.44***	0.91***
	[0.10]	[0.04]	[0.06]	[0.07]	[0.05]

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

For Norway, the main diagonal shows statistical significance throughout, implying the presence of individual heterogeneity behind all processes. This underscores the relevance of our modelling approach.

The fertility coefficients suggest that women who want children are also more likely to enter into any type of union except marriage. In particular, we find a positive relation between fertility and conception both within cohabitation (0.13) and pre-marital cohabitation (0.69). Here we observe a major nation-contrast, because Norway exhibits a positive and significant correlation between fertility and entry into cohabitation. This difference may reflect the different degree of acceptance of childbirth within cohabitation. In other words, Norwegian women do not perceive a non-marital birth as normatively deviant.

Moving now to the estimations, our primary interest lies in the coefficient for uniontype at each birth transition.Table 2.3 and Table 2.4report estimated coefficients for type of union at first and second birth for Spain and Norway. In order to highlight the appropriateness of our method, we present coefficients from the multi process estimation along with the single process results.

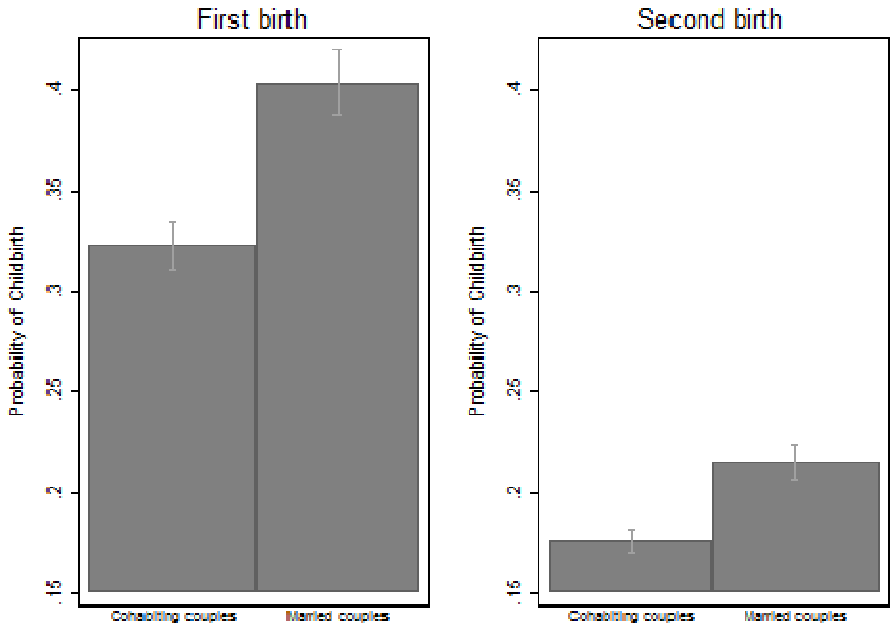
Table 2.3MCMC Estimation for Childbirth within Partnership (Single versus Multi-Process) for Spain

	Single Process	Multi Process
Childless women		
Constant	-4.20***	-3.72***
Marriage(ref. Cohab)	1.07***	0.62***
One Child women		
Constant	-6.12***	-5.66***
Marriage(ref. Cohab)	-0.51***	-0,50***

In both single and multi-process estimations for Spanish married childless women, the coefficient in the multi process is smaller. This is because we have 'cleansed' the coefficient of the positive correlation between fertility transitions and marriage; without allowing for this correlation we would have overstated the effect of marriage on childbirth.

Turning to second births, the coefficient for married women is negative in both single and multi-process estimation. Further, the difference in terms of size of the two coefficients is almost zero. This can be explained by the fact that second births in the more recentSpanish cohorts areless common.[13]

Figure 2.6 Spain-predicted probability of first and second birth by type of union (multi process estimates)



To sum up,when we examine predicted probabilities for both first and second birth transitions in Spain(Figure 2.6), married women are more likely than cohabiting women to give birth. However, when it comes to second births the predicted probabilities are way smaller. Here we must remember that second births in Spain, especially for this cohort, areless common.

[13] In one of our robustness checks where we drop all people younger than 30, we find the same sign for this coefficient. However, the effect is slightly stronger (-0.40** in the single process and -0.47** in the multi process)

Table 2.4MCMC Estimation for Childbirth within Partnership (Single versus Multi-Process) for Norway

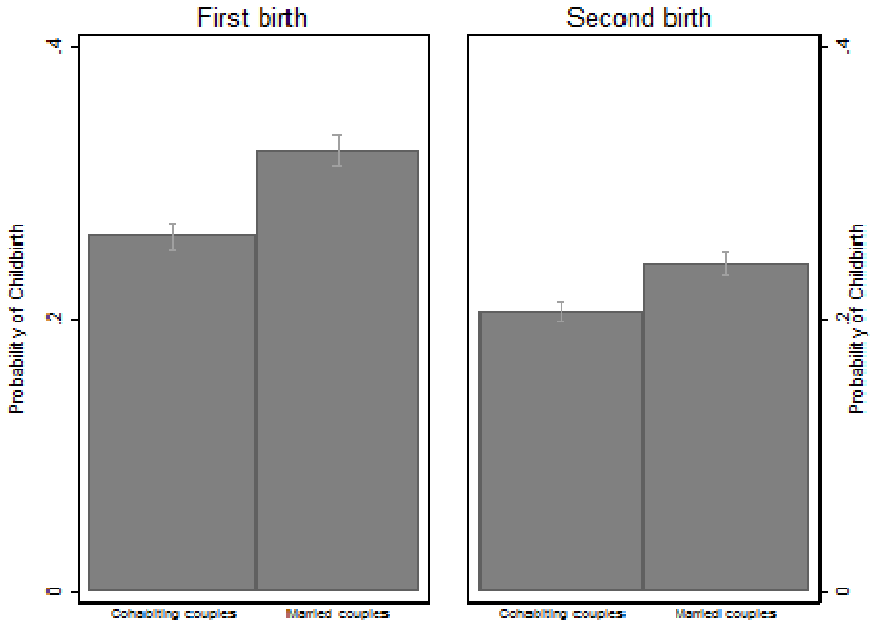
	Single Process	Multi Process
Childless women		
Constant	-3.94***	-3.57***
Marriage(ref. Cohab)	0.70***	0.66***
One Child women		
Constant	-5.05***	-5.09***
Marriage(ref. Cohab)	-0.17*	-0,53***

Turning to Norway, we see that the coefficient for first births is quite similar in both models (slightly lower in the multi-process estimation). One possible explanation is that first births are common in both types of union, so controlling for time invariant unobservables makes little difference[14].

Married women at risk of a second birthshow a negative coefficient in both the single and multi-process model. In the latter, the coefficient is smallerthan in the single process estimation. This is partially in line with what we found in the variancecovariance matrix.On the one hand, women who are keener to have a child are less likely to get married.On the other hand, those who are more likely to marry their cohabiting partner are also more likely to experience childbirth.Accordingly, in the single process approach the marriage effect is exaggerated because of selection on unobservables.

[14]In one of our robustness checks, where we drop all people younger than 30, we find the same sign for this coefficient. However, coefficients are slightly larger(0.62*** in the single process, 0.23** in the multi process). Further, the difference between multi and single process is greater for this sample, meaning that for first births there is more selection on unobservables. When it comes to second births, the coefficients are smaller than in the model shown (-0.11 in the single process and -0.29** in the multi process). In the robustness check, the difference between the single and multi-process estimations is smaller. Additionally, when we exclude those under 30, the difference between Norway and Spain (for first births) diminishes considerably.

Figure2.7 Norway-predicted probability of first and second birth by type of union (multi process estimates)



To sum up, examining the predicted probabilities (Figure2.7)for both first and second birth transitions, Norwegian married women are more likely than cohabiting women to experience a birth. Further,Norway shows a higher probability of a second birth in both types of union.[15]But remember that the youngest cohorts will not yet have completed their fertilitytrajectory. For both countries we see that marriage is the preferred context for both first and second births. However the mechanisms behind the same outcomes appear completely different

6. Discussion

Our starting point was whether cohabitation is increasingly a functional equivalent to formal marriage- at least as far as fertility behavior is concerned. This, we recall, is not what the postmodern 'less family, more individualism' version of the Second Demographic Transition thesis would expect (Lesthaeghe 2010). If the choice of

[15]In order to test whether the difference by parity and type of union is statistically significant we conducted a formal test of the significance of differences, as explained in Gelman and Stern (2006). For first births, the two countries showsignificant differences (i.e. confidence interval: [-.014, -.039], But this is not the case for second births (i.e. C.I.: [-.001, .007]) despite the difference in the size of the estimates.

cohabitation tends to reflect a weaker commitment to family life, it should also be associated with lower birth propensities. We opted for a Norway-Spain comparison since the two represent orthogonally different cultural and institutional contexts.

In Norway cohabitation has been widely diffused, indeed institutionalized, for decades (Lappegard and Norak 2015). Nowadays, among individuals aged 16-79, almost one in four couples are cohabiting (Statistics Norway). Spain, a clear exponent of lowest-low fertility, has experienced a rapid diffusion of cohabitation. Cohabitation rose from practically nil in 1990 to 17 percent of all unions in the mid-2000s.

In addition, overall fertility levels as well as partnership instability are greater in Norway. Around 50% percent of first births, indeed, occur either within premarital cohabitation or cohabitation. In Spain, from 1995 to 2010, non-marital births have increased from 11% to 35.5%(Folguerez-Dominguez 2013).

Childbearing is a measure of the degree to which cohabitation has gained strong social acceptance (Vitali et al. 2015). While Norway stands as a vanguard of family change, Spain is typically grouped within the traditionalist fold (Heuveline and Timberlake 2004; Esping-Andersen 2016). This, at first glance, would appear evident in terms of the evolution of cohabitation. In Norway, the latter has clearly attained normative status; in Spain it is very recent, and despite its rapid growth, we believed that it is unlikely that cohabitation would yet have attained broad acceptance as an alternative to marriage.

At first sight – and contradicting our expectations – we found that fertility patterns look quite similar across the two countries: the likelihood of firstand second births is greater among married couples. However, our multi-process estimation revealed that behind this pattern of similarity lie distinct selection mechanisms. One advantage of multi-process multi-states models is that they also provide an estimate of the underlying selection processes between different events; in this case, partnering and fertility. From the variance- covariance matrix we observed that in Spain the correlation between cohabitation and fertility transitions is not significant, whereas it is in Norway. For Spain this implies that those women with an above average risk of childbirth do not show any significant correlation with those women that are more likely to enter into cohabitation. In contrast, in Norway women with an above average risk of cohabitation

also show an above average risk of childbirth, meaning that cohabitation and fertility transitions are correlated.

Thanks to the multi-process multi-states models, we also discovered that selection on unobservable time-invariant factors differs between country and by birth order. Further, the difference between single andmulti-process estimation showed that first births in Spain are greatly influenced by selection on time-invariant unobservables. For Norway, the same is the case for second births.

In the case of Spain, this is because we 'cleansed' the coefficient forrisk of first birth, the positive correlation we find between fertility transitions and marriage; without allowing for this correlation we would have overstated the effect of marriage on childbirth. Conversely, for Norway, the coefficient for the risk of a second birth is smallerin the multi-process than in the single process estimation. This is partially in line with what we found in the variance covariance matrix. Accordingly, in the single process approach the marriage effect is exaggerated because of selection on unobservables.

A possible explanation is that in Spain, a second birth represents an already selected group. Selection here is driven more by observable than unobservable characteristics. Thus, the difference between the single and the multi-process estimates for the second birth coefficient results negligible. In contrast, in Norway selection on unobservables is irrelevant because virtually everyone in any type of union will have a first child. When it comes to second births, which are less common, we observe that controlling for time invariant unobservables plays a moderately important role.

On a more speculative note, can we expect this to continue? Some of the evidence suggests so, in particular considering the degree of normative acceptance that cohabitation has already attained in Spain. But we should also take into account the very different life course dynamics in the two societies. In contrast to Spain, Norwegian cohabitation is more dualistic, combining a large share of youth who most likely see it as a temporary arrangement, and more mature adults poised to start a family. Due to postponement, the Spanish enter into partnerships at a more mature age, pretty much across-the-board. And this, in turn, helps account for the surprising degree of stability within cohabiting partnerships. In a sense, Spanish cohabitation looks like a replica of marriage - but without the ceremony. In Norway, marriage has less to do with family

formation and, as Perelli-Harris and her colleagues (2014) argue,it appears more like a ceremony to celebrate a loving relationship.

Interpreting the relationship between type of union and fertilityis not straightforward. AsDominguez-Folgueras and Castro-Martín (2013) show, Spanish cohabitationhas diffused across all educationlevelswithin the more recent cohorts. However, even if cohabitation appears to enjoy broad social acceptance as a union option, this does not imply that it has gained normative acceptance for childbearing. Indeed, our results suggest that normative change as regards fertility behavior lags behind that of partnership choice. Norway, in contrast, exhibits a clearly different relationship between fertility and partnering. As emerges inLappegard and Noak's (2015) qualitative study, in Norway there is clearly no stigma attached to having children outside marriage. And yet, marriage continues to be viewed as the most natural context for fertility. These distinctly different normative contexts may, on a more speculative note, help account for the different country dynamics that lie behind apparently similaroutcomes.

On a final note, multi-process estimation helps us deal with potential selection bias that is otherwise difficult to identify. Nevertheless, we should also remember that it is far from being a ‘cure-all’ remedy. We may have gotten a bit closer to identifying the logics that link partnering and childbearing choices, but we are clearly still far away from having fully opened the black box of all the possibly decisive mechanisms that drive both partnering and fertility. To this end, more in-depth qualitative research can potentially produce great value-added.

7. References

Alwin, D and Krosnick, J. (1991) Aging, cohorts and the stability of socio political orientations over the life span. American Journal of Sociology, 97: 169-195

Axiin, W, Clarkberg, M and Thornton, A. (1994) Family influences on family size preferences. Demography, 31: 65-79

Baizán, P., Aassve, A., & Billari, F. C. (2003).Cohabitation, marriage, and first birth: The interrelationship of family formation events in Spain. European Journal of Population, 19(2), 147-169.

Berninger, I., Weiß, B., & Wagner, M. (2011). On the links between employment, partnership quality, and the intention to have a first child: the case of West Germany. Demographic Research, 24(24), 579-610.

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

Brien, M. J., Lillard, L. A., & Waite, L. J. (1999). Interrelated family-building behaviors: Cohabitation, marriage, and non marital conception. Demography, 36(4), 535-551.

Buchmann, M. C., & Kriesi, I. (2011).Transition to adulthood in Europe. Annual Review of Sociology, 37, 481-503.

Coppola, L., & Di Cesare, M. (2008).How fertility and union stability interact in shaping new family patterns in Italy and Spain. Demographic Research, 18(4), 117-144.

Dominguez-Folgueras, M., & Castro-Martín, T. (2013).Cohabitation in Spain: no longer a marginal path to family formation. Journal of Marriage and Family, 75(2), 422-437.

Esping-Andersen, G 2016 Families in the 21st Century. Stockholm: SNS

European Commission (1997).The Young Europeans.Special Eurobarometer 114/Wave 47.2. (Stable URL: http://ec.europa.eu/public_opinion/ archives/ebs_114_en.pdf).

Gelman, A., & Stern, H. (2006). The difference between “significant” and “not significant” is not itself statistically significant. The American Statistician, 60(4), 328-331

Goldstein, H., & Healy, M. J. (1995).The graphical presentation of a collection of means.Journal of the Royal Statistical Society. Series A (Statistics in Society), 175-177.

Heaton, T. B., Jacobson, C. K., & Holland, K. (1999). Persistence and change in decisions to remain childless. Journal of Marriage and the Family, 531-539.

Heuveline, P., & Timberlake, J. M. (2004). The role of cohabitation in family formation: The United States in comparative perspective. Journal of Marriage and Family, 66(5), 1214-1230.

Hiekel, N., Liefbroer, A. C., & Poortman, A. R. (2014).Understanding diversity in the meaning of cohabitation across Europe. European Journal of Population,30(4), 391-410

Hyggen, C., & Skevik, A. (2002).Demography of the Family in Norway.First Report for the project.

Kiernan, K. (2001). The rise of cohabitation and childbearing outside marriage in Western Europe. International Journal of Law, Policy and the Family, 15(1), 1-21.

Kiernan, K (2002) Cohabitation in Western Europe: trends, issues and implications. In A. Booth and A. Crouter, (Ed.), Just Living Together (pp. 3-31). Laurence Erlbaum Associates.

Laplante, B., Castro-Martín, T., Cortina, C., & Martín-García, T. (2015). Childbearing within marriage and consensual union in Latin America, 1980–2010. Population and Development Review, 41(1), 85-108.

Lappegaard, T and Norak, T. (2015) The link between parenthood and partnership in contemporary Norway. Demographic Research, 32: 287-310

Leckie, G., & Charlton, C. (2013). Runmlwin-a program to Run the MLwiN multilevel modelling software from within stata. Journal of Statistical Software,52(11), 1-40.

Lesthaeghe, R. (2010). The unfolding story of the second demographic transition. Population and Development Review, 36(2), 211-251.

Lillard, L. A., & Waite, L. J. (1993).A joint model of marital childbearing and marital disruption. Demography, 30(4), 653-681.

Lyngstad, T. H., Noack, T., & Tufte, P. A. (2010).Pooling of economic resources: A comparison of Norwegian married and cohabiting couples. European Sociological Review, jcq028.

Malpas, N., & Lambert, P.V. (1993). Les Européens et la famile [Europeans and the Family]. Special Eurobarometer 77/Wave 39.European Commission. (Stable URL: http://ec.europa.eu/public_opinion/archives/ebs_77_fr.pdf).

Manning, W. D. (2004).Children and the stability of cohabiting couples. Journal of Marriage and Family, 66(3), 674-689.

Myers, S. M. (1997). Marital uncertainty and childbearing. Social Forces, 75(4), 1271-1289.

Perelli-Harris, B. (2014). How similar are cohabiting and married parents? Second conception risks by union type in the United States and across Europe. European Journal of Population, 30(4), 437-464.

Perelli-Harris, B, Mynarska, M, Berrington, A, Berghammer, C, Evans, A, Isupova, O, Keizer, R, Klarner, A, Lappegaard, T and Vignoli, D (2014) Towards a new understanding of cohabitation. Demographic Research, 31: 1043-78

Raley, R. K. (2001). Increasing fertility in cohabiting unions: Evidence for the second demographic transition in the United States? Demography, 38(1), 59-66.

Reher, D. S. (1998). Family ties in Western Europe: persistent contrasts. Population and Development Review, 203-234.

Requena, M. (2005). The secularization of Spanish society: Change in religious practice. South European Society and Politics, 10(3), 369-390.

Rijken, A. J., & Liefbroer, A. C. (2009).The influence of partner relationship quality on fertility. European Journal of Population, 25(1), 27-44.

Rijken, A. J., & Thomson, E. (2011).Partners' relationship quality and childbearing. Social Science Research, 40(2), 485-497.

Rindfuss, R. R., & VandenHeuvel, A. (1990). Cohabitation: A precursor to marriage or an alternative to being single?. Population and Development Review, 703-726.

Spéder, Z., & Kapitány, B. (2009). How are time-dependent childbearing intentions realized? Realization, postponement, abandonment, bringing forward. European Journal of Population, 25(4), 503-523.

Steele, F., Goldstein, H., & Browne, W. (2004).A general multilevel multistate competing risks model for event history data, with an application to a study of contraceptive use dynamics. Statistical Modelling, 4(2), 145-159.

Steele, F., Kallis, C., Goldstein, H., & Joshi, H. (2005).The relationship between childbearing and transitions from marriage and cohabitation in Britain. Demography, 42(4), 647-673.

Steele, F., Kallis, C., & Joshi, H. (2006). The formation and outcomes of cohabiting and marital partnerships in early adulthood: the role of previous partnership experience. Journal of the Royal Statistical Society: Series A (Statistics in Society), 169(4), 757-779.

Steele, F., Joshi, H., Kallis, C., & Goldstein, H. (2007). Changes in the relationship between the outcomes of cohabiting partnerships and fertility among young British women: evidence from the 1958 and 1970 Birth Cohort Studies.

Testa, M. R. (2007). Childbearing preferences and family issues in Europe: evidence from the Eurobarometer 2006 survey. Vienna Yearbook of Population Research, 357-379.

Thomson, E., Winkler-Dworak, M., Spielauer, M., & Prskawetz, A. (2012).Union instability as an engine of fertility?A microsimulation model for France. Demography, 49(1), 175-195.

Thornton, A. (1978). Marital dissolution, remarriage, and childbearing. Demography, 15(3), 361-380.

Toulemon, L., & Testa, M. R. (2005). Fertility intentions and actual fertility: A complex relationship. Population & Societies, 415(4), 1-4.

Vitali, A., Aassve, A., & Lappegård, T. (2015). Diffusion of Childbearing Within Cohabitation. Demography, 52(2), 355-377.

Waite, L. J., & Lillard, L. A. (1991).Children and marital disruption. American Journal of Sociology, 930-953.

Wiik, K., Bernhardt, E. and Noack, T. (2009) Stability of marital and cohabiting unions following a first birth. Journal of Marriage and Family, 71: 465-77

8. Appendix

Figure2.8 Spain diagnostics checks

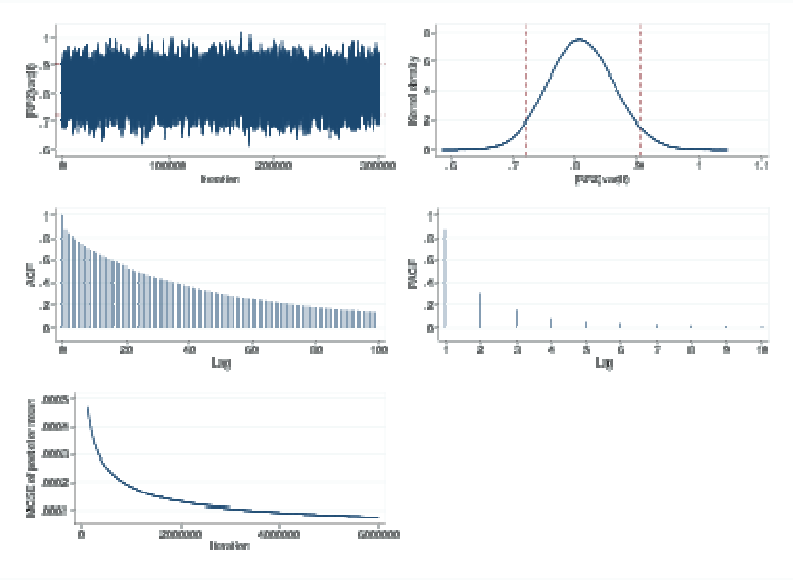
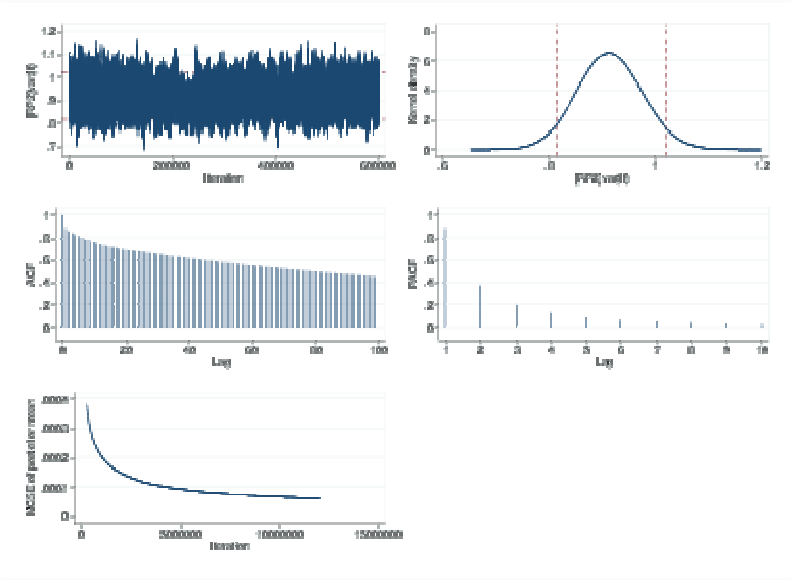


Figure2.9 Norwaydiagnostics checks



The above graphs summarize the diagnostic checks for the multi-process estimation for, respectively, Spain and Norway. They help us to assess whether our model has reached convergence to the posterior distribution. Accordingly, we run the multi-process model with 300.000 iterations for Spain and 600.000 for Norway

The first graph at the top on the left is the trace plot, and "it plots the generated values of the parameter against iteration number" (Advanced Multilevel Modelling using Markov chain Monte Carlo, p.44). In order to have a well-mixed chain it has to look like white noise. As we can see in both graphs the chains appear fairly well mixed. There are no evident fluctuations and the trend itself looks stable around a mean value.

The second graph, at the top on the right side is the kernel density plot and it plots the posterior distribution. As we can see, for both countries, it is an almost symmetric distribution.

The two graphs on the second row are the autocorrelation (on the left side) and the partial autocorrelation (on the right side) functions. In general, they tell us how much the chains are correlated. In particular, in an independent chain we should observe that the two functions move to zero. In our case, the chain's auto correlation function is a slightly persistent but descendent, whereas the partial autocorrelation moves to zero.

Finally, the last graph, on the bottom on the left side, represents a Monte Carlo standard error. This graph explains how much of the error term is due to the fact that we are using that simulation.

Table 2.5 Descriptive statistics Spain from the fertility equation

	Personsix-months					Number of events			
BirthCohort:	Before 1959		After 1959			Before 1959		After 1959	
	Number	%	Number	%		Number	%	Number	%
Firstbirth					Cohabiting	531	8.5	955	23.9
0	31188	52.9	19422	48.9	Married	5692	91.5	3040	76.1
1	27714	47.1	20298	51.1					
Secondbirth					Childless	183	2.9	683	17.1
0	33330	56.6	26578	66.9	Firstbirth	3343	53.7	2114	52.9
1	25572	43.4	13142	33.1	Secondbirth	2697	43.3	1198	30.0
Total	**58902**	100.0	**39720**	100.0		**6223**	100.0	**3995**	100.0

Table 2.6 Descriptive statistics Spain from the fertility equation

	Number of women				
BirthCohort	Before 1959			After 1959	
Number of children	Number		%	Number	%
Childless	183		5.2	683	24.4
Onechild	646		18.3	916	32.7
Twochildren	2697		76.5	1198	42.8
Marital status					
Cohabiting	331		9.4	831	29.7
Married	3195		90.6	1966	70.3
Cohort					
1930-1939	1084	1960-1969	30.7	1434	51.3
1940-1949	1099	1970-1979	31.2	1113	39.8
1950-1959	1343	1980-1990	38.1	250	8.9
Highest Education Level of Respondent					
unknownedu	463		13.1	62	2.2
up to lowersecondary	1598		45.3	224	8.0
uppersecondary	1091		30.9	1546	55.3
Tertiary	374		10.6	965	34.5
Parental divorcebefore 18					
Yes	61		1.7	194	6.9
Total	**3526**		100.0	**2797**	100.0

Table 2.7 Descriptive statistics Norway from the fertility equation

	Personsix-months					Number of events			
	Before		After			Before		After	
BirthCohort	1959		1959			1959		1959	
	Number	%	Number	%		Number	%	Number	%
Firstbirth					Cohabiting	555	10.8	2665	56.4
0	26777	58.4	22319	59.1	Married	4567	89.2	2058	43.6
1	19065	41.6	15431	40.9					
Secondbirth					Childless	273	5.3	911	19.3
0	27116	59.2	24585	65.1	Firstbirth	2693	52.6	2231	47.2
1	18726	40.8	13165	34.9	Secondbirth	2156	42.1	1581	33.5
Total	**45842**	100.0	**37750**	100.0	Total	**5122**	100.0	**4723**	100.0

Table 2.8 Descriptive statistics Norway from the fertility equation

	Number of women				
BirthCohort	**Before 1959**			After 1959	
Number of children	Number	%		Number	%
Childless	273	9.2		911	29.0
Onechild	538	18.1		652	20.8
Twochildren	2155	72.7		1579	50.3
Marital status					
Cohabiting	450	15.2		2116	67.3
Married	2516	84.8		1026	32.7
Cohort					
1930-1939	556	18.7	1960-1969	1442	45.9
1940-1949	1016	34.3	1970-1979	1179	37.5
1950-1959	1394	47.0	1980-1990	521	16.6
Highest Education Level of Respondent					
unknownedu	4	0.1		58	1.8
up to lowersecondary	661	22.3		496	15.8
uppersecondary	1410	47.5		1143	36.4
Tertiary	891	30.0		1445	46.0
Parental divorcebefore 18					
Yes	114	3.8		428	13.6
Total	**2966**	100.0		**3142**	100.0

Table 2.9MCMC estimation for transition into partnership- Spain and Norway-multi process

	Spain		Norway	
From single to marriage	Coeff.	S.E.	Coeff.	
Constant	-7.14***	[0.17]	-9.11***	[0.34]
Duration	0.23***	[0.01]	0.30***	[0.03]
Duration squared	-0.00***	[0.00]	-0.01***	[0.00]
Birth Cohort (ref. 1960-69)				
1970-79	-0.30***	[0.07]	-0.43**	[0.14]
1980-90	0.29+	[0.16]	-0.67*	[0.28]
Level of education				
Missing	-0.61*	[0.24]	0.91**	[0.34]
Tertiary	-1.30***	[0.16]	-1.03***	[0.21]
Upper secondary	-0.45***	[0.12]	-0.72***	[0.20]
Parental Divorce	-0.17	[0.16]	-0.83***	[0.25]
Previous partnership	-0.49+	[0.27]	0.03	[0.25]
Age of current children				
Between 0 and 5	0.60***	[0.15]	0.02	[0.25]
Between 5 and 18	-0.50*	[0.24]	-0.54+	[0.30]
Older than 18	-160.55	[127.88]	-1.53*	[0.72]
From single to cohabitation				
Constant	-8.84***	[0.26]	-6.06***	[0.09]
Duration	0.14***	[0.01]	0.19***	[0.01]
Duration squared	0.00	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-69)				
1970-79	1.17***	[0.11]	0.32***	[0.05]
1980-90	3.08***	[0.18]	0.96***	[0.07]

Level of Education				
Missing	0.13	[0.32]	-1.58***	[0.20]
Tertiary	-0.50**	[0.19]	-0.67***	[0.07]
Upper secondary	-0.27	[0.18]	-0.23***	[0.06]
Parental Divorce	1.05***	[0.15]	0.21***	[0.06]
Previous partnership	3.36***	[0.20]	1.26***	[0.06]
Age of current children				
Between 0 and 5	0.21	[0.16]	-0.19*	[0.07]
Between 5 and 18	-0.18	[0.18]	-0.64***	[0.08]
Older than 18	-0.26	[0.38]	-0.81***	[0.20]
Observations	238208		274898	

Table 2.10MCMC estimation for cohabitation to marriage- cohabitation to separation transition -Spain and Norway- multi-process

	Spain		**Norway**	
From cohabitation to marriage	Coeff.	S.E.	Coeff.	S.E.
Constant	-4.71***	[0.41]	-5.24***	[0.19]
Duration	-0.01	[0.03]	0.12***	[0.01]
Duration squared	-0.00	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-69)				
1970-79	-0.26+	[0.15]	-0.45***	[0.07]
1980-90	-0.87**	[0.28]	-2.24***	[0.24]
Level of Education				
Missing	-1.27*	[0.59]	-0.57	[0.37]
Tertiary	0.09	[0.26]	-0.06	[0.09]
Upper secondary	-0.07	[0.25]	-0.13	[0.09]
Parental Divorce	-0.16	[0.21]	-0.19*	[0.09]
Migrant	0.09	[0.17]	0.22	[0.14]
Previous partnership	-1.01***	[0.25]	-0.28***	[0.08]
Previous children	-0.60***	[0.13]	-0.20***	[0.05]
From cohabitation to separation				
Constant	-7.30***	[0.63]	-5.31***	[0.20]
Duration	0.17***	[0.04]	0.09***	[0.02]
Duration squared	-0.00**	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-69)				
1970-79	0.61*	[0.24]	0.17*	[0.07]
1980-90	0.43	[0.40]	0.27**	[0.10]

Level of Education				
Missing	-0.15	-0.15	0.06	[0.34]
Tertiary	0.01	0.01	-0.02	[0.09]
Upper secondary	-0.02	-0.02	-0.04	[0.09]
Parental Divorce	0.00	0.00	0.48***	[0.08]
Migrant	-0.11	-0.11	-0.08	[0.16]
Previous partnership	-0.47	-0.47	-0.45***	[0.09]
Previous children	-0.59***	-0.59***	-0.65***	[0.06]
Observations	238208	238208	274898	

Table 2.11MCMC estimation for childbirth within partnership (Single-process versus Multi-process estimates) - Spain

	Single Process		Multi Process	
Childless women				
Constant	-4.20***	[0.14]	-3.72***	[0.08]
Partnership duration				
(ref. First two years)				
Up to 3 years	0.67***	[0.06]	0.68***	[0.04]
Up to 6 years	0.71***	[0.08]	0.53***	[0.06]
Morethan6years	0.86***	[0.11]	0.29***	[0.07]
Highest education				
(ref. up to lower secondary)				
Unknown	0.11	[0.22]	-0.23**	[0.08]
Upper secondary	-0.14	[0.11]	-0.20***	[0.05]
Tertiary	-0.60***	[0.12]	-0.63***	[0.06]
Birth cohort				
(ref. 1960-1969)				
1970-79	-0.26***	[0.06]	-0.51***	[0.06]
1980-90	-0.39**	[0.15]	-0.64***	[0.14]
Background characteristics				
Parental Divorce	-0.10	[0.13]	-0.15	[0.11]
Not Migrant	0.27**	[0.09]	0.15+	[0.08]
Partnership dissolution	0.15	[0.18]	-0.59***	[0.18]
Type of union				
Marriage (ref. cohab.)	1.07***	[0.08]	0.62***	[0.07]

Age at partnership				
(ref. 15-20)				
21-25	-0.40***	[0.08]	-0.07	[0.05]
26+	-0.52***	[0.08]	-0.25***	[0.06]
One child women				
Constant	-6.12***	[0.20]	-5.66***	[0.11]
Partnership duration				
(ref. First two years)				
Up to 3 years	-0.30*	[0.15]	0.35***	[0.08]
Up to 6 years	0.29*	[0.14]	1.09***	[0.09]
More than 6 years	0.80***	[0.14]	1.49***	[0.09]
Highest education				
(ref. up to lower secondary)				
Missing	0.28	[0.29]	0.24**	[0.09]
Upper secondary	-0.07	[0.14]	-0.16**	[0.06]
Tertiary	0.29+	[0.16]	0.14+	[0.07]
Birth cohort				
(ref. 1960-69)				
1970-79	0.31***	[0.09]	0.16+	[0.08]
1980-90	0.50+	[0.27]	0.19	[0.26]
Background characteristics				
Parental Divorce	0.13	[0.19]	0.17	[0.14]
Not Migrant	-0.07	[0.13]	-0.04	[0.10]
Partnership dissolution	1.36***	[0.25]	1.55***	[0.22]

Type of union				
Marriage (ref. cohab)	-0.51***	[0.13]	-0.50***	[0.08]
Age at partnership (ref. 15-20)				
21-25	0.21+	[0.11]	-0.03	[0.06]
26+	0.42***	[0.11]	0.11+	[0.06]
Observations	39720		238208	

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

*six month intervals

Table 2.12MCMC estimation for childbirth within partnership (Single-process versus Multi-process estimates) - Norway

	Single Process		Multi Process	
Childless women				
Constant	-3.94***	[0.09]	-3.57***	[0.07]
Partnership duration				
(ref. First two years)				
Up to 3 years	0.56***	[0.06]	0.56***	[0.04]
Up to 6 years	0.55***	[0.08]	0.54***	[0.06]
Morethan6years	0.75***	[0.10]	0.44***	[0.08]
Highest education				
(ref. up to lower secondary)				
Unknown	-0.17	[0.23]	-0.10	[0.24]
Upper secondary	-0.18*	[0.09]	-0.17**	[0.06]
Tertiary	-0.32***	[0.09]	-0.33***	[0.06]
Birth cohort				
(ref. 1960-1969)				
1970-79	-0.27***	[0.06]	-0.35***	[0.06]
1980-90	-1.43***	[0.13]	-1.82***	[0.13]
Background characteristics				
Parental Divorce	-0.05	[0.08]	-0.06	[0.08]
Not Migrant	-0.22+	[0.11]	-0.25**	[0.09]
Partnership dissolution	0.17	[0.07]	-0.19*	[0.08]
Type of union				
Marriage (ref. cohab.)	0.70***	[0.06]	0.66***	[0.05]

Age at partnership				
(ref. 15-20)				
21-25	-0.07	[0.07]	-0.30***	[0.05]
26+	-0.14*	[0.07]	-0.49***	[0.06]
One child women				
Constant	-5.05***	[0.12]	-5.09***	[0.09]
Partnership duration				
(ref. First two years)				
Up to 3 years	-0.48***	[0.10]	0.00	[0.07]
Up to 6 years	0.15	[0.10]	0.74***	[0.07]
More than 6 years	0.37***	[0.11]	1.07***	[0.08]
Highest education				
(ref. up to lower secondary)				
Missing	-0.19	[0.35]	-0.36	[0.33]
Upper secondary	0.15	[0.11]	0.05	[0.07]
Tertiary	0.14	[0.11]	0.11	[0.07]
Birth cohort				
(ref. 1960-69)				
1970-79	0.30***	[0.08]	0.39***	[0.07]
1980-90	1.10***	[0.27]	1.00***	[0.27]
Background characteristics				
Parental Divorce	0.10	[0.11]	0.07	[0.10]
Not Migrant	-0.23	[0.15]	-0.11	[0.11]
Partnership dissolution	0.16*	[0.08]	0.33***	[0.08]

Type of union				
Marriage (ref. cohab)	-0.17*	[0.08]	-0.53***	[0.07]
Age at partnership (ref. 15-20)				
21-25	0.19*	[0.10]	0.18**	[0.06]
26+	0.42***	[0.10]	0.49***	[0.07]
Observations	37750		274898	

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.00

9. Robustness checks

9.1. Dropping all those younger than 30

We ran the model only for those older than 30 years. As we can see from the results in **Table 2.13** Spain MCMC estimation for fertility transitioncoefficients for fertility transitions in Spain remain the same in terms of sign and significance. When it comes to the variance-covariance matrix (Table 2.14Random effects Variance-Covariance Matrix from Multi-process - Spain), the coefficient for the correlation between fertility and marriage in the new analysis is larger and gains in significance.

This is understandable given the exclusion of the younger population which tends to have less traditional values and is maybe also more likely to opt for cohabitation in the early stage of their relationship. Although not significant, the correlations between fertility and cohabitation become positive. This can be explained either by the smaller number of cohabiting and childless couples in the new sample, or by the larger number of non-marital births, given the older average age of the women in the sample.

For Norway, (**Table 2.15**) the coefficients for union type in the multi-process that excludes those under 30 have a smaller size effect for both childless and one-child women. Further, for childless women the coefficient for type of union is less significant. One possible explanation might be the smaller sample size. The results for the other coefficients generally remain the same, except for some loss in significance that, again, may be due to the smaller sample size. As regards the Norwegian variance-covariance matrix (Table 2.16), we see that in the new analysis the correlation between fertility transitions and selection into marriage (from the status of single) turns positive and slightly significant. The same happens to the coefficient for correlation between cohabiting to married and single to married. Norway shows results that are more similar to the Spanish ones. One possible explanation for this is that the older age composition of this sample implies also more marriages. For the other equations, the results remain the same. All in all, also after dropping individuals younger than 30 our results remain the same. In particular, for way, where cohabitation has been widespread for a very long time, the results are even more similar to Spain after this check. This suggests that it is not the group in their 20s which drives the results. If this would have been the case we should have observed Spain diverging even more than Norway, whereas the opposite

happens. We also included diagnostic checks for both countries (**Figure2.10** and **Figure2.11**) and, as we can see, they are good. The chains are well mixed for both countries; the posterior distributions are fairly symmetric too. The chain's auto correlation function moves to zero in the case of Spain and is slightly persistent but descendent in the case of Norway. The partial autocorrelation moves to zero in both countries.

Table 2.13 Spain MCMC estimation for fertility transition

	Single Process		Multi Process	
Childless women				
Constant	-4.22***	[0.16]	-4.00***	[0.17]
Partnership duration (ref. First two years)				
Up to 3 years	0.56***	[0.07]	0.57***	[0.07]
Up to 6 years	0.73***	[0.09]	0.75***	[0.09]
More than 6 years	0.90***	[0.12]	0.93***	[0.11]
Highest education (ref. up to lower secondary)				
Unknown	0.42	[0.25]	0.34	[0.26]
Upper secondary	-0.15	[0.13]	-0.17	[0.13]
Tertiary	-0.48***	[0.14]	-0.54***	[0.14]
Birth Cohort (ref. 1960-1969)				
1970-76	-0.23**	[0.07]	-0.26***	[0.08]
Background characteristics				
Parental Divorce	-0.22	[0.17]	-0.25	[0.17]
Not Migrant	0.24*	[0.12]	0.20+	[0.12]
Partnership dissolution	0.11	[0.21]	-0.14	[0.23]
Type of Union				
Marriage (ref. cohab.)	1.01***	[0.10]	0.74***	[0.14]
Age at partnership (ref. 15-20)				
21-25	-0.29**	[0.09]	-0.27**	[0.10]
26+	-0.48***	[0.09]	-0.39**	[0.13]
One child women				
Constant	-6.31***	[0.22]	-6.04***	[0.24]
Partnership duration (ref. First two years)				
Up to 3 years	-0.16	[0.17]	-0.17	[0.17]
Up to 6 years	0.32*	[0.15]	0.32*	[0.15]
More than 6 years	0.80***	[0.16]	0.79***	[0.16]
Highest education (ref. up to lower secondary)				
Unknown	0.24	[0.31]	0.26	[0.31]
Upper secondary	-0.00	[0.15]	-0.00	[0.15]
Tertiary	0.31+	[0.17]	0.32+	[0.17]
Birth Cohort (ref. 1960-1969)				
1970-76	0.23*	[0.10]	0.22*	[0.10]
Background characteristics				
Not Migrant	0.03	[0.15]	0.05	[0.15]
Parental Divorce	0.20	[0.22]	0.21	[0.22]
Partnership dissolution	1.34***	[0.27]	1.33***	[0.27]
Type of Union				
Marriage (ref. cohab.)	-0.40**	[0.15]	-0.47**	[0.15]
Age at partnership (ref. 15-20)				
21-25	0.14	[0.11]	0.14	[0.11]
26+	0.38***	[0.12]	0.39***	[0.12]
Observations	33712		141594	

Standard errors in brackets $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.14 Random effects Variance-Covariance Matrix from Multi-process - Spain

	Single to married	Single to cohabiting	Cohabiting to married	Cohabiting to separated	Fertility transition
Single to married	0.58***				
	[0.10]				
Single to cohabiting	0.12	3.44***			
	[0.13]	[0.45]			
Cohabiting to married	0.08	-0.14	0.94**		
	[0.11]	[0.25]	[0.29]		
Cohabiting to separated	0.45*	-0.77+	0.01	2.89**	
	[0.21]	[0.46]	[0.37]	[1.05]	
Fertility transition	0.26***	0.08	0.63***	0.21	0.83***
	[0.06]	[0.10]	[0.11]	[0.18]	[0.05]
Observations 370466					
Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001					

Figure2.10 Spain diagnostics checks

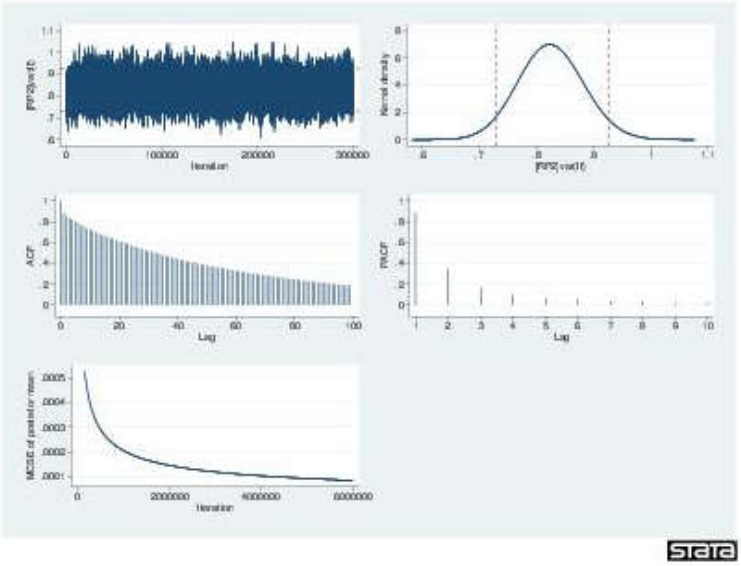


Table 2.15 Norway MCMC estimation for fertility transition

	Single Process		Multi Process	
Childless Women				
Constant	-3.94***	[0.10]	-3.87***	[0.10]
Partnership duration (ref. First two years)				
Up to 3 years	0.56***	[0.07]	0.67***	[0.07]
Up to 6 years	0.47***	[0.09]	0.69***	[0.08]
More than 6 years	0.68***	[0.11]	1.03***	[0.10]
Highest education (ref. up to lower secondary)				
Unknown	-0.13	[0.28]	-0.16	[0.29]
Upper secondary	-0.10	[0.09]	-0.11	[0.10]
Tertiary	-0.19*	[0.09]	-0.21*	[0.10]
Birth cohort (ref. 1960-1969)				
1970-77	-0.17**	[0.06]	-0.21**	[0.07]
Background characteristics				
Parental Divorce	0.00	[0.09]	0.03	[0.10]
Not Migrant	-0.20+	[0.12]	-0.10	[0.13]
Partnership dissolution			-0.28**	[0.10]
Type of union				
Marriage (re. cohab.)	0.62***	[0.06]	0.23**	[0.07]
Age at partnership (ref. 15-20)				
21-25	-0.10	[0.07]	-0.03	[0.08]
26+	-0.22**	[0.07]	-0.01	[0.09]
One child women				
Constant	-4.98***	[0.13]	-4.74***	[0.13]
Partnership duration (ref. First two years)				
Up to 3 years	-0.42***	[0.11]	-0.53***	[0.11]
Up to 6 years	0.23*	[0.11]	0.08	[0.11]
More than 6 years	0.39***	[0.11]	0.22+	[0.11]
Highest education (ref. up to lower secondary)				
Missing	-0.04	[0.41]	-0.12	[0.41]
Upper secondary	0.13	[0.12]	0.10	[0.12]
Tertiary	0.07	[0.12]	0.05	[0.12]
Birth cohort (ref. 1960-1969)				
1970-77	0.24**	[0.08]	0.22**	[0.08]
Background characteristics				
Not Migrant	-0.18	[0.16]	-0.20	[0.16]
Parental Divorce	0.11	[0.12]	0.09	[0.12]
Partnership dissolution	0.15+	[0.08]	0.02	[0.10]
Type of union				
Marriage (re. cohab.)	-0.11	[0.08]	-0.29***	[0.09]
Age at partnership (ref. 15-20)				
21-25	0.13	[0.10]	0.15	[0.10]
26+	0.36**	[0.11]	0.38***	[0.11]
Observations	31008		185164	

Standard errors in brackets
+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2.16 Random effects Variance-Covariance Matrix from Multi-process - Norway

	Single to married	Single to cohabiting	Cohabiting to married	Cohabiting to separated	Fertility transition
Single to married	2.11***				
	[0.50]				
Single to cohabiting	-0.18	0.56***			
	[0.17]	[0.07]			
Cohabiting to married	0.30*	0.08+	0.60***		
	[0.14]	[0.05]	[0.10]		
Cohabiting to separated	0.17	0.08+	0.44***	0.37***	
	[0.14]	[0.05]	[0.07]	[0.11]	
Fertility transition	0.25*	0.18***	0.60***	0.46***	0.68***
	[0.10]	[0.04]	[0.06]	[0.08]	[0.07]
Observations 185164					

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Figure2.11 Norway diagnostics checks

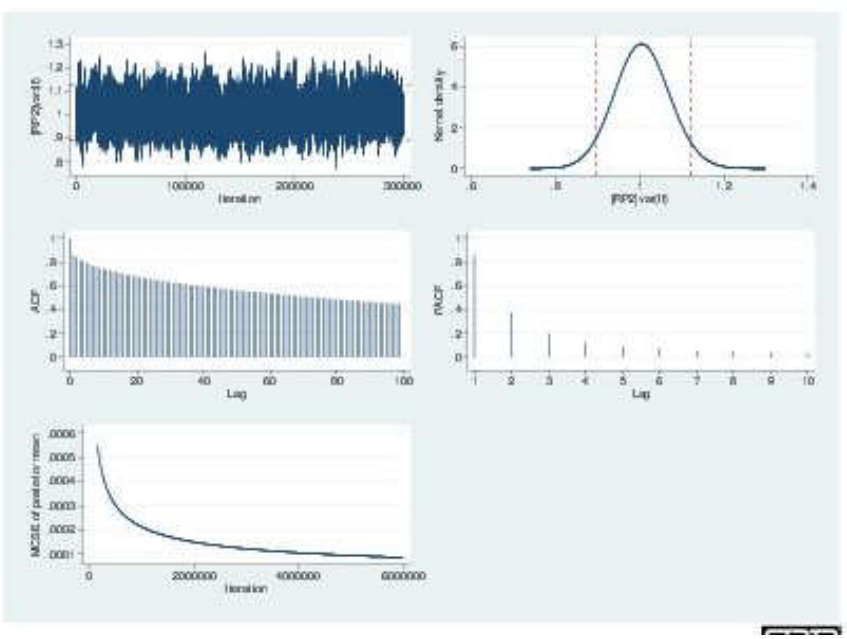


Table 2.17MCMC estimation for transition into partnership-Spain and Norway-multi process

	Spain		Norway	
From single to marriage				
Constant	-6.93***	[0.17]	-9.17***	[0.37]
Duaration	0.22***	[0.01]	0.29***	[0.03]
Duaration squared	-0.00***	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-1969)				
1970-77	-0.34***	[0.08]	-0.47**	[0.16]
Level of education (ref. up to secondary)				
Missing	-0.69*	[0.27]	0.52	[0.42]
Upper secondary	-0.45***	[0.13]	-0.62**	[0.23]
Tertiary	-1.27***	[0.16]	-0.90***	[0.22]
Parental Divorce	-0.27	[0.20]	-0.74**	[0.27]
Previous partnership	-0.19	[0.28]	-0.01	[0.25]
Age of current child				
Between 0 and 5	0.39*	[0.17]	-0.06	[0.26]
Between 5 and 18	-0.66*	[0.27]	-0.56+	[0.30]
Older than 18	-1.70*	[70.84]	-1.58*	[0.71]
From single to cohabitation				
Constant	-8.56***	[0.35]	-5.86***	[0.10]
Duaration	0.08***	[0.02]	0.16***	[0.01]
Duaration squared	0.00***	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-1969)				
1970-77	0.64***	[0.14]	0.28***	[0.05]
Level of education (ref. up to secondary)				
Missing	0.20	[0.46]	-1.63***	[0.25]
Upper secondary	-0.52*	[0.25]	-0.18*	[0.08]
Tertiary	-0.63*	[0.27]	-0.58***	[0.08]
Parental Divorce	1.54***	[0.27]	0.21**	[0.07]
Previous partnership	3.83***	[0.27]	1.22***	[0.07]
Age of current child				
Between 0 and 5	0.04	[0.21]	-0.19*	[0.08]
Between 5 and 18	-0.56*	[0.23]	-0.62***	[0.08]
Older than 18	-0.42	[0.41]	-0.77***	[0.21]
Observations	141594		185164	

Table 2.18MCMC estimation for cohabitation to marriage- cohabitation to separation transition -Spain and Norway-multi process

	Spain		Norway	
From cohabitation to marriage				
Constant	-4.38***	[0.44]	-5.21***	[0.21]
Duration	-0.05	[0.03]	0.12***	[0.01]
Duration squared	0.00	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-1969)				
1970-77	-0.13	[0.16]	-0.38***	[0.07]
Level of education (ref. up to secondary)				
Missing	-0.74	[0.59]	-0.71+	[0.43]
Upper secondary	0.01	[0.29]	-0.12	[0.10]
Tertiary	0.20	[0.30]	-0.03	[0.10]
Parental Divorce	-0.32	[0.29]	-0.18+	[0.10]
Migrant	-0.19	[0.21]	0.26+	[0.15]
Previous partnership	-1.17***	[0.28]	-0.39***	[0.08]
Previous children	-0.55***	[0.15]	-0.21***	[0.05]
From cohabitation to separation				
Constant	-7.93***	[0.82]	-5.54***	[0.23]
Duration	0.17***	[0.04]	0.11***	[0.02]
Duration squared	-0.00*	[0.00]	-0.00***	[0.00]
Birth Cohort (ref. 1960-1969)				
1970-77	0.52+	[0.30]	0.16*	[0.07]
Level of education (ref. up to secondary)				
Missing	-0.54	[0.97]	0.05	[0.40]
Upper secondary	0.16	[0.55]	0.04	[0.11]
Tertiary	0.12	[0.57]	0.01	[0.11]
Parental Divorce	-0.17	[0.49]	0.45***	[0.09]
Migrant	0.09	[0.36]	0.02	[0.18]
Previous partnership	-0.47	[0.37]	-0.42***	[0.10]
Previous children	-0.54**	[0.20]	-0.68***	[0.07]
Observations	141594		185164	

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

9.2. Time invariant covariates

We include observable time invariant covariates that are known to be of importance for fertility transitions, like education level and background characteristics. Although it is not theoretically required to include them for identification, the model is not able to be identified empirically if we remove them. For instance, for the equation for selection into partnership, in order to choose controls variables, we follow the literature on multi process models (Steele et al., 2005). Further, to be sure that including them would not bias the results, we did an additional robustness check running the fertility single process model excluding time invariant covariates. For our main explanatory variables, both the size and significance are not that different from those in our full specification (Table 2.19and Table 2.20). Further, we tried to launch the multi-process for these specifications. However, as already anticipated, the model could not be identified and the software was unable to estimate it.

Table 2.19 Spain -single process for fertility transitions with and without time invariant

	Model 1		Model 2		Model 3	
Childless women						
Constant	-4.28***	[0.05]	-4.32***	[0.06]	-4.04***	[0.07]
Partnership duration (ref. First two years)						
Upto3years			0.65***	[0.04]	0.68***	[0.04]
Upto6years			0.51***	[0.06]	0.54***	[0.06]
Morethan6years			0.31***	[0.07]	0.32***	[0.07]
Age at partnership						
21-25			-0.13*	[0.05]	-0.08+	[0.05]
26+			-0.44***	[0.05]	-0.31***	[0.05]
Type of Union						
Cohabitation	0.94***	[0.05]	1.05***	[0.06]	0.97***	[0.06]
Highest education (ref. up to lower secondary)						
Unknown					-0.21**	[0.08]
Upper secondary					-0.29***	[0.05]
Tertiary					-0.72***	[0.06]
One child women						
Constant	-4.63***	[0.06]	-6.00***	[0.10]	-5.78***	[0.10]
Partnership duration (ref. First two years)						
Up to 3 years			0.35***	[0.08]	0.34***	[0.08]
Up to 6 years			1.06***	[0.09]	1.05***	[0.09]
More than 6 years			1.43***	[0.09]	1.44***	[0.09]
Age at partnership						
21-25			0.00	[0.06]	-0.03	[0.06]
26+			0.22***	[0.06]	0.15*	[0.06]
Type of Union						
Cohabitation	-0.77***	[0.08]	-0.75***	[0.08]	-0.68***	[0.08]
Highest education (ref.up to lower secondary)						
Unknown					0.23**	[0.09]
Upper secondary					0.22**	[0.07]
Tertiary					-0.11*	[0.05]
Observations	98622		98622		98622	

Standard errors in brackets
$^{+}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

covariates

Table 2.20 Norway-single process for fertility transitions with and without time invariant covariates

	Model 1		Model 2		Model 3	
Childless women						
Constant	-4.22***	[0.03]	-4.25***	[0.05]	-4.10***	[0.06]
Partnership duration (ref. First two years)						
Upto3years			0.52***	[0.04]	0.54***	[0.04]
Upto6years			0.49***	[0.06]	0.52***	[0.06]
Morethan6years			0.40***	[0.08]	0.42***	[0.08]
Age at partnership						
21-25			-0.29***	[0.05]	-0.22***	[0.05]
26+			-0.49***	[0.05]	-0.40***	[0.05]
Type of Union						
Cohabitation	0.89***	[0.04]	1.13***	[0.04]	1.11***	[0.04]
Highest education (ref. up to lower secondary)						
Unknown					-0.56**	[0.22]
Upper secondary					-0.14*	[0.06]
Tertiary					-0.35***	[0.06]
One child women						
Constant	-4.37***	[0.04]	-5.50***	[0.08]	-5.41***	[0.09]
Partnership duration (ref. First two years)						
Up to 3 years			0.03	[0.07]	0.03	[0.07]
Up to 6 years			0.77***	[0.07]	0.76***	[0.07]
More than 6 years			1.06***	[0.08]	1.06***	[0.08]
Age at partnership						
21-25			0.19**	[0.06]	0.15*	[0.06]
26+			0.54***	[0.06]	0.51***	[0.07]
Type of Union						
Cohabitation	-0.67***	[0.06]	-0.68***	[0.06]	-0.67***	[0.06]
Highest education (ref.up to lower secondary)						
Unknown					-0.26	[0.32]
Upper secondary					0.04	[0.07]
Tertiary					0.16*	[0.07]
Observations	83592		83592		83592	

Standard errors in brackets
$^{+}p < 0.1$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

9.3. All cohorts together

We tried to estimate a model for older cohorts only (i.e. before 1960). However, due to the small number of cohabitation cases in this group (especially in Spain), it was not possible to identify and estimate the model. Apart from descriptives from the previous period, we also ran both single and multi-process models including older cohorts together with the younger ones. As we can see fromTable 2.21 to Table 2.25, the results are quite similar to those we present in the paper. In particular, in the specification with only younger cohorts the coefficient of our main explanatory variable is almost double in size. Nonetheless the differences/convergences between Norway and Spain stay the same.

Table 2.21 Spain and Norway MCMC estimation for fertility transition

	Spain		Norway	
	Coefficient	SE	Coefficients	SE
Childless women				
Constant	-3.78***	[0.10]	-3.37***	[0.09]
Partnership duration (ref= first two years)				
Up to 3 years	0.70***	[0.04]	0.62***	[0.04]
Up to 6 years	0.57***	[0.06]	0.52***	[0.06]
More than 6	0.31***	[0.07]	0.53***	[0.08]
Highest education level (ref.=up to lower secondary)				
Missing	-0.20**	[0.08]	-0.25	[0.24]
Upper secondary	-0.12*	[0.05]	-0.21***	[0.06]
Tertiary	-0.59***	[0.07]	-0.43***	[0.07]
Birth cohort (ref= 1940-1949)				
1930-39	0.21**	[0.07]	-0.15+	[0.08]
1950-59	0.06	[0.07]	-0.18**	[0.07]
1960-69	-0.18*	[0.07]	-0.23**	[0.07]
1970-79	-0.58***	[0.08]	-0.56***	[0.08]
1980-90	-0.66***	[0.16]	-2.02***	[0.14]
Background Characteristics				
Parental Divorce	-0.15	[0.11]	-0.06	[0.08]
Not Migrant	0.19*	[0.08]	-0.22*	[0.09]
Partnership dissolution	-0.70***	[0.18]	-0.60***	[0.08]
Type of union				
Marriage (ref=Cohabitation)	0.45***	[0.09]	0.38***	[0.06]
Age (ref=from 18 to 21)				
21-25	0.02	[0.06]	-0.12*	[0.05]
25+	0.04	[0.09]	-0.02	[0.07]
One child women				
Constant	-5.51***	[0.13]	-5.07***	[0.11]
Partnership duration (ref= first two years)				
Up to 3 years	0.30***	[0.08]	-0.05	[0.07]
Up to 6 years	1.12***	[0.09]	0.74***	[0.07]
More than 6 years	1.54***	[0.09]	0.98***	[0.08]
Highest education level (ref.=up to lower secondary)				
Missing	0.15+	[0.09]	-0.35	[0.33]
Upper secondary	-0.01	[0.06]	0.07	[0.07]
Tertiary	0.34***	[0.08]	0.10	[0.07]
Birth cohort (ref= 1940-1949)				
1930-39	-0.13+	[0.07]	0.07	[0.07]
1950-59	-0.43***	[0.08]	0.35***	[0.08]
1960-69	-0.44***	[0.08]	0.59***	[0.09]
1970-79	-0.16	[0.11]	1.17***	[0.28]
1980-90	-0.12	[0.27]	0.02	[0.09]
Background Characteristics				

Parental Divorce	0.18	[0.14]	0.06	[0.10]
Not Migrant	-0.00	[0.10]	-0.14	[0.11]
Partnership dissolution	1.60***	[0.22]	0.26**	[0.08]
Type of union				
Marriage (ref=Cohabitation)	-0.51***	[0.08]	-0.45***	[0.07]
Age (ref=from 18 to 21)				
21-25	-0.07	[0.06]	0.20**	[0.06]
25+	0.04	[0.07]	0.49***	[0.07]
Person-years*	68491		433750	

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001
*six month intervals

Table 2.22 Random effects Variance-Covariance Matrix from Multi-process - Spain

	Single to married	Single to cohabitating	Cohabiting to married	Cohabiting to separated	Fertility transition
Single to married	0.62***				
	[0.10]				
Single to cohabiting	0.20+	2.42***			
	[0.11]	[0.30]			
Cohabiting to married	0.11	-0.29+	0.87***		
	[0.09]	[0.16]	[0.21]		
Cohabiting to separated	0.43**	-0.42	0.14	2.11**	
	[0.16]	[0.26]	[0.26]	[0.67]	
Fertility transition	0.27***	0.06	0.65***	0.24	0.82***
	[0.05]	[0.08]	[0.10]	[0.15]	[0.05]

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table 2.23 Random effects Variance-Covariance Matrix from Multi-process - Norway

	Single to married	Single to cohabitating	Cohabiting to Married	Cohabiting to Separated	Fertility transition
Single to married	0.62***				
	[0.13]				
Single to cohabiting	0.14**	0.43***			
	[0.05]	[0.04]			
Cohabiting to married	0.20***	0.14***	0.37***		
	[0.06]	[0.03]	[0.05]		
Cohabiting to separated	0.21^{+}	0.09**	0.31***	0.41***	
	[0.11]	[0.03]	[0.05]	[0.11]	
Fertility transition	0.45***	0.26***	0.56***	0.56***	1.02***
	[0.05]	[0.03]	[0.04]	[0.06]	[0.06]

Figure2.12*Spain- diagnostic checks*

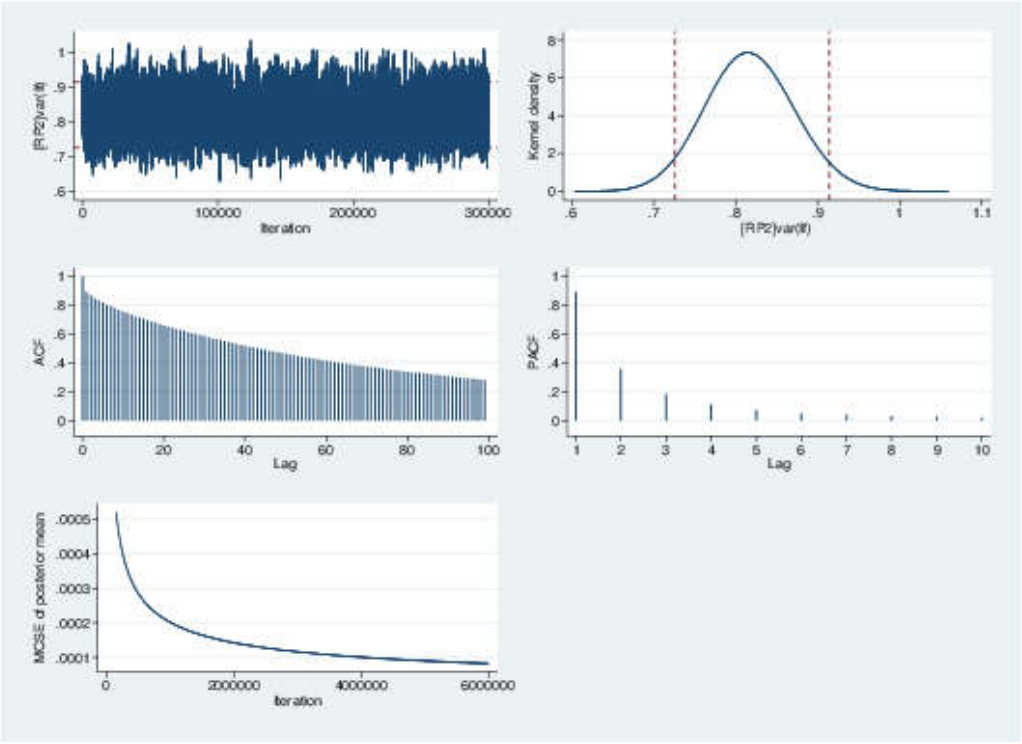
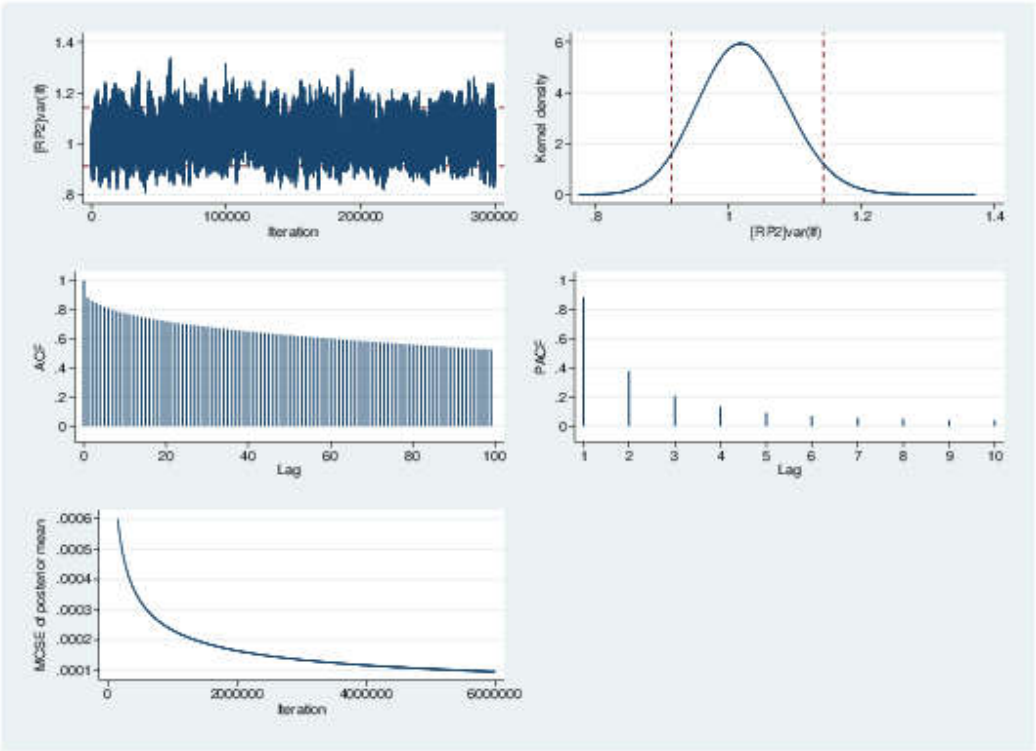


Figure2.13*Norway- diagnostic checks*



	Spain		Norway	
From single to marriage	Coeff.	S.E.	Coeff.	
Constant	-8.03***	[0.12]	-6.94***	[0.13]
Duration	0.29***	[0.01]	0.28***	[0.01]
Duration squared	-0.00***	[0.00]	-0.01***	[0.00]
Birth Cohort				
1940-49	0.41***	[0.06]	0.05	[0.07]
1950-59	0.70***	[0.07]	-0.54***	[0.08]
1960-69	0.25***	[0.07]	-1.48***	[0.10]
1970-79	-0.05	[0.08]	-1.82***	[0.12]
1980-90	0.65***	[0.15]	-2.20***	[0.25]
Level of education				
Missing	0.13+	[0.07]	-0.03	[0.22]
Tertiary	-0.96***	[0.07]	-0.90***	[0.08]
Upper secondary	-0.18***	[0.05]	-0.34***	[0.07]
Parental Divorce	-0.07	[0.12]	-0.10	[0.12]
Previous partnership	-0.94***	[0.19]	-0.59***	[0.13]
Age of actual children				
Between 0 and 5	0.73***	[0.09]	-0.31**	[0.11]
Between 5 and 18	-0.56***	[0.16]	-0.87***	[0.14]
Older than 18	-2.14***	[0.44]	-1.52***	[0.26]
From single to cohabitation				
Constant	-10.02***	[0.25]	-7.87***	[0.12]
Duration	0.16***	[0.01]	0.16***	[0.01]
Duration squared	-0.00***	[0.00]	-0.00***	[0.00]
Birth Cohort				
1940-49	0.06	[0.16]	0.69***	[0.11]
1950-59	0.83***	[0.16]	1.53***	[0.11]
1960-69	1.32***	[0.15]	2.05***	[0.11]
1970-79	2.36***	[0.16]	2.35***	[0.11]
1980-90	4.25***	[0.23]	2.93***	[0.12]
Level of Education				
Missing	0.48**	[0.16]	-1.52***	[0.18]
Tertiary	-0.52***	[0.13]	-0.60***	[0.05]
Upper secondary	-0.39***	[0.11]	-0.24***	[0.05]
Parental Divorce	1.14***	[0.14]	0.20***	[0.05]
Previous partnership	3.03***	[0.18]	1.13***	[0.05]
Age of actual children				
Between 0 and 5	0.60***	[0.13]	-0.04	[0.06]
Between 5 and 18	-0.34*	[0.15]	-0.60***	[0.06]
Older than 18	-0.86***	[0.24]	-0.70***	[0.10]
Observations	407883		433750	

Table 2.24MCMC estimation for transition into partnership- Spain and Norway

Table 2.25MCMC estimation for cohabitation to marriage- cohabitation to separation transition -Spain and Norway-

	Spain		Norway	
From cohabitation to marriage	Coeff.	S.E.	Coeff.	S.E.
Constant	-5.72***	[0.34]	-3.82***	[0.18]
Duration	-0.08***	[0.02]	0.01	[0.01]
Duration squared	0.00**	[0.00]	-0.00***	[0.00]
Birth Cohort				
1940-49	0.68*	[0.32]	0.10	[0.15]
1950-59	1.14***	[0.28]	-0.38**	[0.14]
1960-69	1.06***	[0.28]	-0.90***	[0.14]
1970-79	0.78**	[0.28]	-1.38***	[0.15]
1980-90	0.18	[0.36]	-3.28***	[0.27]
Level of Education				
Missing	-0.34	[0.28]	-0.83**	[0.32]
Tertiary	0.41*	[0.18]	0.06	[0.06]
Upper secondary	0.23	[0.17]	0.04	[0.06]
Parental Divorce	-0.16	[0.18]	-0.23**	[0.08]
Migrant	0.12	[0.14]	0.25*	[0.10]
Previous partnership	-1.01***	[0.20]	-0.73***	[0.06]
Previous children	-0.80***	[0.10]	-0.11**	[0.04]
From cohabitation to separation				
Constant	-10.00***	[0.72]	-6.78***	[0.47]
Duration	0.09**	[0.03]	0.11***	[0.01]
Duration squared	-0.00+	[0.00]	-0.00***	[0.00]
Birth Cohort				
1940-49	0.45	[0.63]	1.17*	[0.46]
1950-59	1.83***	[0.52]	1.10*	[0.44]
1960-69	2.23***	[0.53]	1.31**	[0.44]
1970-79	2.84***	[0.54]	1.47***	[0.44]
1980-90	2.70***	[0.61]	1.59***	[0.45]
Level of Education				
Missing	-0.09	[0.45]	-0.05	[0.31]
Tertiary	0.60+	[0.31]	0.01	[0.08]
Upper secondary	0.45	[0.29]	-0.05	[0.08]
Parental Divorce	0.08	[0.26]	0.49***	[0.08]
Migrant	0.14	[0.22]	-0.03	[0.14]
Previous partnership	-0.25	[0.27]	-0.54***	[0.08]
Previous children	-0.38**	[0.12]	-0.70***	[0.06]
Observations	407883		433750	

9.4. Sensitivity analysis

We preferred not to set a threshold in order to not add additional selection bias in the sample. Further, we did conduct a robustness check dropping all those younger than 30 years old, believing that "shacking up" is far more likely among the young. Our results do not change. To make this point clearer, in the additional material we include two graphs (Figure2.14 and Figure2.15) in which we plot the distribution of partnership durations (in semesters), both before and after dropping the young for both Norway and Spain.

Figure2.14 Minimum partnership duration before and after dropping individuals younger than 30 -Spain-

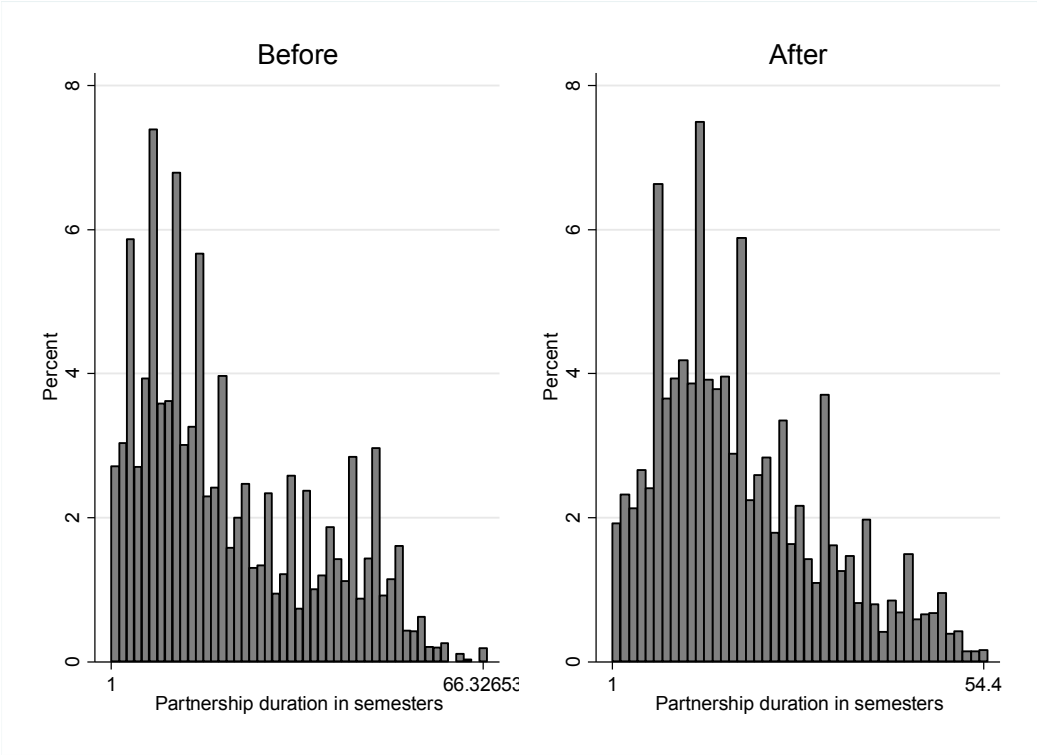
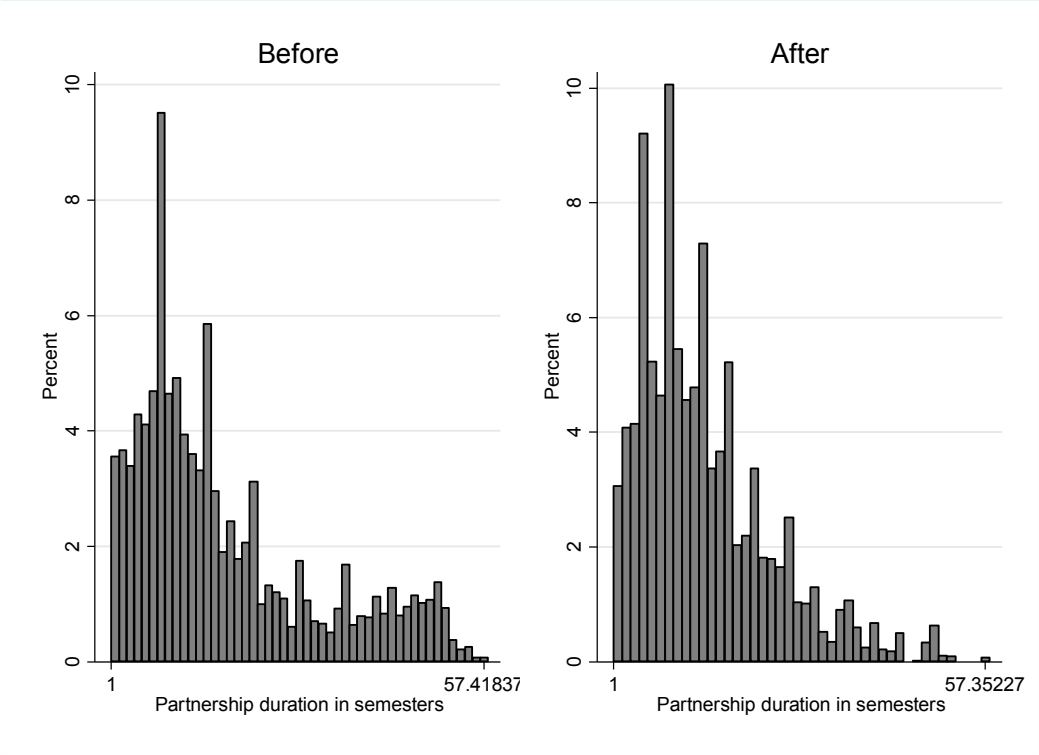


Figure2.15 Minimum partnership duration before and after dropping individuals younger than 30 -Norway-



As we see in the histogram (Figure2.14 and Figure2.15), the distribution, of course, changes a little bit when the sample is older. The results remain, however, quite similar to the specification of the model showed in the paper.

Chapter 3
Counting on Potential Grandparents? Adult Children's Entry into Parenthood across European Countries

---

Abstract

This study investigates whether would-be grandparents' propensity to care for their grandchildren influences their adult child's transition into parenthood. At the time of this transition, it is not observable whether adult children can count on their parents as a source of childcare provision. To overcome this, the author constructs a measure based on the characteristics of actual grandparents and adult children to act as a proxy for future childcare provision. Considering national context, the author estimates distinct models for different groups of countries.Comparison across 11 countries from the first two waves of the Survey of Health, Aging, and Retirement in Europe reveal that grandparental childcare propensity has a positive and significant effect on the transition into parenthood for both pronatalist (Belgium, France) and protraditional countries(Austria, Germany, Greece, Italy, Spain, and Switzerland). The findings contribute to a growing literature on the relationship between formal and informal childcare systems to understand fertility.

1. Introduction

How parents influence their adult children's fertility decisions is quite overlooked. Surprisinglyso, considering their importance in terms of intergenerational exchanges. Most fertility research focuses mainly on either individuals or two partners, and little attention has been devoted to other family members, such as the prospective grandparents—who remain important figures in a person's life in terms of providing emotional and substantive support. Due to demographic shifts, notably the increase in age at first birth and in longevity, parents are now more likely to spend more of their life with their children (Bengtson, Rosenthal, &Burton, 1990; Bengtson, 2001). This alone implies that their role can become more significant (Gauthier, 2002; Uhlenberg, 2004). This study focuses on prospective grandparents' role in their adult children's transition into parenthood. Would-be grandparents are often the main available or affordable source of informal childcare (Fergusson, Maughan, & Golding, 2008). In other words, prospective grandparents may play a decisive role for their offspring in terms of helping reconcile work and family life.

The massive increase in female labor-force participation has converted women's spare time into a scarce resource. For parents, childcare burdens can be costly in terms of foregone income (or leisure) (Becker, 1981; Morgan, 2003). In this context, actual or expected input from prospective grandparents provides more flexibility and increases prospective parents' trust in the possibility of reconciling work and family life. And yet, receiving support from the older generation may depend very much on their age and health. If the parents of the adult child are frail, they may need to receive rather than provide care.

Entry into parenthood is a very important event in an individual's life (Rindfuss, Guilkey, Morgan, Kravdal, & Guzzo, 2007). It dramatically affects happiness and how daily life is organized (Myrskylä & Margolis, 2014; Nomaguchi & Milkie, 2003). The first experience of parenthood is also likely to influence subsequent fertility transitions (Margolis & Myrskylä, 2015; Newman, 2008). The choice of having a first child is mainly affective, whereas the decisions guiding higher parities tend to be more rational—e.g. to provide a sibling for the first child (Morgan, 2003). Yet, although these specific reasons differ slightly from each other, they are both based on the same general logic related to the concept of "family building" (Morgan, 2003). At a time as unique as

the transition into parenthood, adult children's perceptions and expectations of having their own children could be influenced by how involved their parents might be as grandparents.

The few studies that explore the role of parental support for adult children's fertility focus on the transition from the first to the second or subsequent births (e.g. Aassve, Meroni, &Pronzato, 2012; Thomese&Liefbroer, 2013).Research on entry into parenthood is scarce—in particular studies focusing on would-be grandparents' characteristics.

This study tries to fill this gap by exploring how the characteristics of would-be grandparents may influence the onset of family building.As argued by Pfau-Effinger (2005), whether one type of care is preferred to another is due to the interplay of cultural values, family models, and public policies. Yet the interplay between formal and informal care, and the ways in which individuals divide family responsibilities across different countries, may lead to distinct scenarios (Arber & Timonen, 2012). A second contribution of this study is to consider macro-level heterogeneity in terms of the role potential grandparents play in first-birth transitions. In this way, we can explore how would-be grandparents' different propensities for providing childcare influence couples' transition into parenthood across different European contexts.

I address the following research questions: Are adult children's transition into parenthood influenced by the characteristics of their parents, as would-be grandparents, inasmuch as these signal the likelihood of future childcare provision? Is there cross-country variation in such a relationship?

The contribution this study makes is threefold. First, it looks specifically at the role played by the characteristics of would-be grandparents. Second, by focusing on first-birth transitions, it contributes to the literature on determinants of transition into parenthood. Third, given the interplay between institutional context and individual fertility behaviors, the study adopts a cross-national comparative design—i.e. distinct analyses are carried out for different groups of countries. In other words, this study provides an indirect test of how intergenerational relationships across different welfare regimes influence fertility.

2.Background

2.1 The Influence of Grandparents on Fertility at the Micro Level

At the individual level, parents stand out among other relatives and friends for the significant help they provide to their adult children (e.g. Fergusson et al., 2008), both in terms of time and money (see Coall & Hertwig, 2010 and 2011 for an overview). Parents in the role of grandparents can provide a considerable amount of childcare (Aassve et al., 2012b; Gauthier, 2002; Mathews &Sear, 2013; Thomese&Liefbroer, 2013). Also, grandparents have a positive impact on their adult children in terms of female labor-force participation (Aassve, Arpino, & Goisis, 2012a) and fertility (Aassve et al., 2012b; Thomese & Liefbroer, 2013).

A comprehensive literature has investigated which factors make grandparental childcare provision more likely. Thomese and Liefbroer (2013) showed that the probability of having another child is an increasing function of the number of active grandparents, and that it decreases with geographical distance between grandparents and their adult children. Geographical proximity to their parents facilitates adult children's work and family balance as well, especially if there is more than one young child in the household (Compton & Pollak, 2014). Furthermore, as argued by Heylen, Mortelmans, Hermans, and Boudiny (2012), if couples live close to their parents before they have children, this influences their expectations. It gives them a clearer idea of what kind of future help they could obtain.

Besides their mere presence, grandparental characteristics—i.e. health condition, time constraints, and personal preferences—as well as the overall family structure are key features that influence the adult children's fertility behaviors (Aassve et al., 2012b). For grandparents to be perceived as a potential source of childcare, they need to take interest in this activity, have time for it, and be sufficiently healthy and energetic to look after infants or toddlers—often more than one.

Grandparental childcare provision is especially important in the first years of the newborn's life (Silverstein &Marenco, 2001), and first-born or only children tend to be greater recipients of grandparental childcare than subsequent siblings (Fergusson et al., 2008). This underpins the importance of focusing on first birth. Gender bias is another factor that shapes the nature of grandparental childcare provision: Grandmothers are

typically more involved than grandfathers, especially at high level of childcare intensity (Hank & Buber, 2009; Wheelock & Jones, 2002). Finally, the grandparent's age has a negative impact on childcare provision: the older they are, the lower their level of support (Aassve et al., 2012b; Kaptijn, Thomese, Van Tilburg, & Liefbroer, 2010; Thomese & Liefbroer, 2013).

In this study, grandparental characteristics are both a proxy for future childcare provision and a predictor of the future care adult children may have to provide. Prior research has placed little importance on grandparental characteristics, paying more attention to either the demographics of the couples, i.e. the adult children and would-be parents, or to the demographics of the grandchild. In this study, I consider the characteristics of both the prospective grandparents and the prospective parents at the same time. The presence of healthy potential grandparents should increase the potential parents' expectations of future childcare provision with a consequent positive effect on first-birth transition. Nonetheless, the opposite may also be true. We could argue that healthier grandparents have a more active lifestyle, which may not be compatible with looking after grandchildren. In addition, if high-intensity childcare is required, this may be a barrier for any potential grandparenting.

Following Aassve and his colleagues (2012b), beyond health and time constraints, grandparents also need to show a preference for family responsibilities. Improvement in later-life conditions has led to more heterogeneity among older people in terms of retirement age, family duties, and involvement in social activities. As Timonen and Arber (2012, p.16) state, "The current idea of 'active' and 'successful' ageing point in the direction of self-actualization and personal choices around leisure time use, which may not be straightforwardly compatible with extensive provision of grandchildcare." (See also Arpino & Bordone, 2015). On the one hand, grandparents need enough time to devote to childcare, especially when the grandchildren are very young. Employed or active grandparents, for instance, are more time constrained. In this case, entry into parenthood may be discouraged unless the adult child has alternatives to informal grandparental childcare. On the other hand, entry into grandparenthood, as explained by Van Baveland De Winter (2013), may accelerate retirement, especially for women. In this article, I take all these conditions into account and investigate their joint effect on adult children's first-birth transitions.

2.2 The Interaction between the Role of Grandparents and the Type of Context

The role played by grandparents in terms of fertility may vary according to the distinct "care regimes" (Pfau-Effinger, 2004) and contexts (Arber & Timonen, 2012; Jappens & Van Bavel, 2012). The literature focusing on the influence of culture and institutions on fertility is considerable. If we consider the childbirth decision as a rational process (Becker &Barro, 1986), public policies may influence the costs–benefit calculus (Becker & Murphy, 2000). The welfare state can reduce the cost of children via an in-kind benefit (Gauthier, 2007; Luci-Greulich&Thévenon, 2013; Thévenon&Gauthier, 2011) or increase family income via income support (Gauthier, 2007).

Some studies show that in-kind benefits and public childcare provision are the most effective measures for achieving work–family reconciliation, especially for preschool-age children (Brilli, Del Boca, &Pronzato, 2013; Del Boca, 2002; Luci-Greulich&Thévenon, 2013;Rindfusset al., 2007; Thévenon& Gauthier, 2011). Public childcare provision lowers the cost of having children for working mothers by decreasing their time constraints and allowing them to work longer hours (Del Boca, 2002).

Most of these studies, however, do not directly address informal childcare, because they consider it as residual. As explained by Herlofson and Hagestad (2012), there are two main dynamics at play. First, in universalpublic childcare systems, grandparents help their grandchildren's mothers, especially working mothers, when childcare is intensive. For example, even if there are public services, grandparental support is needed in case of an accident or if a grandchild has a disability. Families rely on the informal support either for unexpected situations or for particularly care-demanding types of children for whom public childcare is not enough. Second, in familistic welfare systems, grandparents help raise grandchildren due to the lack of public childcare. As underlined by Herlofson and Hagestad (2012), in the first case, grandparents are "family savers", adding flexibility through extra childcare provision to an already efficient system. In contrast, in the familisticregime, grandparents are "mother savers", substituting for the welfare state (Herlofson & Hagestad, 2012).

Cultural values and different childcare arrangements influence each other as well as the development of new family policies and social roles (Arber & Timonen, 2012). On the

one hand, as underlined by Jappens and Van Bavel (2011), the "normative climate" makes mothers more keen on one specific type of childcare provision than another. Mothers who live in a traditional context would prefer their children's grandparents to formal childcare; mothers who live in a more progressive region would prefer formal childcare provision (Jappens & Van Bavel, 2011).

Cultural values also influence grandparents' perception of their role and responsibilities. By combining data from the Norwegian panel study on Life course, Aging, and Generation (NorLAG) with the Survey of Health, Aging, and Retirement in Europe (SHARE), Herlofson and Hagestad (2012) show that there is general agreement on the role of grandparents as supportive figures. However, national differences emerge when their support is decomposed. For instance, approximately 35% of Southern European grandparents strongly believe that their support should also involve an economic dimension, compared to less than 10% in Denmark and the Netherlands (Herlofson & Hagestad, 2012).

Hank and Buber (2009) also found an inverse relationship between the prevalence and intensity of grandparenting across different European countries. In countries with stronger family norms, like Spain and Italy, the percentage of grandparents who provide some childcare is the lowest. However, when the authors distinguish between regular and occasional childcare, those countries show an above average grandparental involvement in childcare provision, because of the amount of regular care that takes place. On the other hand, in Scandinavia, where family norms are weaker, the authors find the highest share of some grandparenting over the year but a below average level of regular childcare when it comes to intensity (Hank & Buber, 2009).

In conclusion, the combination of micro- and macro-level fertility analyses and grandparental characteristics has generated a promising line of literature that suggests that grandparental childcare, together with a strong welfare system, is conducive to parents having subsequent offspring following their first child (e.g. Aassve et al., 2012b; Kaptijn et al., 2010; Thomese&Liefbroer, 2013). The first-birth transition is a crucial event in completed fertility and there is a dearth of knowledge on the influence of first-birth transition on subsequent birth events (Margolis & Myrskylä, 2015). I argue that although first-birth transition can be seen as driven by less rational factors than

subsequent ones, it still represents what Morgan (2008) calls the "family building" phase, and therefore deserves greater attention.

2.3. European Country Clusters

Several classification systems have been offered in order to compare nation-specific institutional characteristics (e.g. Esping-Andersen, 1990; Gauthier, 1996; Saraceno & Keck, 2010, 2011). This study requires a classification that takes into account both social norms and institutions, with a particular focus on childcare systems. Here Gauthier's (1996) family-regime typology is especially useful, and it has been applied in previous studies of fertility and work–family reconciliation issues (e.g. Del Boca et al., 2009). In particular, countries are grouped along two dimensions: family policies and social values.

By considering family policies and social values at the same time, Gauthier captures how different regimes react to the decline of the breadwinner model and its impact on fertility. The idea is that an increase in women's paid work reduces their time for caring. This requires governments to fill the "care gap." Clusters of countries are based on both the responsiveness of public policies, which, in turn, depends on family norms, and the type of response. Gauthier (1996) includes measures like levels of cash benefits, maternity leave, provision of childcare facilities, and the degree of openness of the abortion law. It is of course difficult to place a country squarely within one group. All countries that are considered here have experienced a modernization process and several reforms of public policies. Thus, what I try to identify is the "major policy difference" (Thévenon, 2011) that persists over time.

Gauthier (1996) presents four regimes: protraditional, pro-egalitarian, pro-family/pronatalist, and pro-family but noninterventionist. In protraditional countries, there is asymmetry between family as a value, which is very well established, and family policies, which may be fairly unsupportive. The welfare state is not in line with its citizenship to support family formation and outliving. In this group, around 50% of grandparents provide at least occasional childcare and, among them, between 20% and 50% provide childcare daily (Herlofson & Hagestad, 2012). Here, childcare services tend to be scarce. As reported by a RAND Europe dossier (Mills et al.,2014), apart from Spain, the percentage of children up to the age of three in formal childcare arrangements

in 2010 varies from almost 6% in Greece to around 28% in Switzerland. Conversely, the percentage of children below three years of age in informal childcare is particularly high. Apart from Germany, it ranges between 30 and 60 percentage points. Moreover, in 2007, the public expenditure on childcare and early education services as a percentage of GDP in the best scenario—Italy—is about 0.7% (Mills et al., 2014). As shown by Thévenon (2011), the maternal employment rate for women with children under age two falls between 47.3% in Italy and 60.5% in Austria.

In pronatalist countries, both the policies and the norms support family formation, as in France and Belgium. According to Gauthier (1996), in this cluster of countries not only fertility but also family formation is an important goals. As explained by Thévenon and Gauthier (2011), fertility may indeed often be a side effect of family-friendly policies. By supporting work and family life reconciliation, and boosting female employment, they also create "favorable conditions for fertility." In this group, policies for balancing family and work life, with a particular emphasis on female employment, are well established and the amount of child benefits is fairly high (Lewis, Knijn, Martin, & Ostner, 2008; Thévenon & Gauthier, 2011). Public expenditure on preprimary childcare as a percentage of GDP is around 0.5% in both France and Belgium (Mills et al., 2014). The same figures for all early education services are around 1% for France and slightly less for Belgium (Mills et al., 2014). Furthermore, childcare coverage is particularly high compared to other continental European countries (Thévenon, 2011). In detail, the percentage of children up to three years old in formal childcare arrangements, for both countries, is above the Barcelona target, namely between 35% and 40% in Belgium and between 40% and 45% in France. Finally, the employment rate for mothers with children under two is fairly high, at 63.8% for Belgium and 53.7% for France (Thévenon, 2011). But family values are also well-grounded. The percentage of children younger than three in informal childcare fluctuates around 20% (Mills et al., 2014). Moreover, between 40% and 60% of grandparents strongly agree that it is their duty to be there for their grandchildren in case of difficulty (Herlofson & Hagestad, 2012). Finally, the percentage of grandparents who provide almost daily childcare—among grandparents who look after grandchildren at least occasionally—is around 20% (Herlofson & Hagestad, 2012). These percentages are lower than in the protraditional group but higher than in the pro-egalitarian group.

In pro-egalitarian countries, gender equality is prioritized. The welfare state provides full assistance for work and family life balance (Gauthier, 1996). In this cluster, among grandparents who provide at least occasional care, only 5% provide care on an almost daily basis—the lowest in Europe (Herlofson & Hagestad, 2012). The percentage of children under three years of age in informal childcare, provided by grandparents or others, is almost zero in Denmark and Sweden, whereas it is around 60% in the Netherlands (Mills et al., 2014). The percentage of children under three in formal childcare arrangements is around 50% in the Netherlands and Sweden but close to 80% in Denmark (Mills et al., 2014). Moreover, the maternal employment rate for women with children below two years of age ranges between 69% in the Netherlands and 72% in Denmark (Thévenon, 2011). Finally, public expenditure only for preprimary education as a percentage of GDP is around 0.5% in the three countries.

In this group, "instead of promoting a traditional family, the main concern has been the achievement of a more egalitarian sex-role model. […] Legislation on parental leave, as opposed to maternal leave, has been one of the centre-pieces of this model." (Gauthier, 1996, p. 204). I include the Netherlands in the pro-egalitarian cluster. It is well-known that the Netherlands is very much a part-time economy and this may contradict the pro-egalitarian classification. However, two factors should be considered.

First, Wielers and Raven (2014) show how, in the Netherlands, part-time work is not necessarily related to a more traditional division of labor. Instead, it indicates a shift in work norms and obligations towards a more balanced life for both men and women. For this reason, we can consider the Netherlands as a country that follows an "adult worker model,"i.e. a situation where both men and women work and share childcare responsibilities, as opposed to the "male breadwinner/female career model family" (Lewis, 2001).

Second, although the Netherlands differs from the Scandinavian model, as explained by Pfau-Effinger (2004), its path to modernization, also termed a "cultural revolution," was inspired by the principles of gender equality. Public policies aimed to increase the participation of men in family life and were not limited to encouraging women's participation in the labor market (Pfau-Effinger, 2004). As Pfau-Effinger (2005) states: "The dominant cultural model has been further developed towards a 'dual breadwinner/dual career' model, even though the cultural notion of equal contribution of

fathers to informal family care is still only in some part reflected in everyday practices of care within the family" (p.31). Finally, in pro-family but noninterventionist countries, family policies aim to help only those families in need while still encouraging the traditional family model (Gauthier, 1996). In my sample, however, there are no countries in this group.

2.4.Hypotheses

In protraditional countries I expect grandparental childcare propensity to have a positiveimpact on adult children's likelihood of having a first birth. Two mechanisms can be identified. First, in these countries, family obligations and social roles are stronger; hence, grandparents will take care of their grandchildren because they feel entitled to do so and because they want to be socially perceived as "good grandparents." Building on previous studies (e.g. Daatland, Herlofson, & Lima, 2011; Herlofson&Hagestad, 2012; Kalmijn& Saraceno, 2008), prospective grandparents are expected to be more responsive to their adult children's needs. Second, adult children will also prefer to rely fully on informal care, because this would be perceived as the norm that guarantees the best quality in terms of outcomes and reliability (Arpino, Pronzato, &Tavares, 2014). Jointly these two mechanisms imply a marginal role for welfare state services: Grandparental childcare is acceptable and desirable from the perspectives of all parties involved and society at large, so new policies would be only marginal when adult children consider the care of their future children.

Additional support for the hypothesis that grandparental childcare propensity will have a higher impact on adult children's transition into parenthood in protraditional countries can be drawn fromKalmijn and Saraceno (2008).They testedwhether Southern European adult children are more responsive to their parents' health-care needs than elsewhere. By adopting a multilevel approach, they found strong support for their hypothesis. We can partially apply this reasoning in terms of country norms, to downward exchanges, i.e. grandparents caring for their grandchildren.This cluster of countries has found to be the one with the highest intensity in downward transfer and grandparental childcare provision (Hank and Buber, 2008; Albertini, 2007). By contrast, in more individualistic pro-egalitarian countries, in which the welfare state is more supportive and individuals rely on formal childcare, I expect grandparental childcare propensity to have a null effect on entry into parenthood.

Pronatalist countries are placed in an intermediate position. Here, individuals rely on both the welfare state and the family, thus the eventual unavailability of their parents for grandparental duties should not be so decisive.

4.Method

Data are from the Survey of Health, Aging, and Retirement in Europe (SHARE http://www.share-project.org/). It is a cross-national panel dataset aimed at describing different aspects of the aging population's (aged 50+) living conditions, including physical and mental health; family networks, work and marital status; and financial situation. Five waves, from 2004/05 to 2011, are currently available and data collection is scheduled every two years. Several European Union countries (i.e. Austria, Belgium, Germany, Denmark, Greece, Spain, Italy, Sweden, the Netherlands, France, Hungary, Portugal, Poland, Czech Republic, Estonia, and Slovenia) plus Israel and Switzerland are included. A clear advantage of this dataset is the possibility to draw on information that the oldest generation report about their adult children. For up to four children per respondent, I have fairly detailed information on socioeconomic and demographic characteristics, such as fertility behavior. These four selected children are not necessarily still living with their parents.

To answer my research questions, I applied a two-step approach, using a different sample at each stage. In the first step, I drew on a sample of actualgrandparents to estimate a linear probability model that measures grandparental childcare propensity. In the second step, from a sample of would-be grandparents, I used the predictions from the first-step values as a proxy for future childcare provision to estimate parents' influence on their adult children's transition into parenthood.

The reason for using this research design is twofold. First, I focus on first-birth transition, which means that actual grandparental childcare cannot be observed. A proxy for future childcare provision is therefore needed. The grandparental childcare propensity derived from the first step provides exactly such a measure. From the adult child's perspective, their parents' propensity to provide childcare may be considered not only as a proxy for childcare provision but also as a predictor of the future care they themselves will have to provide to both their parents and offspring. Also, by splitting the estimation process into two steps, each on the basis of different samples, I avoid having a unique regression with highly correlated covariates.

Finally, to address country-level heterogeneity, I ran separate models for three different groups of countries in both the first and second steps. Here I used Gauthier's classification (1996), as previously described. Empirically speaking, this criterion allows me to distinguish the principal types of care regimes without over-partitioning the sample. **Table 3.1** shows how countries are distributed across the three different categoriesI ran the model according to other classifications too (see the section on robustness checks for details).

Table 3.1 Group of countries (1996)

Countries model	Countries	Dependent variable=1 (First step)	
		N.	%
Pronatalist/pro-family	France, Belgium	876	23.87
Protraditional	Italy, Spain, Greece, Austria, Germany, Switzerland	1580	30.74
Pro-egalitarian	Denmark, the Netherlands, Sweden	658	14.56
Pro-family but noninterventionist	--		
		13330	

Note: Here the dependent variable measures whether grandparents provide childcare at least weekly

4.1 First Step

In the first step, I examined how different circumstances and personal characteristics of both adult children and theirparents, as would-be grandparents, may influence the likelihood of grandparenting. Thus, I selected variables that reflect different dimensions of future grandparents' lives, namely what Aassve and his colleagues (2012b) define as health, availability to care, and willingness to care. As part of the health dimension, I selected objective measures of health such as a grip strength test—which the literature

considers a good predictor of vitality (Rantanen et al., 1999)—recall ability, verbal fluency, and orientation in time. I also included self-perceived health, which captures the grandparents' general attitude towards their health condition, and the depression scale as a proxy for mental health.

Concerning willingness to provide care, I used all the information about social or voluntary activities available in SHARE in order to capture individuals' time constraints. Geographical proximity is used as a proxy for availability. Finally, basic demographic information about both the parents, i.e. potential grandparents, and the adult children was also taken into account. Additional details on covariates and results of the first-step estimation are provided in the additional material. The variables are consistent across the two estimation steps.

In this step, the sample was drawn from the cross-sectional sample of the first wave, i.e. 2004/05, of SHARE. I selected all individuals from the oldest generation with at least one grandchild, whether they provide childcare or not. In other words, individuals from the oldest generation who do not have grandchildren were deleted from the sample. This is the most important selection number wise—about 27% of the households are dropped. In this step the final pooled sample size is 13330 actual grandparents divided as follows: 4520 pro-egalitarian, 5140 protraditional, and 3670 pronatalist (see alsoTable 3.1).

The dependent variable is dichotomous: It equals 1 if a grandparent is providing childcare at least weekly and 0 otherwise. Thus, the dependent variable takes into account frequency of childcare provision: It equals 1 only if it occurs at least weekly. By including low frequency childcare provision I could have captured occasional grandparental support, but it is not of interest in this study. Table 1 shows the dependent variable distribution in Step 1. As expected, protraditional countries display the highest levels of grandparental childcare, whereas pro-egalitarian countries have the lowest levels. The pronatalist countries are in between.

Thus, for each variable, via linear regression, I estimated its weight in determining grandparental childcare provision. I then used these weights in the second step to obtain a measure for grandparents' propensity to provide childcare. In other words, I estimated a model using all these variables and then used their prediction to measure

grandparents' propensity to provide childcare. To estimate such a relationship, I implemented a linear probability model. Due to the data structure, i.e. adult children nested under their parents, standard errors in the linear probability model were adjusted for clusters. For each group of countries, for each adult child *i* nested under their parent *f*, the model can be written as:

$$ChildcareProvision_{f,i} = \beta_0 + \beta_1 PH_{f,i} + \beta_2 CF_{f,i} + \beta_3 B_{f,i} +$$

$$\beta_4 MH_{f,i} + \beta_5 AC_{f,i} + \beta_6 GP_{f,i} + \varepsilon_{i,f}$$

where *PH* is a set of covariates measuring grandparental physical health (limited activitiesand grip strength test), *CF* is a set of variables related to grandparental cognitive function (numeracy, orientation in time, verbal fluency and listing words.), *B* comprises variables concerning health-related behaviors (smoking, sports, voluntary work), *AC*is made up of covariates for adult children's characteristics (employment status and geographical proximity), GP is a set of variables for grandparents' other characteristics (age, birth cohort, gender, marital and employment status, number of children and grandchildren) and *MH*concerns mental health (the depression scale).

4.2 Second Step

The second step explores the effect of would-be grandparents' propensity to provide childcare after their adult child's first-birth transition. The idea behind this step is twofold: first, to build a synthetic measure that assigns to each would-be grandparent the likelihood that he or she will look after the grandchild and, second, to identify how this measure influences the first-birth transition. The measure was obtained by using the first step's predicted values on the second step's sample, the result of which serves as a proxy for future childcare provision.

In this second step, I relied on the longitudinal sample obtained by merging the first two waves, i.e. 2004/2005 and 2007, for 11 countries for which I have longitudinal information: Sweden, the Netherlands, France, Austria, Belgium, Switzerland, Greece, Germany, Denmark, Spain, and Italy. Although more waves of SHARE are available, I chose to analyze only the first two because of attrition and data constraints.

I selected all households with at least one adult child for which I might observe a first birth transition between the two waves. More specifically, I selected adult daughters,

aged between 21 and 45 and adult sons, aged between 21 and 50 (included). I fixed the lower bound of the age range at 21 years to avoid cases of teen pregnancy, which involve different mechanisms of intergenerational support (Sadler & Clemmens, 2004). Regarding the upper bound, it is different across genders, because men typically enter into parenthood later than women. I also dropped individuals for whom the dependent variable was missing (less than 0.001% of the sample). The other controls represent very basic information, so there is no particular bias or selection on missing values. The overall N is 9258 and adult children divided as follows: 2517 pro-egalitarian, 4710 protraditional, and 2031 in the pronatalist (seeTable 3.2).

Although information was reported by the oldest generation (i.e. the parents of the adult child), the adult children for whom we have information are not necessarily still living with their parents. In line with previous studies (Aassve et al., 2012b), due to the lack of identification numbers for adult children, I matched individuals on gender and date of birth to properly link the information belonging to the same adult child across different waves.

The dependent variable was derived from combining information across the two waves. It assumes a value equal to 1 if an individual *i*, childless at $t-1$, experiences a first birth in *t*. Table 3.2shows the dependent variable distribution across the different groups of countries. The pro-egalitarian countries have the highest numbers of births, whereas the protraditional countries show the lowest levels of fertility and the highest levels of childlessness. As expected, pronatalist countries are in the middle, although they are closer to protraditional than to pro-egalitarian countries (seeTable 3.3).

Table 3.2 Dependent Variable Distribution for Each Group of Countries—Second Step

First-birth transitions: Pro-egalitarian			First-birth transitions: Protraditional			First-birth transitions: Pronatalist		
	N	%		N	%		N	%
0	2092	83.2		4184	88.8		1768	87.0
1	425	16.8		526	11.2		263	12.9
Total	2517		Total	4710		Total	2031	

Note: Here the dependent variable measures whether a first birth occurs between the two waves

I used a mixed logistic model, adjusting standard errors due to the clustered structure of the data (i.e. different adult children nested under the same parent). I implemented a logistic instead of an event history approach due to data limitations; I do not have grandchildren's dates of birth. Formally, for each individual adult child i with a parent f, the model equation can be written as:

$$Firstbirth_{f,\mathrm{i}[t-1,t]} = \beta_0 + \beta_1 GP^*_{f,i,(t-1)} + \beta_2 AD_{f,i,t-1} + \beta_3 G_{f,i,t-1} + \varepsilon_{f,i,t}$$

GP* is the predicted values of the grandparental childcare propensity constructed in the first step. It is measured at t−1, when the adult child is at the onset of the decision process. AD is a set of variables related to the adult child's attributes (age, gender, and cohort) and G are variables concerning their parents (age, sex, and cohort). I included few independent variables because I did not want to over-control the model, given how I built the grandparental propensity for providing childcare. All the covariates were measured at t−1 because fertility decisions precede births and t−1 is when individuals made their decisions.

Table 3.3 Descriptive Statistics Second Step: Control Variables

	Pro-egalitarian		Protraditional		Pronatalist	
Adult child	Number	%	Number	%	Number	%
gender						
male	1428	56.7	2746	58.3	1171	57.7
female	1089	43.3	1964	41.7	860	42.3
birth cohort						
1958–1965	352	14.0	604	12.8	248	12.2
1966–1972	580	23.0	1109	23.5	393	19.4
1973–1977	718	28.5	1424	30.2	560	27.6
1978–1980	472	18.8	885	18.8	414	20.4
1980+	395	15.7	688	14.6	416	20.5
Total	2517	100.0	4710	100.0	2031	100.0
Grandparent						
gender						
male	820	47.5	1485	47.9	732	52.2
female	905	52.5	1612	52.1	670	47.8
birth cohort						
1901–1934	254	14.7	423	14.0	181	12.9
1935–1939	210	12.2	507	16.7	167	11.9
1940–1945	434	25.2	774	25.6	280	20.0
1945–1950	498	28.9	712	23.5	384	27.4
1950+	329	19.1	613	20.2	390	27.8
Total	1725	100.0	3029	100.0	1402	100.0

5. Results

5.1 First Step

Results from the linear probability model, in which the dependent variable is whether or not the grandparent provides childcare on at least a weekly basis, are generally in line with the existing literature (results are shown in**Table 3.4**). For the three groups of countries, employed grandparents are less likely to provide childcare than are retired grandparents. The number of adult children reduces grandparents' propensity to provide childcare and geographical proximity between grandparents and adult children increases the likelihood of grandparental childcare, regardless of the country cluster.

5.2 Second Step

In this step, I used predicted values from the first step as a proxy for future grandparental childcare provision. For each group of countries I present marginal

effect(Figure 3.1) and predicted probabilities (Figure 3.2), each associated with my key explanatory variable: grandparental childcare propensity. Higher values of my measure for future grandparental childcare provision correspond to a higher propensity for prospective grandparents to provide childcare (complete regression results are included in the Robustness checks,**Table 3.5**).

Figure 3.1 Marginal Effect of Grandparental Childcare Propensity on having a first bith by Group of Country (Second Step)

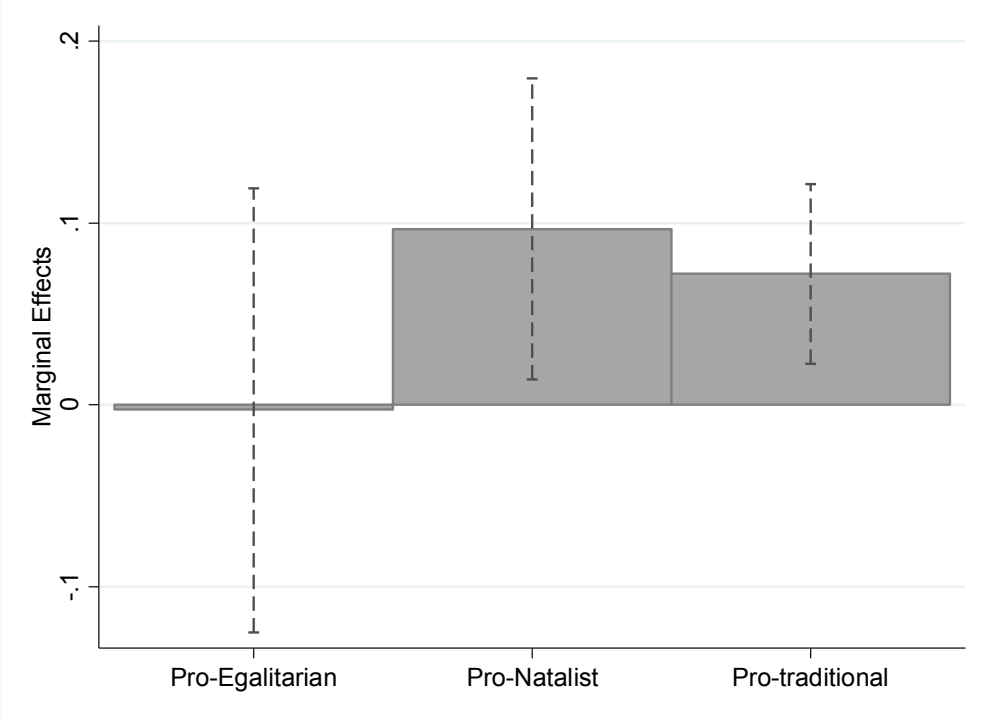


Figure 3.1shows the marginal effect of grandparental childcare propensity after having adjusted for all the other covariates. Looking at both the pronatalist and protraditional countries—net of all the controls included in the model—the marginal effects are positive and significant. Surprisingly, pronatalist countries show a larger size effect than the protraditional cluster[16]. Moreover, for the pro-egalitarian countries, I find a slightly negative but not statistically significant effect.

[16] This is just an observation. A direct test for difference across counties has not been done.

Figure 3.2. Predicted Probability of Having a First Birth on Grandparental Childcare Propensity by Group of Countries (Second Step)

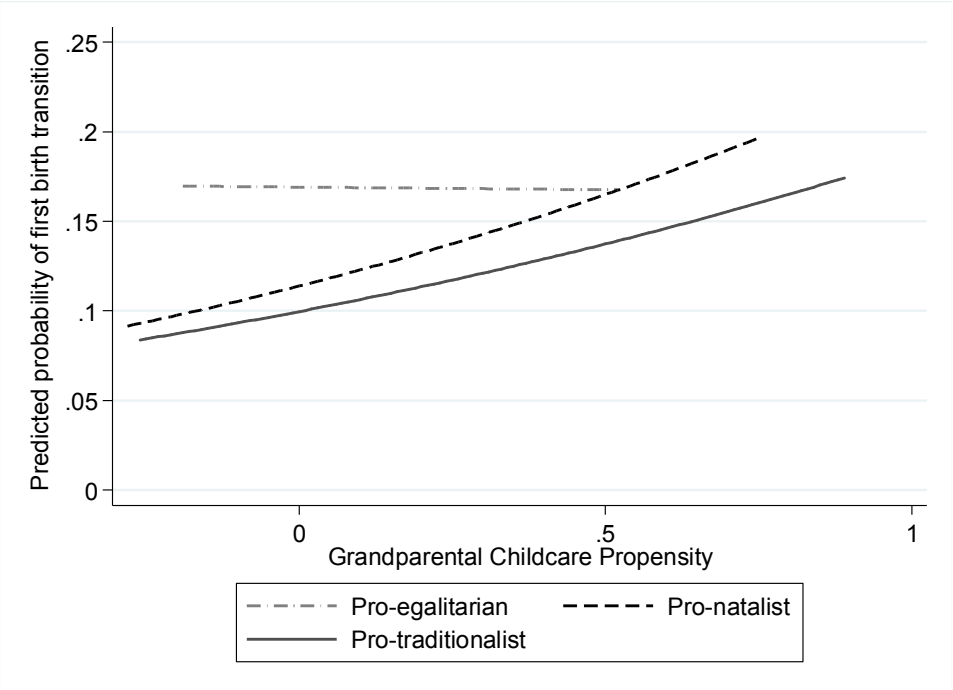


Figure 3.2shows the relationship between the level of grandparental childcare propensity and the predictive probability of a first birth for each country group. The predicted values of grandparental childcare propensity are on the *x* axis and the predicted probability of experiencing a first-birth transition is on the *y* axis. For pro-egalitarian countries the coefficient in the model is negative, although nonsignificant. Pronatalist countries show a significant and positive coefficient. For increasing values of grandparental childcare propensity, the probability of having a first birth increases. The same holds for protraditional countries, but at a lower rate.

In summary, in the pro-egalitarian countries, the probability of having a first child is almost invariant with respect to an increase in grandparental propensity to provide childcare. When it comes to pronatalist countries (i.e. France and Belgium), where there is a mix of public policies and family aid, the probability of having a first birth increases as grandparental childcare propensity increases. Finally, for protraditional countries I also find a higher probability of entry into parenthood for increasing values of grandparental childcare propensity. In this group, the predicted probabilities vary between 8% for very low levels of grandparental propensity and 17% for higher values

of my grandparental propensity to provide childcare measure. Although it represents a large effect, within the pronatalist countries, the same variation ranges from 0.09 to about 0.20.

Interestingly, for the pronatalist group, the range of predicted probabilities is slightly wider than those within the protraditional group. Yet the same difference holds for intermediate values of my measure for grandparental propensity to provide childcare. In other words, in the pro-egalitarian cluster, for high values of my measure, there are no observations. Thus, focusing only on the middle values, which may stand for an average situation for each group of countries, we observe that the relationship within clusters found in the extremes remains identical.

6. Discussion

The principal aim of this study was to understand the influence of potential grandparental childcare on their children's entry into parenthood. The focus on grandparents is justified by their potential to provide emotional and monetary support as well as time investments. Focusing on first births implies that I cannot observe would-be grandparents providing childcare. I therefore opted for a two-step estimation approach.

In the first step, from a sample of actual grandparents, I explored, with a linear probability model, the relationship between grandparental characteristics and childcare provision. I considered only grandparental childcare that occurs at least weekly. In the second step, from a sample of would-be grandparents, I estimated the influence of grandparents on their adult children's first-birth transition. Using the first-step estimates, I built a measure for the grandparental propensity to provide childcare.

Given the importance of context and exploiting cross-national differences, I ran separate models for distinct clusters of countries, derived from Gauthier's (1996) categorization. This captures the importance of family in a given society and also the family policies. The three groups are pronatalist, protraditional, and pro-egalitarian (Table 3.1).

The analyses confirmed some of my hypotheses. Firstly, I found that grandparents play some role in their adult children's entry into parenthood and, second, I found that the relationship between grandparental childcare propensity and first-birth transition varies according to the context. In the second step, I found that in both pronatalist and

protraditional countries future parental support has a significant and positive effect. In the pronatalist countries, the predicted probability of having a first birth ranges from 0.09 to 0.20 for the lowest and the highest values of the propensity measure, respectively. When it comes to the protraditional group, this ranges from 0.08 to 0.17. Finally, the pro-egalitarian group shows a slightly negative and nonsignificant coefficient for the grandparenting propensity score. The predicted probability of having a first birth ranges from 0.16 to 0.17 for the lowest and the highest value of grandparental propensity to provide childcare care, respectively. Although nonsignificant, the intercept for this group of countries is higher compared to those of both the pronatalist and protraditional clusters. Nonetheless, the predicted probability for the pro-egalitarian group is flatter. It remains almost constant for increasing values of the grandparenting propensity score.

On a more speculative note, potential grandparental childcare seems very important for the adult child's transition into parenthood. I can identify two potential reasons. The first is that, from a psychological point of view, by signaling that they are keen to look after the grandchild, grandparents also show a propensity for looking after the adult child. In other words, their adult children are able to consider the transition into parenthood with more confidence. And yet, this "confidence injection" may be declined in different ways due to both individual heterogeneity and context. Some individuals may be encouraged by the potential grandparental help because they perceive a better work and family balance or constant and unconditional support during some of the more stressful phases of parenthood, e.g. breast feeding. In other words, we have two types of potential support: first, from the would-be grandparent to the grandchild, and, second, from would-be grandparent to the adult child, in the case of both future psychological support and work–family balance. In this latter case, the grandparents would be, from the adult child's perspective, available and willing to help. Because the grandparents enjoy their adult children's trust, their potential availability would have an even stronger effect on their adult children's fertility than the availability of other members of the extended family might have.

The second reason is that, from a macro perspective, the fact that would-be grandparents signal that they would take on the role of future childcare providers has a different effect in different contexts. In pro-egalitarian countries, characterized by a

supportive welfare regime, entry into parenthood is not influenced by grandparental childcare propensity, whereas in countries where family policies are weaker, grandparents do play a role in their adult children's first-birth transition. Furthermore, countries with a mixture of formal and informal childcare systems seem to be the most responsive in terms of grandparental childcare propensity. In fact, they seem to be even more responsive than the protraditional group, even though I expected that their strong family values would bring out the strongest effect of my grandparental childcare propensity on first birth.

Two of the main results beg some questions and require elaboration. First, why does prospective grandparental childcare provision have no effect in pro-egalitarian countries but a stronger effect in pronatalist ones that have implemented work–family reconciliation policies? Second, why is the influence of grandparental childcare provision stronger in the pronatalist countries than in the protraditional ones, where the family plays such a major role?

Regarding the first point, a possible explanation may lie in the different historical development of public policies in the two country groups. In the pro-egalitarian countries, policies have always been driven by work–family reconciliation. In the pronatalist cluster, policies were historically aimed at boosting fertility (Luci & Thévenon, 2013; Thévenon, 2011), thus policies that help working women to balance work and family might be seen as a side effect rather than goals in themselves. In other words, in these countries family policies are fairly strong but not as well developed as in pro-egalitarian countries.

Furthermore, as argued by Thévenon and Gauthier (2011), family-friendly policies lead to an increase in fertility—as an unintended consequence—more than policies directly aimed at boosting fertility itself. Consequently, as Herlofson and Hagestad (2012) explain, whereas in Scandinavia grandparents are ready to intervene in unexpected situations or for particularly demanding care needs, in other countries, such as France or Italy, grandparents help raise grandchildren due to inefficiencies in the public childcare system. In addition, as suggested by Mills and her colleagues (2014), there is great variation in childcare perceptions and normative values across Europe. To extend what Mills and her colleagues (2014) argue for Austria and Germany to all of Europe: "perception of childcare may operate not only as a barrier to the wider use of childcare,

but lack of momentum to create policies" (p. 14). This argument, combined with the argument made by Herlofson and Hagestad (2012), highlights how important individuals' perceptions of the childcare system are for the efficiency of the childcare system itself, which brings us to two important observations.

On the one hand, the welfare state offers flexible and efficient services for family planning. On the other hand, families also perceive these public services as optimal for combining work and family. This latter argument is very close to the one made by Aassve, Billari, and Pessin (2016) to explain the relationship between generalized level of trust and fertility outcomes. As they state, "The key is that high levels of generalized trust imply a higher predisposition to outsource care activities that were traditionally restricted to the realm of the family." (p. 5).

Second, I find that the pronatalist group shows the strongest effect of grandparental propensity for providing childcare, especially where the highest values are concerned. There may be different explanations for this. I expected to find this for the protraditional group, because the value of the family is well-established and the informal safety net is deeply rooted in society.

This cultural component, however, has several consequences for fertility. First, it affects the sustainability of grandparenthood. In the protraditional group, future childcare provision is more intense (Hank & Buber, 2009), and this implies that grandparents must meet higher requirements in terms of those individual characteristics mentioned in the background section. Informal childcare—specifically care provided by grandparents—could make the difference in terms of work–family reconciliation when grandparents can be considered a back-up for public policy but not as a complete substitute for it (Kaptijn et al., 2010; Thomese & Liefbroer, 2013). In those contexts where there is "too much family," fertility is in fact particularly low (Livi-Bacci, 2001). Following Billari and Dalla Zuanna (2015), the extended family exercises social pressure that leads to future parents developing excessive concerns about their future children. Thus, they either delay entry into parenthood or forgo it altogether. This may reduce the marginal importance of grandparents' support on fertility because parental concerns will take precedence over the entire life-course of the future newborn (Billari & Dalla Zuanna, 2015).

In the pronatalist countries, the coexistence of a stronger formal system along with informal care leads families to have more children. Indeed, families are able to use both sources of childcare in the most efficient way. One possible explanation is that the virtuous synergy between the two types of childcare, on the one hand, enables families to solve potential conflicts between work and family schedules and, on the other hand, raises families' perceptions of public policy efficiency, thereby increasing their use of formal care. This mechanism will lower the perceived cost of child-rearing and stimulate fertility.

All in all, this study confirms the important role of grandparents in fertility transitions, particularly for the first child. Although entry into parenthood is determined by many mechanisms, the first experience may influence subsequent births (Margolis & Myrskylä, 2015).

Some limitations should be mentioned. First, due to data constraints, for each couple of adult children, I could only observe half of the grandparents because SHARE does not provide information about in-laws. I also ascribed different residual characteristics to the context, such as the proportion of formal and informal care or the perception of public services, which could not be directly measured in this study. The interplay between formal and informal care and its effect on fertility is important for both a better understanding of society and more effective policy.

7.References

Aassve, A., Arpino, B., & Goisis, A. (2012a). Grandparenting and mothers' labour-force participation: A comparative analysis using the generations and gender survey. Demographic Research, 27(3), 53–84. doi: 0.4054/DemRes.2012.27.3

Aassve, A., Meroni, E., & Pronzato, C. (2012b). Grandparenting and childbearing in the extended family. European Journal of Population/Revue européenne de Démographie, 28(4), 499-518.doi: 10.1007/s10680-012-9273-2

Aassve, A., Billari, F. C., & Pessin, L. (2016).Trust and Fertility Dynamics. Social Forces, 95 (2), 663–692. doi: 10.1093/sf/sow080

Arber, S. & Timonen, V. (Eds.). (2012). Contemporary grandparenting: Changing family relationships in global contexts. Bristol: Policy Press.

Arpino, B. & Bordone, V. (2015).Regular provision of grandchild care and participation in social activities. Review of Economics of the Household, 1–40.

Arpino, B., Pronzato, C. D., & Tavares, L. P. (2014).The Effect of Grandparental Support on Mothers' Labour Market Participation: An Instrumental Variable Approach. European Journal of Population, 30(4), 369–390. doi: 10.1007/s10680-014-9319-8

Becker, G. S. (1981). Altruism in the Family and Selfishness in the Market Place. Economica, 1–15.

Becker, G. S. & Barro, R. J. (1986).Altruism and the economic theory of fertility. Population and Development Review, 69–76.

Becker, G. S. & Murphy, K. M. (Eds.). (2009). Social economics: Market behavior in a social environment. Cambrige, MA: Harvard University Press.

Bengtson, V. L., Rosenthal, C., & Burton, L.. (1990). Families and aging: Diversity and heterogeneity. In R. H. Binstock & L. George (Eds.), Handbook of aging and the social sciences (3rd ed.) (pp. 263–287). San Diego: Academic Press.

Bengtson, V. L. (2001). Beyond the Nuclear Family: The Increasing Importance of Multigenerational Bonds. Journal of Marriage and Family, 63(1), 1–16. doi: 10.1111/j.1741-3737.2001.00001.x

Billari, F. C. & Dalla Zuanna, G. (2015).Nei Paesi moderni nascono ancora bambini. Il Mulino, 64(1), 29–38.

Börsch-Supan, A., Brugiavini, A., Jürges, H., Kapteyn, A., Mackenbach, J., Siegrist, J., & Weber, G. (2005). Health, ageing and retirement in Europe – First results from the Survey of Health, Ageing and Retirement in Europe. Mannheim: Mannheim Research Institute for the Economics of Aging (MEA).

Börsch-Supan, A. & Jürges, H (Eds.). (2005). The Survey of Health, Ageing and Retirement in Europe – Methodology. Mannheim: Mannheim Research Institute for the Economics of Aging (MEA)

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., … Zuber, S. (2013). Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). International Journal of Epidemiology.doi: 10.1093/ije/dyt088.

Börsch-Supan, A. (2016). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 1. Release version: 5.0.0. SHARE-ERIC. Data set. doi: 10.6103/SHARE.w1.500

Brilli, Y., Del Boca, D., & Pronzato, C. D. (2013). Does child care availability play a role in maternal employment and children's development? Evidence from Italy. Review of Economics of the Household, 14(1), 27–51. doi: 10.1007/s11150-013-9227-4

Coall, D. A. & Hertwig, R. (2010). Grandparental investment: Past, present, and future. Behavioral and Brain Sciences, 33(1), 1–19. doi: 10.1017/S0140525X09991105

Coall, D. A. & Hertwig, R. (2011). Grandparental Investment: A Relic of the Past or a Resource for the Future? Current Directions in Psychological Science, 20(2), 93–98. doi: 10.1177/0963721411403269

Compton, J. & Pollak, R. A. (2014).Family proximity, childcare, and women's laborforce attachment. Journal of Urban Economics, 79, 72–90. doi: 10.1016/j.jue.2013.03.007

Daatland, S. O., Herlofson, K., & Lima, I. A. (2011). Balancing generations: on the strength and character of family norms in the West and East of Europe. Ageing and Society, 31(7), 1159–1179.

Del Boca, D. (2002). The effect of child care and parttime opportunities on participation and fertility decisions in Italy. Journal of Population Economics, 15(3), 549–573. doi: 10.1007/s001480100089

Del Boca, D., Pasqua, S., & Pronzato, C. (2009). Motherhood and market work decisions in institutional context: a European perspective. Oxford Economic Papers, 61(suppl. 1), i147–i171.doi: 10.1093/oep/gpn046

Esping-Andersen, G. (1990). The three worlds of welfare capitalism. Cambridge: Policy Press.

Esping-Andersen, G. (1999). Social foundations of postindustrial economies. Oxford: Oxford University Press.

Fergusson, E., Maughan, B., & Golding, J. (2008). Which children receive grandparental care and what effect does it have? Journal of Child Psychology and Psychiatry, 49(2), 161–169. doi: 10.1111/j.1469-7610.2007.01840.x

Gauthier, A. (2002). The role of grandparents. Current Sociology, 50(2), 295–307. doi: 10.1177/0011392102050002623

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. doi: 10.1007/s11113-007-9033-x

Herlofson, K., & Hagestad, G. O. (2012).Transformations in the role of grandparents across welfare states. In S. Arber and V. Timonen (Eds.), Contemporary grandparenting: Changing family relationships in global contexts (pp. 27–50). Bristol: Policy Press.

Hank, K. & Buber, I. (2009). Grandparents caring for their grandchildren: Findings from the 2004 survey of health, ageing, and retirement in Europe. Journal of Family Issues, 30(1), 53–73. doi:10.1177/0192513X08322627

Heylen, L., Mortelmans, D., Hermans, M., & Boudiny, K. (2012). The intermediate effect of geographic proximity on intergenerational support.A comparison of France and Bulgaria. Demographic Research, Special Collection, 27(17), 455–486. doi: 10.4054/DemRes.2012.27.17

Jappens, M. & Van Bavel, J. (2012). Regional family norms and child care by grandparents in Europe. Demographic research, 27(4), 85–120.doi: 10.4054/DemRes.2012.27.4

Kalmijn, M., & Saraceno, C. (2008). A comparative perspective on intergenerational support: Responsiveness to parental needs in individualistic and familialistic countries. European Societies, 10(3), 479–508.

Kaptijn, R., Thomese, F., Van Tilburg, T. G., & Liefbroer, A. C. (2010). How grandparents matter. Human Nature, 21(4), 393–405. doi: 10.1007/s12110-010-9098-9

Leitner, S. (2003). Varieties of familialism: the caring function of the family in comparative perspective. European societies, 5(4), 353–375.doi: 10.1080/1461669032000127642

Lewis, J. (2001). The decline of the male breadwinner model: implications for work and care. Social Politics, 8(2), 152–169.

Lewis, J. (2002). Individualisation, assumptions about the existence of an adult worker model and the shift towards contractualism. In A. H. Carling, S. Duncan, & R. Edwards (Eds.), Analysing families: morality and rationality in policy and practice (pp. 51–6). East Sussex: Psychology Press.

Lewis, J., Knijn, T., Martin, C., & Ostner, I. (2008).Patterns of development in work/family reconciliation policies for parents in France, Germany, the Netherlands, and the UK in the 2000s. Social Politics 15(3), 261–286.

Livi-Bacci, M. (2001).Too few children and too much family. Daedalus, 130(3), 139–155.

Luci-Greulich, A. & Thévenon, O. (2013). The impact of family policies on fertility trends in developed countries. European Journal of Population/Revue européenne de Démographie, 29(4), 387–416.doi: 10.1007/s10680-013-9295-4

Margolis, R. & Myrskylä, M. (2015).Parental well-being surrounding first birth as a determinant of further parity progression.Demography, 52(4).doi: 10.1007/s13524-015-0413-2

Mathews, P. & Sear, R. (2013). Does the kin orientation of a British woman's social network influence her entry into motherhood? Demographic Research, 28, 313–340.

Mills, M., Präg, P., Tsang, F., Begall, K., Derbyshire, J., Kohle, L., … Hoorens, S. (2014). Use of childcare in the EU Member States and progress towards the Barcelona targets: Short Statistical Report No. 1. Santa Monica, CA: RAND

Corporation. Retrieved from http://www.rand.org/pubs/research_reports/RR185.html.

Morgan, S. P. (2003). Is low fertility a twenty-first-century demographic crisis? Demography, 40(4), 589–603. doi: 10.1353/dem.2003.0037

Myrskylä, M. & Margolis, R. (2014). Happiness: Before and after the kids. Demography, 51(5), 1843–1866. doi: 10.1007/s13524-014-0321-x

Newman, L. (2008). How parenthood experiences influence desire for more children in Australia: A qualitative study. Journal of Population Research, 25(1), 1–27. doi: 10.1007/BF03031938

Nomaguchi, K. M. & Milkie, M. A. (2003). Costs and rewards of children: The effects of becoming a parent on adults' lives. Journal of marriage and family, 65(2), 356–374. doi: 10.1111/j.1741-3737.2003.00356.x

Pfau-Effinger, B. (Ed.), (2004). Development of culture, welfare states and women's employment in Europe. Aldershot: Ashgate.

Pfau-Effinger, B. (2005). Culture and welfare state policies: reflections on a complex interrelation. Journal of Social Policy, 34(1), 3–20. doi: 10.1017/S0047279404008232

Rantanen, T., Guralnik, J. M., Foley, D., Masaki, K., Leveille, S., Curb, J. D., & White, L. (1999). Midlife hand grip strength as a predictor of old age disability. Jama, 281(6), 558–560. doi: 10.1001/jama.281.6.558

Rindfuss, R. R., Guilkey, D., Morgan, S. P., Kravdal, Ø.,&Guzzo, K. B. (2007). Child care availability and first-birth timing in Norway. Demography, 44(2), 345–372. doi: 10.1353/dem.2007.0017

Saraceno, C. & Keck, W. (2010). Can we identify intergenerational policy regimes in Europe? European Societies, 12(5), 675–696. doi: 10.1080/14616696.2010.483006

Saraceno, C. & Keck, W. (2011). Towards an integrated approach for the analysis of gender equity in policies supporting paid work and care responsibilities. Demographic research, 25(11), 371–406.doi: 10.4054/DemRes.2011.25.11

Sadler, L. S. & Clemmens, D. A. (2004).Ambivalent grandmothers raising teen daughters and their babies. Journal of Family Nursing, 10(2), 211–231. doi: 10.1177/1074840704263984

Silverstein, M., & Marenco, A. (2001). How Americans enact the grandparent role across the family life course. Journal of Family Issues, 22(4), 493–522. doi: 10.1177/019251301022004006

Thévenon, O. (2011). Family policies in OECD countries: A comparative analysis. Population and development review, 37(1), 57–87. doi: 10.1111/j.1728-4457.2011.00390.x

Thévenon, O. & Gauthier, A. H. (2011). Family policies in developed countries: A 'fertility-booster' with side-effects. Community, Work & Family, 14(2), 197–216. doi: 10.1080/13668803.2011.571400

Thomese, F. & Liefbroer, A. C. (2013). Child care and child births: The role of grandparents in the Netherlands. Journal of Marriage and Family, 75(2), 403–421. doi: 10.1111/jomf.12005

Uhlenberg, P. (2004). Relationships: Demography and beyond. Annual Review of Gerontology and Geriatrics 24, ,77–97.

Van Bavel, J. & De Winter, T. (2013). Becoming a grandparent and early retirement in Europe.European sociological review, 29(6), 1295–1308.doi: 10.1093/esr/jct005

Wheelock, J. & Jones, K. (2002). 'Grandparents are the next best thing': informal childcare for working parents in urban Britain. Journal of Social Policy, 31(3), 441–463. doi: 10.1017/S0047279402006657

Wielers, R. & Raven, D. (2013). Part-time work and work norms in the Netherlands. European Sociological Review, 29(1), 105–113. doi: 10.1093/esr/jcr043

8. Appendix

8.1 Providing more details about first-step variables

a) General health

This set of variables aim to measure different dimension of grandparents' general health. In particular, I can isolate three different groups: "objective health", i.e. mental health, cognitive function and physical health which are generally based on brief medical test administered to the respondent. "Effective health", with this category I refer to social activity (e.g. voluntary work) and healthy behaviors (e.g. smoking habits) which may influence the life style of the grandparents in terms of time constraints and healthy habits. Finally, "subjective health" I include the self-reported level of health. This latter variable, gives us a hint on the perception the grandparent has about himself whereas the others tells us how a third person, i.e. the adult child consider the health status of the respondent.

a.1) Cognitive functions

- Numeracy score

It tests the mathematical attitudes of the individual. In particular, questions linking mathematical reasoning or calculus with daily-routine problem-solving are administered. This is a categorical variable which scores from 0 to 5. Higher values correspond to higher performance.

- Orientation in time

It tests the capacity of the respondent of orientate him/her self within time. (e.g. questions like "which day of the week\the month is today?"). It is a categorical variable which I recoded in three categories: "good", "fair" and "bad".

- Recall ability (ten word list-words listing in the regression table)

It measures short-term memory. In particular, the interviewer lists ten words and he asks the respondents to repeat as many words as possible. It ranges from 0 to 10 and I consider it as continuous.

- Verbal fluency score

It measures the richness of one's vocabulary (i.e. "How many names of animals do you know?"). It ranges from 0 to 81 and it is continuous.

a.2) Physical health

- Grip strength

It measures one's strength in grasping an object. According to medical literature it is a very good predictor of one's vitality and longevity. Since strength is gender and age-specific different scales apply according to gender and age groups. In order to have a homogeneous measure, the value for each individual is computed as the deviance from the score of a fictional standard individual belonging to the same age and gender group. It is considered as continuous in my specification.

- Physical limitations

It measures the level of limitation in daily activity due to physical impairments. It is categorical and ranges from 0 to 3, severely limited, limited but not severely and not limited. I include this variable because it is the most accurate measure representing the individuals' level of impairment.

- Sports:

It is a categorical variable measuring the frequency of sport activity.

a.3) Mental health

- Depression scale

It represents one's level of depression. This measured is based on the Euro D scale. It ranges from 0 to 12 and higher values correspond to higher depression levels. It is considered as continuous.

a.4) *Healthy behaviors and socialization*

- Smoking

It measures the frequency of smoking habits in the last twelve months. It is a categorical variable, the categories are stopped smoking, no daily smoking for at least one year and currently smoking.

- Voluntary work, sport-related activities and care of disabled adults

These are binary variables. They assume value equal to 1 if the individual perform each of them at least weekly and 0 otherwise.

- Health care provided to partner

This is a dummy variable flagging whether the subject is regularly providing (at least weekly) care for his\her partner.

a.5) Self perceived health

This variable is built on the question "would you say your health is..". The answer is classified in five categories with ascending values: very good, good, fair, bad, very bad. In order to make the interpretation easier, I reversed the scale of the variable so that higher level are associated with better health. Further, due to data constraints (i.e. some categories were made by too few values), I put together the last two lower categories (i.e. bad and very bad). Some selection might drive this fact as individuals whom health is poorer, would also have lower probability to answer questions.

b) Demographics

- Grandparents' employment status

This variable is built on the question "in general, how would you describe you current situation?" The answer is categorized as follows: retired, employed, self-employed, unemployed, permanently sick or disabled, homemaker, other (specify). Due to the heterogeneous distribution of values within categories, I had some very small sub-groups. Thus, I built a categorical equal to 0 for grandparents who are retired or homemaker, equal to 1 for those who are employed, self-employed , equal to 2 for unemployed and a fourth category including all the others typologies (missing values are dropped because there are very few missing cases i.e. less than the 0.001% of the sample). The logic of this partition is that both retired and homemakers represent those who are less subject to time constraints. Finally, the third category is residual and includes sick people andother (but not missing). I put them together because there are very few cases.

- Marital status of the grandparent

This variable is a categorical variable; I distinguish those who are living alone (because of widowhood or divorce) from those who are living with partner (married or registered partnership.

- I have also included grandparents' sex and age (continuous) plus a dummy variable for country and adult child's sex.

c) Proximity

- Geographical distance

This variable measures the distance between the household of the adult child and the place where her parents live expressed in kilometers. In the original questionnaire and in my analysis the categories are: co-resident, same building, between 1 and 5 kilometers, between 5 and 25 kilometers, between 25 and 100 kilometers and more than 100 kilometers.

- Area of building

This variable distinguishes between those parents that live in big town from those who are living either in town or in a rural area. The main reason to include this variable is because the type of relationship and individuals roles may change substantially.

8.2 Regression results from both first and second step

Table 3.4 Results from First Step Estimation (Dependent Variable: Grandparental Childcare Provision)

Area of building (ref= bigtown)					
town	0.001		0.020		-0.026+
	[0.012]		[0.014]		[0.016]
rural area	0.013		0.025		0.017
	[0.015]		[0.016]		[0.020]
country (ref.= Sweden)		country (ref.= Austria)		country (ref.= France)	
Netherlands	0.021	Germany	0.026	Belgium	0.021
	[0.014]		[0.021]		[0.015]
Denmark	-0.017	Spain	0.061*		
	[0.013]		[0.024]		
		Italy	0.102***		
			[0.024]		
		Greece	0.097***		
			[0.023]		
		Switzerland	0.044		
			[0.031]		
Constant	0.321**		0.328***		0.512***
	[0.107]		[0.071]		[0.087]
N	4520		5140		3670
R-sq	0.128		0.223		0.178

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table 3.5 Results from Second Step Estimation (Dependent Variable: First Birth Transition)

	Pro-egalitarian	Pro-traditional	Pro-natalist
grandparenting propensity	-0.022	0.746**	0.890*
	[0.461]	[0.262]	[0.390]
age (adult child)	-0.057+	-0.019	-0.034
	[0.032]	[0.028]	[0.043]
age (grandparent)	0.024	-0.037	-0.008
	[0.027]	[0.026]	[0.039]
adult child female (ref.=ma	0.277*	0.098	0.330*
	[0.109]	[0.096]	[0.137]
grandmother (ref=male)	0.019	-0.119	-0.058
	[0.113]	[0.101]	[0.142]
Adult child birth cohort (ref.= 1958-65)			
1966-72	0.322	0.239	0.099
	[0.326]	[0.247]	[0.395]
1973-77	0.003	-0.213	0.414
	[0.480]	[0.394]	[0.608]
1978-80	-0.862	-1.068*	0.008
	[0.594]	[0.498]	[0.750]
> 1980	-1.955**	-1.821**	-1.579+
	[0.700]	[0.605]	[0.891]
Grandparent birth cohort (ref.= 1901-34)			
1935-39	0.156	-0.230	0.204
	[0.336]	[0.235]	[0.446]
1940-45	0.337	-0.395	0.010
	[0.423]	[0.341]	[0.593]
1946-50	0.478	-0.529	-0.141
	[0.539]	[0.466]	[0.757]
> 1950	0.363	-0.854	-0.118
	[0.658]	[0.581]	[0.920]
Constant	-1.452	1.436	-0.549
	[2.336]	[2.161]	[3.361]
N	2517	4710	2031

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

9. Robustness Checks

9.1 Different group of countries

Grouping countries together is a complex task. To ensure that my results are not driven by my grouping criteria, I run my models in line with the classification provided by Saraceno & Keck (2011). Based on their system, country groups are formed according to the interplay between two different concepts: commodification/decommodification (Esping-Andersen, 1990 and 1999) and default/supported familialism/defamilialization (Leitner 2003; Saraceno & Keck 2010) (for more details see Saraceno & Keck, 2011). Although this classification is aimed also at grasping the level of gender equity in each country, it is based on different childcare and care policies.

The countries are clustered as follows: 1) Weak supported familialism-weak defamilialization (WSF-WD), in my sample: Greece, Italy and Spain. 2) Weak supported familialism-strong defamilialisation (WSF-SD), i.e. Denmark and Sweden. 3) Strong supported familialism-weak defamilialisation (SSF-WD), i.e. Austria, Germany and Switzerland. Although Switzerland is not considered in the original study, I add it into this group because of similarities with the other group members. 4) Internally divergent (ID), i.e. Belgium, France and the Netherlands. The results obtained after employing these categories are coherent with those I encountered using Gauthier's clusters (1996). Results are shown inTable 3.6.

Focusing on the coefficient of grandparental childcare propensity in the last estimation step, I find that in the WSF-SD group -which makes up part of Gauthier's pro-egalitarian cluster - the coefficient remains negative and not significant. The WSF-WD group, which is a subgroup of Gauthier's pro-traditional countries, shows a positive and significant coefficient, in line with my previous findings. When it comes to the ID group, grandparental childcare propensity is positive and significant. I am aware that this latter group is not directly comparable with Gauthier's pronatalist category because of my inclusion of the Netherlands. Finally, in the SSF-WD group, which is the other subgroup of Gauthier's pro-traditional cluster, the coefficient is slightly negative although not significant. This outcome might also be related to the particularly small size of this subsample.

Table 3.6 Results from Second-Step, First Robustness Check (Countries Clustered According to Saraceno and Keck(2011) Dependent Variable Second Step: First Birth Transition)

	Strong DF and weak SF	Weak SF and WD	Internallydivergent	Strong SF and weak DF
Grandparenting propensity	-0.801	1.460***	0.685*	-0.055
	[0.719]	[0.302]	[0.327]	[0.391]
age (adultchild)	-0.051	-0.046	-0.070*	-0.000
	[0.042]	[0.036]	[0.032]	[0.044]
age (grandparent)	-0.002	-0.072*	0.013	0.007
	[0.039]	[0.035]	[0.028]	[0.040]
adult child female (ref.=male)	0.241+	-0.008	0.329**	0.230
	[0.140]	[0.127]	[0.107]	[0.147]
grandmother (ref=male)	0.015	-0.092	-0.002	-0.052
	[0.150]	[0.138]	[0.109]	[0.151]
Adult child birth cohort (ref.= 1958-65)				
1966-72	0.322	0.125	0.064	0.439
	[0.435]	[0.351]	[0.302]	[0.368]
1973-77	-0.009	-0.543	0.003	0.259
	[0.634]	[0.530]	[0.458]	[0.609]
1978-80	-0.835	-1.680*	-0.671	-0.208
	[0.785]	[0.671]	[0.566]	[0.767]
> 1980	-1.906*	-2.415**	-2.185**	-1.024
	[0.905]	[0.804]	[0.676]	[0.937]
Grandparentbirthcohort (ref.= 1901-34)				
1935-39	-0.235	-0.289	0.321	-0.225
	[0.426]	[0.305]	[0.338]	[0.376]
1940-45	-0.246	-0.777+	0.367	0.009
	[0.549]	[0.454]	[0.438]	[0.524]
1946-50	-0.137	-1.006	0.297	-0.027
	[0.717]	[0.621]	[0.560]	[0.715]
> 1950	-0.410	-1.595*	0.323	-0.063
	[0.889]	[0.789]	[0.679]	[0.870]
Constant	0.472	4.660	-0.631	-2.374
	[3.131]	[2.965]	[2.423]	[3.147]
N	1459	3049	3089	1661

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

9.2. Model by single countries

Given this latter result, in order to further test the robustness of my results within this group, I run the model for each country separately (Table 3.7). Except for Sweden, Germany, Denmark and Switzerland, which show negative and nonsignificant coefficients for grandparental childcare propensity, all the other countries display a positive effect, although not always significant. The lack of significance is reasonable given the reduced sample size. Finally, since the pro-traditional cluster is supposedly the one with the highest frequency in grandparental childcare provision, I run the model changing the first-step dependent variable definition. Here, I code as 1 cases of grandparents providing at least daily childcare rather than the weekly minimum, which

is the case in my main model specification. Thus, I run the model separately for each country in the pro-traditional group.

Results presented in Table 3.7andTable 3.8show additional robustness checks described above. These results are coherent with the previous robustness checks. In other words, the effect of grandparental childcare propensity stays positive although not always significant, apart from Germany and Switzerland where this coefficient is slightly negative and not significant.

Table 3.7 Results from Second Step Estimation single country model (Dependent Variable: First birth transition)

	Sweden	Austria	Germany	Netherlands	Spain	Italy	France	Denmark	Greece	Switzerland	Belgium
grandparenting propensity	-0.534	0.244	-0.383	0.472	1.260*	1.850***	1.060	-0.938	1.189	-0.492	0.697
	[0.800]	[0.664]	[0.520]	[0.582]	[0.532]	[0.406]	[0.648]	[1.127]	[0.769]	[0.591]	[0.469]
age (adult child)	-0.066	0.042	0.013	-0.071	-0.125+	-0.014	-0.106	-0.048	0.094	-0.156	0.024
	[0.056]	[0.070]	[0.064]	[0.050]	[0.064]	[0.054]	[0.066]	[0.066]	[0.074]	[0.114]	[0.058]
age (grandparent)	0.024	-0.007	-0.009	0.056	-0.098	-0.097+	-0.022	-0.057	0.000	0.047	0.005
	[0.052]	[0.064]	[0.064]	[0.034]	[0.064]	[0.058]	[0.059]	[0.064]	[0.063]	[0.102]	[0.051]
adult child female (ref.=male)	0.259	-0.045	0.346	0.331+	-0.101	0.018	0.408+	0.298	-0.113	0.584+	0.297+
	[0.178]	[0.271]	[0.211]	[0.173]	[0.209]	[0.195]	[0.224]	[0.237]	[0.319]	[0.332]	[0.173]
grandmother (ref=male)	0.024	0.123	-0.049	0.023	-0.275	-0.014	-0.045	-0.010	-0.025	-0.512	-0.071
	[0.188]	[0.277]	[0.227]	[0.173]	[0.220]	[0.211]	[0.219]	[0.260]	[0.328]	[0.373]	[0.186]
Adult child birth cohort (ref.= 1958-65)											
1966-72	0.705	0.202	0.582	0.316	-0.229	0.276	-0.465	-0.203	0.791	0.591	0.490
	[0.606]	[0.599]	[0.576]	[0.483]	[0.612]	[0.520]	[0.658]	[0.674]	[0.832]	[0.931]	[0.496]
1973-77	-0.033	0.890	0.284	0.024	-1.214	-0.222	-0.213	0.197	0.893	-0.841	0.883
	[0.880]	[1.023]	[0.911]	[0.725]	[0.908]	[0.780]	[0.999]	[0.961]	[1.226]	[1.499]	[0.777]
1978-80	-0.954	0.326	0.166	-0.908	-2.526*	-0.756	-1.002	-0.639	-0.128	-2.277	0.763
	[1.088]	[1.222]	[1.156]	[0.896]	[1.119]	[1.007]	[1.221]	[1.187]	[1.570]	[1.894]	[0.966]
> 1980	-1.552	0.335	-1.606	-2.033+	-5.122**	-0.899	-2.558+	-3.349*	0.064	-3.347	-0.829
	[1.226]	[1.504]	[1.494]	[1.086]	[1.628]	[1.164]	[1.423]	[1.596]	[1.837]	[2.263]	[1.173]
Grandparent birth cohort (ref.= 1901-34)											
1935-39	-0.704	-0.438	-0.575	0.710	-0.440	-0.573	-0.543	0.235	0.437	0.067	0.906+
	[0.527]	[0.668]	[0.591]	[0.538]	[0.504]	[0.516]	[0.652]	[0.662]	[0.799]	[1.010]	[0.541]
1940-45	0.052	-0.029	-0.563	1.093+	-1.221	-1.022	-0.929	-1.249	0.045	0.449	0.857
	[0.677]	[0.879]	[0.856]	[0.642]	[0.799]	[0.745]	[0.885]	[0.945]	[1.132]	[1.193]	[0.700]
1946-50	0.096	-0.369	-0.513	1.263	-1.424	-1.546	-1.197	-1.038	0.459	1.019	0.870
	[0.912]	[1.218]	[1.202]	[0.792]	[1.112]	[1.036]	[1.089]	[1.187]	[1.414]	[1.660]	[0.930]
> 1950	-0.007	-0.813	-0.575	1.369	-2.398+	-2.249+	-1.325	-1.614	0.879	1.457	1.045
	[1.134]	[1.446]	[1.433]	[0.938]	[1.419]	[1.249]	[1.352]	[1.469]	[1.748]	[2.057]	[1.130]
Constant	-1.053	-2.960	-1.309	-3.767	10.304+	5.192	3.853	4.591	-7.151	-0.166	-4.471
	[4.230]	[5.038]	[5.300]	[3.376]	[5.406]	[4.607]	[5.193]	[5.229]	[5.928]	[7.588]	[4.223]
N	968	525	703	1058	856	1043	834	491	1150	433	1197

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table 3.8 Results from Second-Step, Second Robustness Check (Dependent Variable First Step: Daily Childcare Provision. Dependent Variable Second Step: First Birth Transition)

	Austria	Germany	Spain	Italy	Greece	Switzerland
grandparenting propensity	0.505	-0.810	0.992	2.118***	1.559+	-2.038
	[1.121]	[1.196]	[0.808]	[0.591]	[0.892]	[1.692]
age (adult child)	0.042	0.013	-0.123+	-0.012	0.101	-0.164
	[0.069]	[0.063]	[0.063]	[0.054]	[0.073]	[0.113]
age (grandparent)	-0.009	-0.004	-0.097	-0.083	0.004	0.018
	[0.064]	[0.062]	[0.065]	[0.057]	[0.063]	[0.101]
adult child female (ref.=male)	-0.043	0.340	-0.086	0.078	-0.110	0.539
	[0.270]	[0.211]	[0.208]	[0.193]	[0.319]	[0.333]
grandmother (ref=male)	0.125	-0.052	-0.313	-0.062	-0.054	-0.474
	[0.268]	[0.227]	[0.219]	[0.210]	[0.330]	[0.370]
Adult child birth cohort (ref.= 1958-65)						
1966-72	0.198	0.581	-0.198	0.298	0.831	0.538
	[0.592]	[0.574]	[0.605]	[0.514]	[0.838]	[0.925]
1973-77	0.874	0.279	-1.201	-0.218	0.952	-0.995
	[1.004]	[0.909]	[0.901]	[0.778]	[1.229]	[1.490]
1978-80	0.316	0.163	-2.558*	-0.822	-0.025	-2.459
	[1.208]	[1.154]	[1.111]	[1.004]	[1.574]	[1.879]
> 1980	0.312	-1.604	-5.162**	-0.938	0.236	-3.522
	[1.479]	[1.493]	[1.620]	[1.159]	[1.839]	[2.243]
Grandparent birth cohort (ref.= 1901-34)						
1935-39	-0.430	-0.541	-0.364	-0.408	0.483	-0.132
	[0.664]	[0.581]	[0.504]	[0.505]	[0.802]	[0.939]
1940-45	-0.035	-0.530	-1.187	-0.776	0.141	0.203
	[0.879]	[0.846]	[0.800]	[0.726]	[1.128]	[1.207]
1946-50	-0.399	-0.448	-1.386	-1.246	0.656	0.553
	[1.217]	[1.176]	[1.113]	[1.010]	[1.411]	[1.648]
> 1950	-0.853	-0.511	-2.304	-1.793	1.001	0.974
	[1.445]	[1.408]	[1.419]	[1.228]	[1.741]	[2.042]
Constant	-2.788	-1.719	10.340+	4.147	-7.631	2.389
	[4.904]	[5.147]	[5.403]	[4.485]	[5.895]	[7.845]
N	525	703	856	1043	1150	433

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Figure 3.3 Marginal effect of grandparental childcare on having a first birth by single of country (second step)

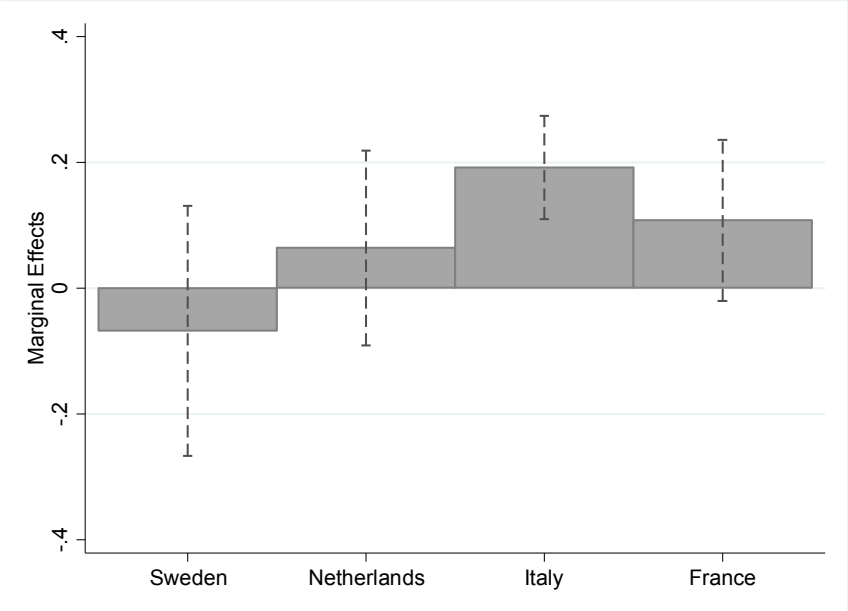
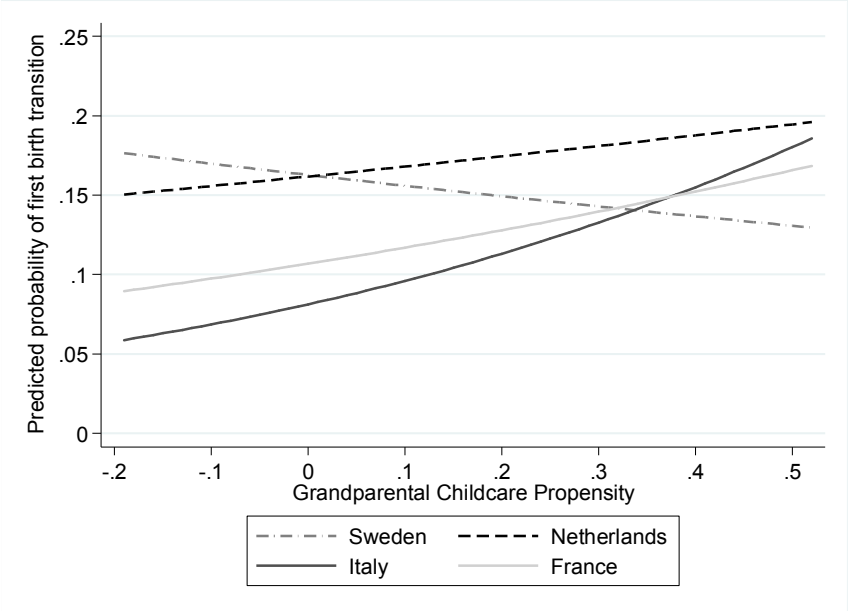


Figure 3.4 Predicted probability of having a first birth on grandparental childcare propensitysingle country (second step)



9.3 Pooled Model

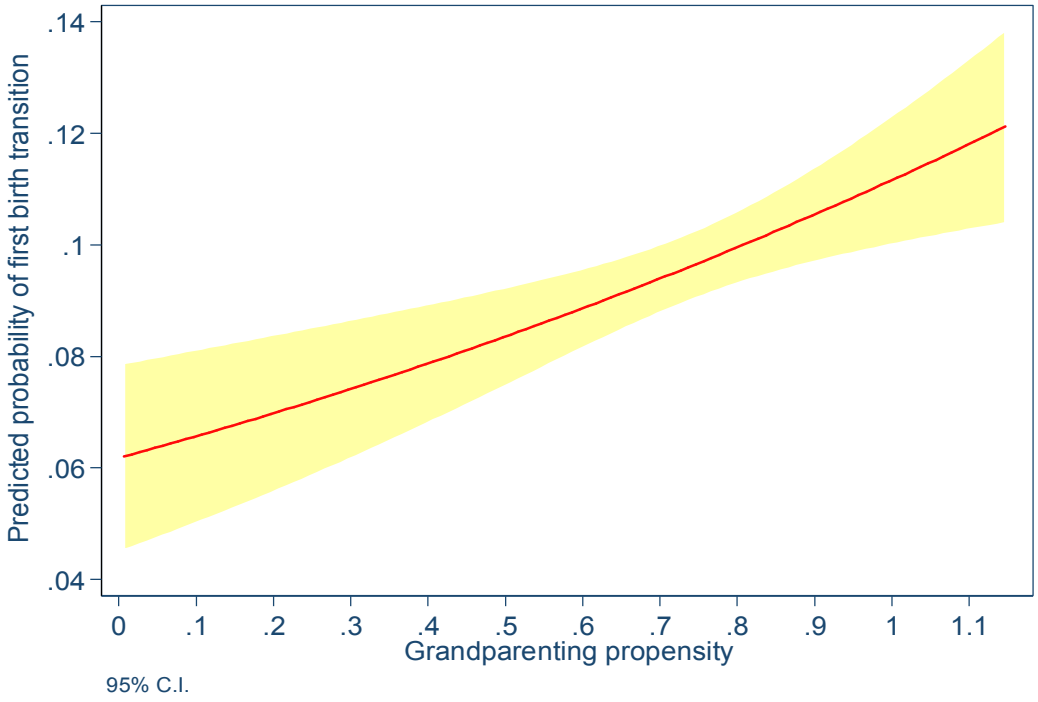
I also run a pooled model including a dummy variable for each country and I find a strong positive effect for grandparental propensity for providing childcare (Table 3.9and Figure 3.5). In this last specification, however, country dummy variables have strongly positive and significant coefficients. This represents an additional justification for running separate models for different clusters of countries.

Table 3.9 Results from Second Step Estimation (Dependent Variable: First Birth Transition)-Pooled Model

	(4)	(5)
Index for *grandparenting*	1.065***	1.068***
	[0.274]	[0.274]
Country (ref= Sweden)		
Austria	1.378***	1.379***
	[0.234]	[0.234]
Germany	1.241***	1.242***
	[0.206]	[0.206]
Netherlands	1.708***	1.709***
	[0.222]	[0.222]
Spain	1.055***	1.056***
	[0.217]	[0.217]
Italy	1.255***	1.257***
	[0.218]	[0.218]
France	0.997***	0.997***
	[0.211]	[0.211]
Denmark	1.541***	1.541***
	[0.201]	[0.201]
Greece	1.174***	1.175***
	[0.220]	[0.220]
Switzerland	1.464***	1.465***
	[0.203]	[0.203]
Belgium	0.952***	0.952***
	[0.251]	[0.251]
Adult child birth cohort (ref=1941-1965)		
1966-19732	0.464*	0.464*
	[0.211]	[0.211]
1973-1977	-0.126	-0.127
	[0.296]	[0.296]
1978-1980	-0.833*	-0.835*
	[0.352]	[0.352]
1981-1984	-2.323***	-2.325***
	[0.431]	[0.431]
>1985	-3.801***	-3.802***
	[0.609]	[0.609]
Gender of the adult child (ref=male)	0.959**	0.931**
	[0.297]	[0.293]
Grandparents' birth cohort (ref=1908-1939)		
1939-1945	0.162	0.161
	[0.162]	[0.162]
1946-1951	0.315	0.312
	[0.227]	[0.227]
>1952	0.515+	0.512+

Gender of the grandparent (ref=male)	-0.084	-0.114
	[0.108]	[0.080]
Gender of the adult child*gender of the grandparent (ref=male*male)	-0.063	
	[0.152]	
Gender of the adult child**grandparenting* propensity	-0.883*	-0.890*
	[0.382]	[0.381]
Age o fthe adult child	-0.062***	-0.062***
	[0.018]	[0.018]
Age of the grandparent	0.017	0.017
	[0.015]	[0.015]
Constant	-3.083*	-3.054*
	[1.209]	[1.209]

Figure 3.5 Predicted probability of having a first birth for increasing value of grandparents' indicator (Pooled model)



9.4 Bootstrap: training and prediction

Here I took randomly one half of my sample, in the first step, and I train the model on it. Afterwards, I use the other half of that sample to predict my grandparental childcare propensity measure. I repeated this process 1000 times (this number of iteration was determined from a formal test reported below). So I ended up with a dataset in which I can compare 1000 predictions and their corresponding 1000 real values. I standardized

my grandparental childcare propensity measure in order to set it between [0,1] (as the variable I am predicting is between 0 and 1). Once I standardized my measure, I computed the median value of the prediction for both values of the dependent variable (i.e. the median value of prediction when DV=0 and a median value when DV=1). After computing median values, I compute the difference between the dependent variable I predict and the actual median value of prediction. Results are shown in Figure 4. As we can see from the graph, for the three groups of countries and for each value of the dependent variable this difference in median values is fairly small (about 0.18 in the worst case scenario).

Initial estimate of bootstrap size needed for standard errors

---

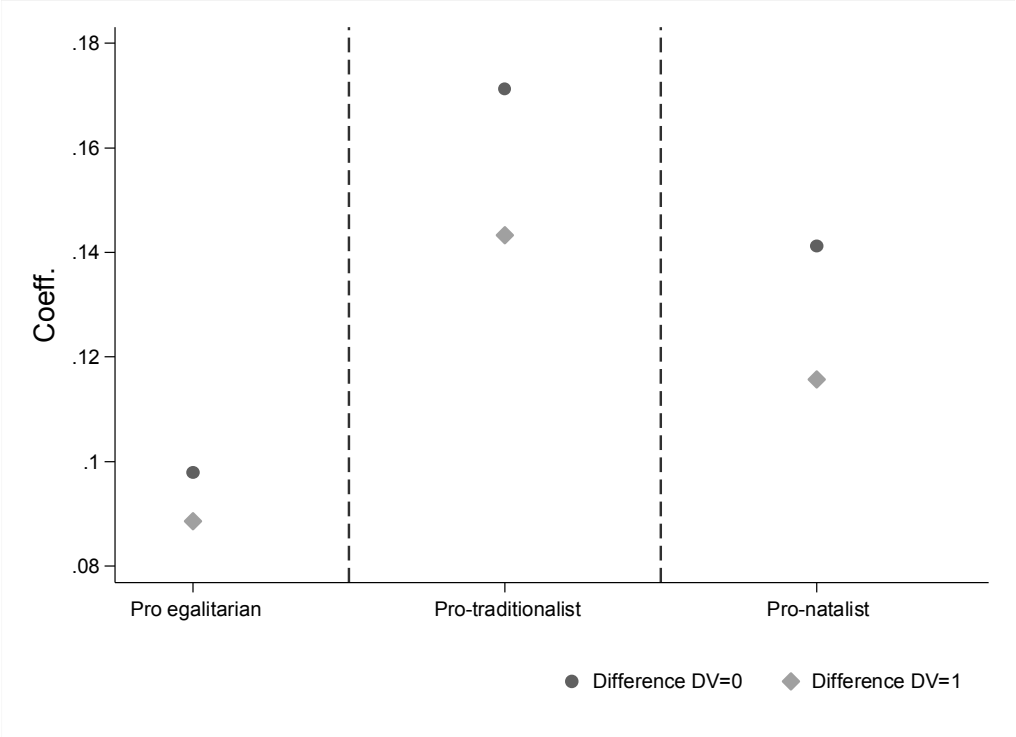
Percent deviation from Binfinity (pdb) 5.000

Probability (1 - tau) 0.950

Required size (B1) 768

The output was the same for each subsample, so I decide to do 1000 iteration to be safe.

Figure 3.6 Difference in estimates between the real estimates and their predictions (1000 Iteration)



Furthermore, I run a cross validation analysis. I randomly divide the sample in five numerically equal subsamples. Then, for each of this subsamples I used the 80% of the data to train and 20% to test the model. Also, I repeated this five cross validation technique 100 times (according to a rule of thumb for cross validation) and computed the average RMSE (Root mean square error). RMSE is an absolute measure of fit and it is also used to measure reliability of the model predictive power. In my case, the average value of the RMSE is around 0.4 for every group of countries. The scale is the same of the dependent variable, i.e. from 0 to 1. Smaller values of RMSE correspond to better fit and higher reliability. I can consider my 0.4 out of 1 acceptable.

9.5 Estimates of different types of index.

Here, I tried to build alternative indexes, by dropping some groups of variables in order to test whether the significance among coefficients changes in different specifications. Specifically I run three alternative specifications:

a) I drop all the variables related with physical health
b) I drop all the variables related with cognitive functions

c) I keep only self-perceived health as a measure of both physical and cognitive health

From the results, it is clear that even by changing specification, both signs and significance of the coefficients remains substantially unchanged. Thus, keeping everything else equal it is better to include more variables in order to grasp anything. This is particularly useful as we are using a two-step strategy.

a) Index without variables on physical health

Table3.10 Results from First Step Estimation (Dependent Variable: Grandparental Regular Childcare Provision)

	Pro-egalitarian	Pro-traditional	Pro-natalist
1935-1939	0.032	0.024	0.008
	[0.022]	[0.024]	[0.030]
1940-1945	0.032	0.031	0.035
	[0.031]	[0.034]	[0.041]
1946-1950	0.037	0.050	0.029
	[0.042]	[0.047]	[0.054]
> 1951	0.048	0.058	0.000
	[0.052]	[0.060]	[0.068]
female(ref=male)	0.019	0.016	0.026+
	[0.012]	[0.013]	[0.016]
single(ref=living with partner)	-0.006	-0.024	-0.031+
	[0.014]	[0.015]	[0.017]
employed/self-employed (ref=retired)	-0.058***	-0.064***	-0.020
	[0.016]	[0.018]	[0.022]
unemployed	-0.033	-0.070*	-0.001
	[0.032]	[0.033]	[0.031]
Others	-0.040	-0.055	-0.014
	[0.027]	[0.037]	[0.037]
Gp_age	-0.002	-0.002	-0.003
	[0.002]	[0.002]	[0.003]
n.of grandchildren (ref=1)			
2	0.000	0.028+	0.013
	[0.018]	[0.015]	[0.021]
3	0.025	0.063***	0.069**
	[0.021]	[0.019]	[0.026]
4	0.025	0.042*	0.098***
	[0.020]	[0.021]	[0.028]
5+	0.003	0.059**	0.079**
	[0.019]	[0.020]	[0.024]
n. of adult children(ref=1)			
2	-0.129***	-0.239***	-0.247***
	[0.037]	[0.025]	[0.036]
3	-0.189***	-0.348***	-0.332***
	[0.037]	[0.026]	[0.037]
4	-0.214***	-0.410***	-0.397***
	[0.038]	[0.028]	[0.038]
part-time (ref=full time employed)	0.085***	0.056**	0.016
	[0.015]	[0.018]	[0.019]
unemployed	0.003	-0.001	-0.059*
	[0.028]	[0.029]	[0.029]
others	-0.009	-0.028+	-0.068***
	[0.014]	[0.016]	[0.020]
sex of the adult children (ref=male)	0.048***	0.113***	0.073***
	[0.010]	[0.013]	[0.014]
depression scale	0.004	-0.001	-0.003
	[0.003]	[0.003]	[0.003]
care for sick disabled adult	0.018	0.072**	-0.012
	[0.024]	[0.026]	[0.022]
voluntary work	0.010	-0.005	0.000
	[0.015]	[0.024]	[0.020]
social activities	0.007	-0.001	0.004
	[0.012]	[0.019]	[0.019]
help to care spouse	-0.066*	-0.028	-0.085*
	[0.032]	[0.037]	[0.034]
Self-perceived health (ref=excellent)			
very good	-0.015	-0.018	0.004
	[0.016]	[0.026]	[0.026]
good	-0.039*	-0.010	-0.001
	[0.016]	[0.025]	[0.024]

fair	-0.046*		-0.010		-0.026		
	[0.021]		[0.026]		[0.027]		
Poor	-0.064*		0.012		0.014		
	[0.031]		[0.034]		[0.038]		
numeracy score (ref=bad)							
2	-0.008		-0.007		0.015		
	[0.054]		[0.025]		[0.030]		
3	0.010		0.025		0.012		
	[0.053]		[0.024]		[0.029]		
4	0.007		0.003		0.010		
	[0.053]		[0.026]		[0.031]		
Good	-0.009		0.009		0.033		
	[0.053]		[0.030]		[0.035]		
Orientation in date (ref=bad)							
Fair	-0.097		-0.019		-0.128*		
	[0.086]		[0.047]		[0.065]		
Good	-0.130		-0.024		-0.113+		
	[0.085]		[0.045]		[0.063]		
word listing	-0.001		-0.007*		0.005		
	[0.003]		[0.003]		[0.004]		
verbal fluency score	0.001		-0.001		0.001		
	[0.001]		[0.001]		[0.001]		
contact with the adult child (ref=no contact)							
at least weekly	-0.076***		-0.115***		-0.108***		
	[0.009]		[0.016]		[0.015]		
Rarely	-0.092**		-0.043		-0.252***		
	[0.032]		[0.041]		[0.024]		
geographical proximity (ref=coresident)							
less than 5 Km	-0.081*		-0.256***		0.000		
	[0.033]		[0.044]		[.]		
between 5 and 25Km	-0.111***		-0.143***		-0.124***		
	[0.015]		[0.017]		[0.019]		
between 25 and 100 Km	-0.160***		-0.323***		-0.227***		
	[0.015]		[0.020]		[0.020]		
more than 100Km	-0.214***		-0.384***		-0.314***		
	[0.013]		[0.014]		[0.019]		
Area of building (ref= bigtown)							
Town	-0.001		0.025+		-0.022		
	[0.012]		[0.014]		[0.016]		
rural area	0.008		0.023		0.021		
	[0.014]		[0.016]		[0.020]		
country (ref=Sweden)		country (ref=Austria)					
Netherlands	0.026+	Germany	0.032				
	[0.013]		[0.021]				
Denmark	-0.015	Spain	0.059*				
	[0.013]		[0.023]				
		Italy	0.100***				
			[0.024]				
		Greece	0.083***				
			[0.023]	country (ref=France)			
		Switzerland	0.052+	Belgium	0.023		
			[0.030]		[0.015]		
Constant	0.482***		0.619***		0.662***		
	[0.106]		[0.072]		[0.091]		
N	4520		5140		3670		

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

b) Index without variables on cognitive functions

Table 3.11 Results from First Step Estimation (Dependent Variable: Grandparental Regular Childcare Provision)

	Pro-egalitarian	Pro-traditional	Pro-natalist
1935-1939	0.029	0.030	0.020
	[0.022]	[0.024]	[0.030]
1940-1945	0.034	0.040	0.058
	[0.031]	[0.034]	[0.041]
1946-1950	0.038	0.067	0.058
	[0.043]	[0.047]	[0.054]
> 1951	0.050	0.073	0.040
	[0.053]	[0.060]	[0.068]
female(ref=male)	0.024*	0.016	0.018
	[0.011]	[0.014]	[0.017]
single(ref=living with partner)	-0.007	-0.022	-0.032+
	[0.013]	[0.015]	[0.017]
employed/self-employed (ref=retired)	-0.059***	-0.069***	-0.015
	[0.016]	[0.018]	[0.022]
unemployed	-0.027	-0.070*	-0.008
	[0.032]	[0.034]	[0.030]
Others	-0.034	-0.062	-0.016
	[0.028]	[0.038]	[0.036]
Gp_age	-0.002	-0.001	-0.001
	[0.002]	[0.002]	[0.003]
n.of grandchildren (ref=1)			
2	-0.002	0.028+	0.015
	[0.018]	[0.015]	[0.021]
3	0.026	0.062**	0.069**
	[0.021]	[0.019]	[0.026]
4	0.026	0.047*	0.100***
	[0.020]	[0.021]	[0.027]
5+	0.003	0.060**	0.076**
	[0.019]	[0.019]	[0.024]
n. of adult children(ref=1)			
2	-0.127***	-0.241***	-0.245***
	[0.037]	[0.025]	[0.036]
3	-0.188***	-0.350***	-0.333***
	[0.037]	[0.026]	[0.037]
4	-0.212***	-0.416***	-0.396***
	[0.038]	[0.028]	[0.038]
part-time (ref=full time employed)	0.085***	0.055**	0.017
	[0.015]	[0.018]	[0.019]
unemployed	0.004	0.001	-0.061*
	[0.027]	[0.029]	[0.028]
others	-0.008	-0.029+	-0.068***
	[0.014]	[0.016]	[0.019]
sex of the adult children (ref=male)	0.048***	0.113***	0.073***
	[0.010]	[0.013]	[0.014]
depression scale	0.004	-0.000	-0.003
	[0.003]	[0.003]	[0.003]
care for sick disabled adult	0.022	0.070**	-0.011
	[0.024]	[0.026]	[0.022]
voluntary work	0.008	-0.005	0.002
	[0.015]	[0.024]	[0.020]
social activities	0.005	-0.009	0.006
	[0.012]	[0.019]	[0.019]
help to care spouse	-0.064*	-0.028	-0.092**
	[0.031]	[0.037]	[0.035]

Self-perceived health (ref=excellent)			
very good	-0.014	-0.022	0.006
	[0.016]	[0.026]	[0.025]
good	-0.034*	-0.011	-0.002
	[0.017]	[0.025]	[0.024]
fair	-0.033	-0.011	-0.031
	[0.023]	[0.027]	[0.028]
Poor	-0.053	0.010	0.008
	[0.035]	[0.036]	[0.042]
limited activities (ref=severely limited)			
limited but not severely	0.009	0.007	-0.003
	[0.018]	[0.022]	[0.029]
not limited	0.016	0.006	-0.032
	[0.019]	[0.024]	[0.030]
Grip strenght test	0.004	-0.024	0.078*
	[0.025]	[0.024]	[0.032]
Smoking(ref= currently smoking)	0.004	0.017	-0.022
no daily smoking for at least one year	[0.013]	[0.015]	[0.020]
	0.026+	0.036*	-0.049*
stopped smoking	[0.014]	[0.017]	[0.021]
Sport (ref=more than once a week)			
once a week	-0.002	-0.015	0.000
	[0.015]	[0.016]	[0.021]
one to three times a month	-0.000	-0.058**	0.007
	[0.019]	[0.020]	[0.026]
hardly ever or never	-0.008	-0.005	-0.026
	[0.013]	[0.014]	[0.017]
contact with the adult child (ref=no contact)			
at least weekly	-0.076***	-0.111***	-0.108***
	[0.009]	[0.016]	[0.015]
Rarely	-0.076*	-0.059	-0.251***
	[0.032]	[0.036]	[0.024]
geographical proximity (ref=coresident)			
less than 5 Km	-0.098**	-0.242***	0.001
	[0.032]	[0.040]	[0.022]
between 5 and 25Km	-0.113***	-0.145***	-0.123***
	[0.015]	[0.017]	[0.019]
between 25 and 100 Km	-0.162***	-0.324***	-0.226***
	[0.015]	[0.020]	[0.020]
more than 100Km	-0.215***	-0.387***	-0.312***
	[0.013]	[0.014]	[0.019]
Area of building (ref= bigtown)			
Town	0.000	0.025+	-0.028+
	[0.012]	[0.014]	[0.016]
rural area	0.009	0.026	0.011
	[0.015]	[0.016]	[0.019]

		country (ref=Austria)			
		Germany	0.025		
			[0.021]		
		Spain	0.062**		
			[0.023]		
		Italy	0.102***		
country (ref=Sweden)			[0.023]		
Netherlands	0.023+	Greece	0.090***		
	[0.013]		[0.021]	country (ref=France)	
Denmark	-0.014	Switzerland	0.048	Belgium	0.017
	[0.013]		[0.030]		[0.014]
Constant	0.355***		0.555***		0.641***
	[0.054]		[0.055]		[0.066]
N	4520		5140		3670

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

b) Index with only perceived health

Table 3.12 Results from First Step Estimation (Dependent Variable: Grandparental Regular Childcare Provision)

	Pro-egalitarian	Pro-tradition	Pro-natalist
1935-1939	0.027	0.025	0.015
	[0.022]	[0.024]	[0.030]
1940-1945	0.029	0.036	0.044
	[0.031]	[0.034]	[0.040]
1946-1950	0.030	0.059	0.041
	[0.042]	[0.047]	[0.054]
> 1951	0.041	0.066	0.016
	[0.052]	[0.059]	[0.067]
female(ref=male)	0.020+	0.012	0.023
	[0.011]	[0.013]	[0.015]
single(ref=living with partner)	-0.004	-0.024+	-0.034*
	[0.013]	[0.015]	[0.017]
employed/self-employed (ref=retired)	-0.059***	-0.067***	-0.016
	[0.016]	[0.018]	[0.022]
unemployed	-0.030	-0.067*	-0.003
	[0.032]	[0.033]	[0.031]
Others	-0.035	-0.054	-0.014
	[0.028]	[0.037]	[0.036]
Gp_age	-0.002	-0.001	-0.002
	[0.002]	[0.002]	[0.003]
n.of grandchildren (ref=1)			
2	-0.001	0.029+	0.014
	[0.018]	[0.015]	[0.021]
3	0.024	0.063**	0.070**
	[0.021]	[0.019]	[0.025]
4	0.025	0.047*	0.099***
	[0.020]	[0.021]	[0.027]
5+	0.003	0.060**	0.077**
	[0.019]	[0.019]	[0.024]
n. of adult children(ref=1)			
2	-0.130***	-0.241***	-0.244***
	[0.037]	[0.025]	[0.036]
3	-0.190***	-0.348***	-0.329***
	[0.037]	[0.026]	[0.037]
4	-0.215***	-0.413***	-0.396***
	[0.038]	[0.028]	[0.038]
part-time (ref=full time employed)	0.085***	0.056**	0.016
	[0.015]	[0.018]	[0.019]
unemployed	0.004	-0.002	-0.062*
	[0.027]	[0.029]	[0.029]
others	-0.008	-0.029+	-0.067***
	[0.014]	[0.016]	[0.019]
sex of the adult children (ref=male)	0.048***	0.113***	0.072***
	[0.010]	[0.013]	[0.014]
care for sick disabled adult	0.022	0.072**	-0.012
	[0.023]	[0.025]	[0.022]
voluntary work	0.008	-0.006	0.003
	[0.015]	[0.024]	[0.020]
social activities	0.006	-0.005	0.006
	[0.012]	[0.019]	[0.018]
help to care spouse	-0.063*	-0.031	-0.089*
	[0.031]	[0.037]	[0.035]

Self-perceived health (ref=excellent)					
very good	-0.015		-0.021		0.006
	[0.016]		[0.026]		[0.026]
good	-0.037*		-0.010		-0.005
	[0.015]		[0.025]		[0.023]
fair	-0.038*		-0.009		-0.034
	[0.019]		[0.026]		[0.027]
Poor	-0.056+		0.012		-0.004
	[0.030]		[0.033]		[0.036]
contact with the adult child (ref=no contact)					
at least weekly	-0.076***		-0.114***		-0.109***
	[0.009]		[0.016]		[0.015]
Rarely	-0.084**		-0.041		-0.251***
	[0.030]		[0.032]		[0.024]
geographical proximity (ref=coresident)					
less than 5 Km	-0.087**		-0.259***		0.000
	[0.031]		[0.036]		[.]
between 5 and 25Km	-0.111***		-0.144***		-0.123***
	[0.015]		[0.017]		[0.019]
between 25 and 100 Km	-0.160***		-0.324***		-0.224***
	[0.015]		[0.020]		[0.020]
more than 100Km	-0.213***		-0.385***		-0.310***
	[0.013]		[0.014]		[0.018]
Area of building (ref= bigtown)					
Town	0.001		0.028*		-0.023
	[0.012]		[0.014]		[0.016]
rural area	0.008		0.028+		0.020
	[0.014]		[0.016]		[0.019]
		country (ref=Austria)			
		Germany	0.029		
			[0.021]		
		Spain	0.070**		
			[0.021]		
		Italy	0.110***		
country (ref=Sweden)			[0.022]		
Netherlands	0.023+	Greece	0.089***		
	[0.013]		[0.021]	country (ref=France)	
Denmark	-0.017	Switzerland	0.050+	Belgium	0.024+
	[0.013]		[0.030]		[0.014]
Constant	0.380***		0.567***		0.584***
	[0.049]		[0.048]		[0.058]
N	4520		5140		3670

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

9.6. Estimating an index for any positive childcare frequency

In this robustness check, I run my models including, in the first step, as independent variable any positive frequency of grandparental childcare provision. As we can see from marginal effects in Figure 3.7once I widened frequency of grandparental childcare provisions, I obtain larger coefficients across all the three groups. Further, pro-egalitarian countries show a positive effect. The predictive probabilities of pronatalist and protraditional (Figure 3.8) show a more similar trend to the one presented in paper, i.e. for more "regular" childcare. By including sporadic grandparental childcare may involve too heterogeneous types of grandparental provisions. Specifically, I could not

distinguish grandparents who look after grandchildren during a specific period of the year (e.g. summer holidays) from grandparents who sporadically visit their grandchildren. Moreover, in the literature there is a clear trade-off between frequency and prevalence of grandparental childcare provision across European countries

Table 3.13 Results from First Step Estimation (Dependent Variable: Grandparental Childcare Provision at any frequency)

	Pro-egalitarian	Pro-traditional	Pro-natalist
1935-1939	0.007	0.055**	-0.046
	[0.025]	[0.021]	[0.028]
1940-1945	-0.022	0.070*	-0.035
	[0.035]	[0.029]	[0.038]
1946-1950	-0.053	0.101*	-0.054
	[0.047]	[0.040]	[0.051]
> 1951	-0.080	0.124*	-0.055
	[0.059]	[0.051]	[0.064]
female(ref=male)	-0.001	0.021+	-0.004
	[0.012]	[0.012]	[0.015]
single(ref=living with partner)	-0.004	-0.011	-0.018
	[0.014]	[0.013]	[0.016]
employed/self-employed (ref=retired)	-0.003	-0.003	-0.019
	[0.015]	[0.015]	[0.017]
unemployed	0.002	0.027	-0.041
	[0.031]	[0.029]	[0.028]
Others	-0.053+	-0.002	0.001
	[0.027]	[0.037]	[0.036]
Gp_age	-0.007**	0.003	-0.008**
	[0.002]	[0.002]	[0.003]
n.of grandchildren (ref=1)			
2	0.045***	0.015	0.020
	[0.012]	[0.010]	[0.013]
3	0.128***	0.085***	0.101***
	[0.016]	[0.015]	[0.018]
4	0.181***	0.067***	0.172***
	[0.017]	[0.016]	[0.020]
5+	0.176***	0.080***	0.181***
	[0.017]	[0.016]	[0.018]
n. of adult children(ref=1)			
2	-0.408***	-0.363***	-0.367***
	[0.016]	[0.014]	[0.016]
3	-0.531***	-0.495***	-0.513***
	[0.018]	[0.016]	[0.018]
4	-0.664***	-0.580***	-0.639***
	[0.020]	[0.020]	[0.022]
part-time (ref=full time employed)	0.127***	0.105***	0.048*
	[0.018]	[0.018]	[0.020]
unemployed	-0.055	0.013	-0.074*
	[0.038]	[0.028]	[0.034]
others	-0.010	0.051**	-0.044+
	[0.020]	[0.017]	[0.025]
sex of the adult children (ref=male)	0.067***	0.108***	0.077***
	[0.015]	[0.014]	[0.016]
depression scale	-0.003	-0.002	-0.001
	[0.003]	[0.003]	[0.003]
care for sick disabled adult	-0.004	0.033+	-0.002
	[0.019]	[0.019]	[0.022]
voluntary work	0.034*	-0.020	0.028
	[0.015]	[0.020]	[0.020]
social activities	0.017	-0.006	0.001
	[0.013]	[0.015]	[0.017]
help to care spouse	-0.006	-0.015	-0.025
	[0.033]	[0.030]	[0.039]
Self-perceived health (ref=excellent)			
very good	-0.006	0.006	-0.001
	[0.016]	[0.021]	[0.021]
good	-0.033*	-0.010	-0.003
	[0.016]	[0.019]	[0.020]
fair	-0.009	-0.010	-0.001
	[0.022]	[0.021]	[0.025]
Poor	0.041	-0.003	-0.032
	[0.039]	[0.031]	[0.038]

fair	-0.009	-0.010	-0.001
	[0.022]	[0.021]	[0.025]
Poor	0.041	-0.003	-0.032
	[0.039]	[0.031]	[0.038]
limited activities (ref=severely limited)			
limited but not severely	0.015	-0.003	-0.040
	[0.018]	[0.020]	[0.025]
not limited	0.016	0.015	-0.016
	[0.019]	[0.021]	[0.026]
Grip strenght test	-0.037	0.020	0.014
	[0.024]	[0.021]	[0.030]
Smoking(ref= currently smoking)			
no daily smoking for at least one year	-0.005	0.010	-0.026
	[0.013]	[0.013]	[0.017]
stopped smoking	-0.001	0.032*	-0.022
	[0.013]	[0.015]	[0.018]
Sport (ref=more than once a week)			
once a week	-0.000	0.000	-0.020
	[0.015]	[0.013]	[0.018]
one to three times a month	-0.008	-0.010	0.001
	[0.018]	[0.016]	[0.022]
hardly ever or never	-0.003	0.001	-0.027+
	[0.013]	[0.012]	[0.015]
numeracy score (ref=bad)			
2	-0.032	0.045*	0.031
	[0.040]	[0.022]	[0.031]
3	-0.033	0.037+	0.030
	[0.038]	[0.020]	[0.029]
4	-0.009	0.046*	0.038
	[0.038]	[0.022]	[0.031]
Good	-0.019	0.054*	0.063+
	[0.039]	[0.026]	[0.035]
Orientation in date (ref=bad)			
Fair	-0.077	-0.016	-0.029
	[0.074]	[0.038]	[0.051]
Good	-0.105	-0.027	-0.024
	[0.073]	[0.035]	[0.048]
word listing	0.004	-0.003	0.006+
	[0.003]	[0.003]	[0.003]

verbal fluency score		-0.001		-0.001+	0.000
		[0.001]		[0.001]	[0.001]
contact with the adult child	(ref=no contact)				
		-0.179***		-0.217***	-0.163***
at least weekly		[0.021]		[0.022]	[0.023]
		-0.324***		-0.394***	-0.283***
Rarely		[0.038]		[0.042]	[0.030]
geographical proximity (ref=coresident)					
		0.090*		0.044	0.189***
less than 5 Km		[0.038]		[0.045]	[0.027]
		0.085*		-0.010	0.146***
between 5 and 25Km		[0.034]		[0.046]	[0.027]
		0.013		-0.145**	0.112***
between 25 and 100 Km		[0.041]		[0.049]	[0.029]
		-0.112**		-0.210***	0.000
more than 100Km		[0.042]		[0.039]	[.]
Area of building (ref= bigtown)					
Town		0.015		0.015	-0.043**
		[0.012]		[0.012]	[0.015]
rural area		-0.004		-0.019	0.006
		[0.015]		[0.014]	[0.018]
			country (ref =Austria)		
			Germany	0.041*	
				[0.018]	
			Spain	0.036+	
				[0.021]	
country (ref=Sweden)			Italy	0.008	
Netherlands		-0.004		[0.021]	
				0.005	
		[0.014]	Greece	[0.020]	country (ref=France)
Denmark		0.012		0.035	-0.054***
		[0.014]	Switzerland	[0.026]	Belgium [0.013]
Constant		0.980***		0.814***	0.891***
		[0.099]		[0.079]	[0.077]
N		4520		5140	3670

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Table 3.14 Results from Second Step Estimation (Dependent Variable: first birth transition)

	Pro-egalitarian	Pro-traditional	Pro-natalist
grandparenting propensity	0.283	1.090***	1.233***
	[0.246]	[0.186]	[0.262]
age (adult child)	-0.058+	-0.024	-0.036
	[0.032]	[0.028]	[0.044]
age (grandparent)	0.025	-0.040	0.001
	[0.027]	[0.026]	[0.040]
adult child female (ref.=male)	0.273*	0.072	0.279*
	[0.109]	[0.096]	[0.137]
grandmother (ref=male)	0.008	-0.087	-0.040
	[0.113]	[0.101]	[0.143]
Adult child birth cohort (ref.= 1958-65)			
1966-72	0.317	0.235	0.059
	[0.327]	[0.249]	[0.394]
1973-77	-0.000	-0.214	0.365
	[0.481]	[0.396]	[0.604]
1978-80	-0.864	-1.052*	0.048
	[0.594]	[0.501]	[0.748]
> 1980	-1.893**	-1.795**	-1.431
	[0.699]	[0.608]	[0.890]
Grandparent birth cohort (ref.= 1901-34)			
1935-39	0.142	-0.287	0.243
	[0.337]	[0.237]	[0.459]
1940-45	0.330	-0.482	0.061
	[0.421]	[0.343]	[0.614]
1946-50	0.477	-0.635	-0.034
	[0.538]	[0.469]	[0.783]
> 1950	0.386	-0.976+	-0.002
	[0.656]	[0.583]	[0.954]
Constant	-1.600	1.622	-1.498
	[2.329]	[2.166]	[3.434]
N	**2518**	**4710**	**2031**

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

Figure 3.7 Marginal Effect of Grandparental Childcare Propensity on Having a First Birth by Group of Country (Second Step, any positive childcare provision)

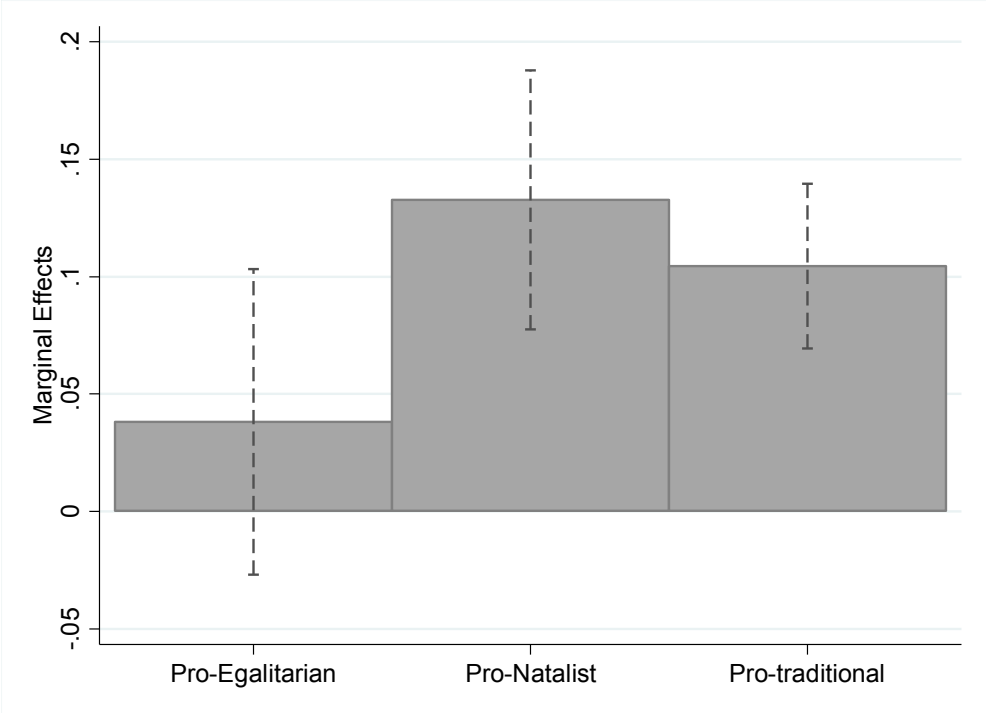
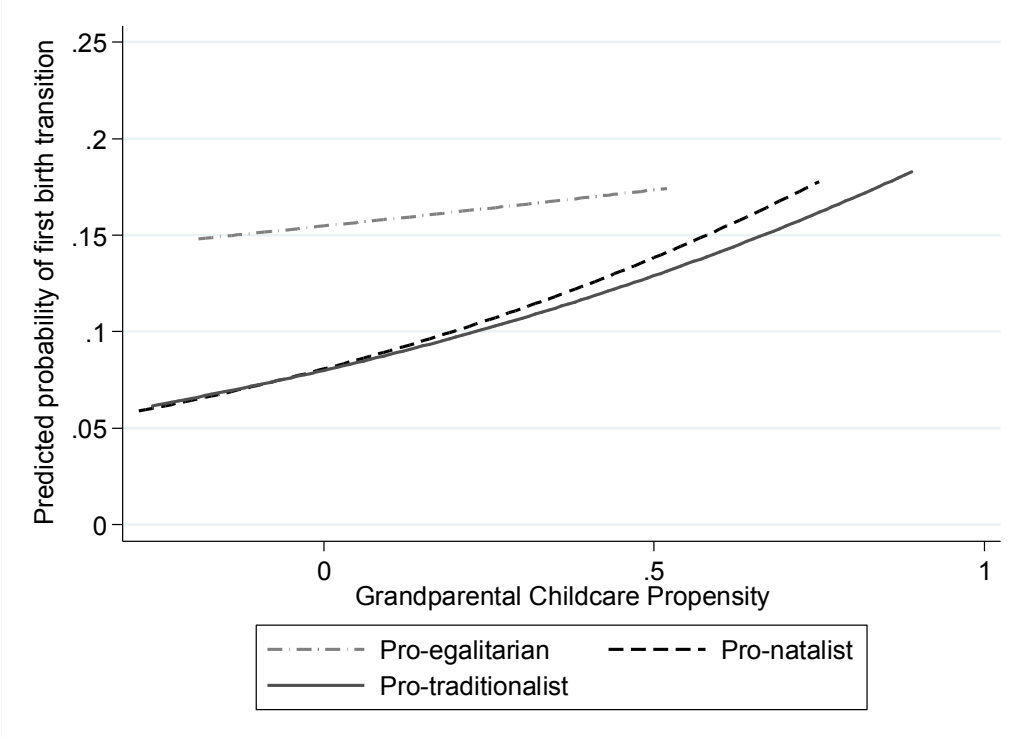


Figure 3.8 Predictive Probability of Having a First Birth on Grandparental Childcare Propensity by Group of Countries (Second Step)



9.7 Logistic model in the first step

Table 3.15 Results from First Step Estimation (Dependent Variable: Grandparental Childcare Provision)

	Pro-egalitari	Pro-traditional	Pro-natalist
female (ref=male)	0.248*	0.150+	0.136
	[0.109]	[0.086]	[0.115]
single (ref. = living with a	-0.066	-0.132	-0.221+
	[0.125]	[0.090]	[0.115]
employed/selfemployed	-0.539***	-0.415***	-0.160
	[0.140]	[0.109]	[0.136]
unemployed	-0.195	-0.509*	-0.010
	[0.285]	[0.232]	[0.193]
other	-0.289	-0.504+	-0.231
	[0.223]	[0.267]	[0.242]
Gp_age	-0.033***	-0.029***	-0.026**
	[0.009]	[0.006]	[0.008]
n. of grandchildren (ref.=1)			
2	0.022	0.165+	0.101
	[0.153]	[0.094]	[0.142]
3	0.221	0.380**	0.454**
	[0.168]	[0.116]	[0.166]
4	0.248	0.256*	0.656***
	[0.172]	[0.126]	[0.175]
5+	0.033	0.401***	0.535**
	[0.167]	[0.121]	[0.166]
n. of adult children (ref.=1)			
2	-0.836***	-1.291***	-1.228***
	[0.208]	[0.143]	[0.190]
3	-1.355***	-1.937***	-1.823***
	[0.222]	[0.152]	[0.202]
4	-1.722***	-2.428***	-2.374***
	[0.237]	[0.170]	[0.220]
Adult child employment status			
part time self employed	0.614***	0.293**	0.067
	[0.112]	[0.097]	[0.113]
unemployed	0.002	0.007	-0.412+
	[0.288]	[0.188]	[0.216]
Other	-0.135	-0.205*	-0.625***
	[0.153]	[0.103]	[0.187]
sex of adult child (ref. = m	0.487***	0.724***	0.567***
	[0.096]	[0.076]	[0.091]
depression scale	0.027	-0.004	-0.012
	[0.029]	[0.018]	[0.024]
care for sick adult	0.108	0.399*	-0.126
	[0.195]	[0.156]	[0.158]
voluntary work	0.090	-0.021	0.002
	[0.129]	[0.155]	[0.135]

social activities	0.058	-0.036	0.025
	[0.111]	[0.118]	[0.125]
help to care spouse (ref=r	-0.592+	-0.118	-0.821**
	[0.346]	[0.223]	[0.285]
Self perceived health (ref. excellent)			
very good	-0.094	-0.141	0.068
	[0.149]	[0.158]	[0.171]
good	-0.336*	-0.090	0.048
	[0.153]	[0.149]	[0.164]
fair	-0.330	-0.096	-0.166
	[0.206]	[0.161]	[0.197]
poor	-0.373	0.037	0.264
	[0.351]	[0.211]	[0.299]
limited activities (ref.= severly limited)			
limited, but not severely	0.119	0.066	0.042
	[0.169]	[0.129]	[0.195]
not limited	0.162	0.073	-0.129
	[0.171]	[0.141]	[0.200]
Grip strenght test	-0.027	-0.152	0.577**
	[0.214]	[0.147]	[0.214]
Smoking (ref.= currently smoking)			
no daily smoking for at lea	0.100	0.087	-0.110
	[0.124]	[0.095]	[0.128]
stopped smoking	0.254*	0.213*	-0.318*
	[0.126]	[0.108]	[0.137]
Sport (ref, = more than once a week)			
once a week	-0.005	-0.125	0.033
	[0.136]	[0.098]	[0.133]
one to three times a mon	0.090	-0.411***	0.060
	[0.175]	[0.124]	[0.170]
hardly ever, or never	-0.057	-0.057	-0.157
	[0.116]	[0.087]	[0.114]
numeracy score (ref.= bad)			
2	-0.027	-0.032	0.208
	[0.469]	[0.144]	[0.245]
3	0.143	0.161	0.220
	[0.461]	[0.136]	[0.234]
4	0.119	0.020	0.191
	[0.463]	[0.150]	[0.242]
5 good	-0.047	0.045	0.418
	[0.469]	[0.175]	[0.268]

Orientation in date (ref.=bad)					
Fair	-0.729		-0.090		-1.004*
	[0.505]		[0.276]		[0.419]
good	-1.016*		-0.159		-0.921*
	[0.495]		[0.259]		[0.407]
words listing	-0.003		-0.037+		0.027
	[0.030]		[0.021]		[0.026]
verbal fluency score	0.010		-0.002		0.005
	[0.009]		[0.005]		[0.008]
geographical proximity (ref.=coresident)					
less than 5 km	1.519***		1.756***		1.744***
	[0.346]		[0.131]		[0.228]
between 5 and 25 km	0.698*		1.033***		1.049***
	[0.352]		[0.146]		[0.233]
between 25 100 km	0.060		-0.370+		0.231
	[0.370]		[0.223]		[0.250]
more than 100km	-1.462***		-1.687***		-1.172***
	[0.437]		[0.267]		[0.328]
Area of building (ref= bigtown)					
town	0.006		0.113		-0.125
	[0.106]		[0.085]		[0.106]
rural area	0.115		0.184+		0.156
	[0.130]		[0.101]		[0.130]
country (ref.= Sweden)		country (ref.= Austria)		country (ref.= France)	
Netherlands	0.179	Germany	0.107	Belgium	0.145
	[0.118]		[0.133]		[0.100]
Denmark	-0.192	Spain	0.315*		
	[0.142]		[0.149]		
		Italy	0.526***		
			[0.146]		
		Greece	0.524***		
			[0.141]		
		Switzerland	0.204		
			[0.194]		
Constant	-1.252		-1.033*		-0.416
	[0.780]		[0.421]		[0.631]
N	4520		5140		3670

Standard errors in brackets + p<0.1, * p<0.05, ** p<0.01, *** p<0.001

9.8 Estimating the second step without cohort-only linear age

Table 3.16 Descriptive Statistics Second Step -Control Variables-

	Pro-egalitarian		Pro-traditional		Pro-natalist	
Adultchild	Number	%	Number	%	Number	%
gender						
male	1428	56.7	2746	58.3	1171	57.7
female	1089	43.3	1964	41.7	860	42.3
Total	2517	100.0	4710	100.0	2031	100.0
Grandparent						
gender						
male	820	47.5	1485	47.9	732	52.2
female	905	52.5	1612	52.1	670	47.8
Total	1725	100.0	3029	100.0	1402	100.0

Figure 3.9 Marginal Effect of Grandparental Childcare Propensity on Having a First Birth by Group of Country (Second Step)

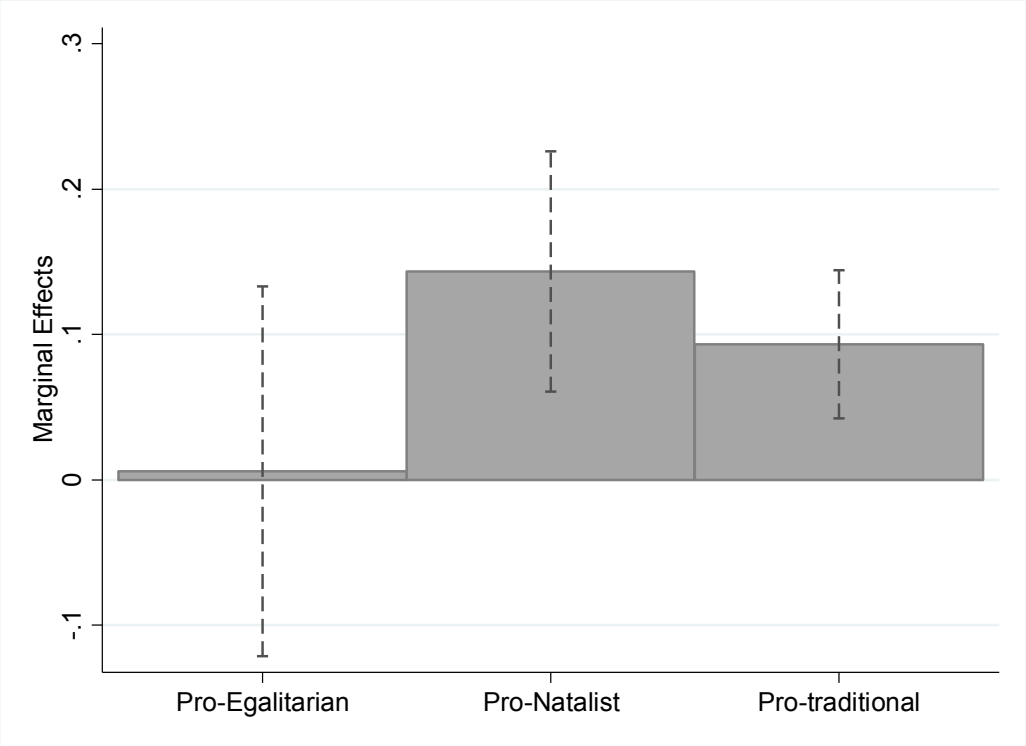
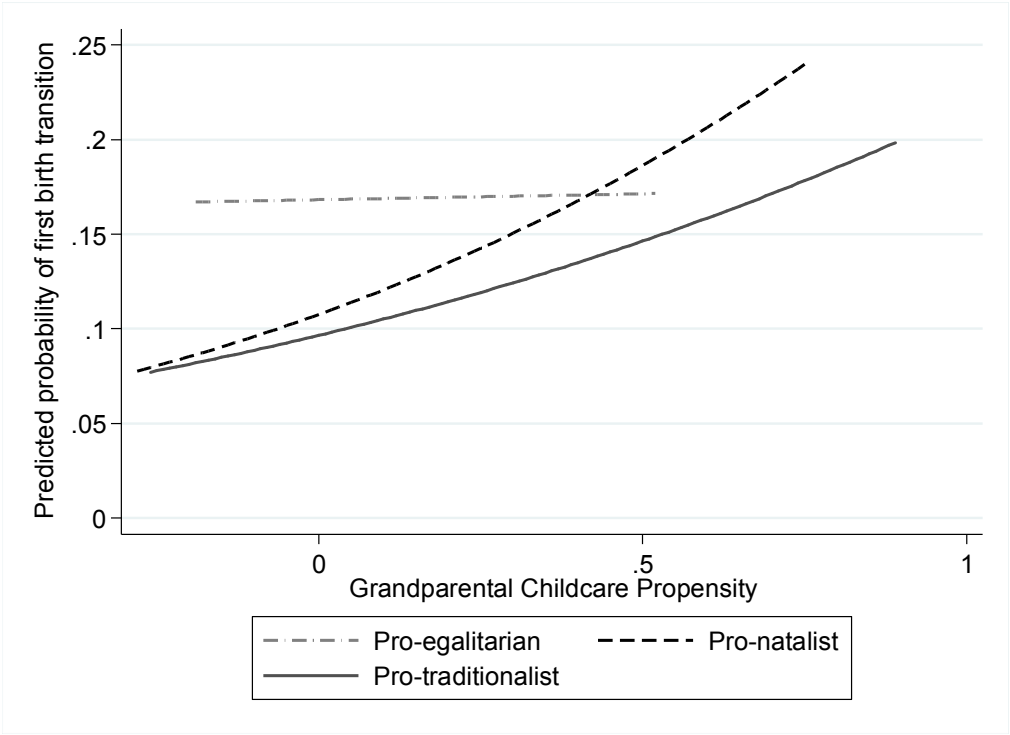


Figure 3.10 Predictive Probability of Having a First Birth on Grandparental Childcare Propensity by Group of Countries (Second Step)



Chapter 4 Grandparental fertility dividend? p. 168-213, has been removed at the author's request.

Chapter 5
Conclusions

1.Conclusions

In this chapter I summarize the main findings and some conclusions we can draw from chapters 2-4. Each of these chapters presents new results but, at the same time, they also pose challenges for future research. The common thread of the dissertation is how fertility, as a function of women's reconciliation problems, has changed as a consequence of major economic and demographic changes over the second half of the 20th Century.

Chapter 2 investigated the relationship between fertility, marriage and cohabitation. It aimed at investigating the meaning of cohabitation as new type of union in two different fertility settings. Chapters 3 and 4 focused on the influence of new intergenerational structures on fertility. They analyze how contemporary grandparents can influence fertility by easing couples' work-family conflicts. Specifically, Chapter 3 investigated to what extent would-be grandparents and their characteristics may influence an adult child's transition into parenthood. Chapter 4 focused more on the role of grandparental childcare for the second birth transition, which is the crucial transition for higher completed fertility levels.

Each of the three chapters uses a different combination of datasets and quantitative methods to explore fertility dynamics. Chapter 2 explores the relationship between type of union and fertility outcomes for the most recent cohorts (i.e. those born after 1960) in both Norway and Spain. First, we investigated whether the context for fertility is different. In particular we analyzed the distribution of both first and second birth transitions between marriage and cohabitation. Second, in exploring such a difference we take into account the interrelation between fertility and partnership transitions. Using the GGS 2007 for Norway and the FFS 2006 for Spain, we reconstructed individuals' partnership and fertility histories. The empirical results highlight that, in Spain where cohabitation, as a context for childbirth, is still at an early stage of normative acceptance, fertility is positively correlated with cohabitation only when it is followed by marriage. In Norway, where cohabitation is practically equivalent to marriage, fertility is positively correlated with all types of unions. Nonetheless, in the two countries the preferred context for fertility remains marriage.

Chapter 3 focused on the relationship between fertility and informal care. It investigates to what extent would-be grandparents, if available to provide childcare, influence adult

children's transition into parenthood. Using the first two waves of SHARE, I implement a two-step approach in order to eliminate possible strong collinearity among variables. The results show a general positive influence of prospectively available grandparents on entry into parenthood across all countries. Furthermore, different models for different groups of countries are estimated in order to avoid a too heterogeneous sample. This chapter also contributes indirectly to the debate about to what extent different welfare regimes shape fertility decisions. The results show that grandparents play an important role in those countries where there is normative acceptance of informal care (Jappens and Van Bavel, 2012). This influence is significant in those countries where grandparental care is less prevalent but more intense within the population (Hank and Buber, 2009). Furthermore, countries characterized by a fairly efficient public childcare system show the strongest effect.

Chapter 4 investigated the role of grandparental childcare used during the first child' early years in influencing the second birth transition. Using the first five waves of MCS, I use an instrumental variable approach. The type of childcare used by households is endogenous to fertility transitions. Following the approach taken in previous studies (e.g. Arpino et al., 2013), I instrument grandparental childcare with a variable for whether grandmothers are still alive. This chapter focuses on a single country, the UK. There are two reasons for this choice. First, the UK is one of the countries with the most expensive early childcare. Second, it shows a very peculiar fertility trend which is stable overall but very heterogeneous once we break it down according to specific characteristics like education or ethnicity (Sigle-Rushton, 2008). Results show that grandparental care in the early years has a strong and positive effect on second birth transitions. The effect of grandparental childcare remains positive and significant after controlling for educational levels, income quintiles, ethnicity or maternal traditional values.

The dissertation derives several conclusions that can motive future research. Chapters 2 and 3 offer a general micro-macro overview of fertility dynamics, whereas Chapter 4 focuses more on a case study, the UK. It provides insight into the importance of grandparental support by focusing on micro-level mechanisms. These findings are relevant for future research but also for perspective data collection and methodological advancement. First, they contribute to the debate about important research questions

utilizing an alternative methodological approach (Chapter2). Of course, there are previous studies that used multilevel multistate models for answering similar research questions (e.g. Baizan et al., 2003) but it was never on countries like Spain and nor on the most recent cohorts. Second, they shed light on the role of grandparents in the transition into parenthood (Chapter 3). Existing research has considered them separately, there is an extensive literature on the interplay between grandparents and fertility (e.g Thomese and Liefbroer, 2013,). Yet, some studies focus on the influence of first birth transition on subsequent fertility transitions (e.g.Margolis and Myrskyla 2011 Myrskyla and Margolis 2014) but there are no studies which combine the two . Finally, these findings suggest that, in the early years of the child, grandparental help is beneficial also for a second birth transition (Chapter 4). Further, this chapter also represents a clear example of how exploit a type of dataset not designed for intergenerational research. Chapter 2 highlights the importance of taking into account endogeneity and selection at the time of analyzing interdependent processes like fertility and partnership's formation. Nonetheless, also after using such a sophisticated statistical method, we could not draw any clear conclusion without recurring to the qualitative literature. Measuring selection on unobservables does not provide us with a universal explanation; we need to interpret that measure. Especially for old cohorts, indeed, quantitative research has a limit; cohabitants in the past were so few that these sophisticated models cannot be identified. Nonetheless, qualitative studies jointly with simpler models on old cohorts can give us a hint to both the past and current social meaning of fertility within cohabitation.Most importantly, it can give us a clearer understanding of the changing meaning of, and selectivity into, childbirth within cohabitation. Thus, in order to open the black box, strong quantitative research should be flanked by qualitative research. In the future, more rigorous mixed methods, i.e. studies that use the same sample for both qualitative and quantitative analysis, are necessary and desirable.

Chapter 3 and 4 focus on the role of informal childcare, grandparental specifically, on fertility transitions. Grandparental care has been found to be very important for both adult child and the grandchildren (Meltzer, 1994; Fergusson; Maughan and Golding, 2008; Aassve et al., 2012a, b; Gauthier, 2002; Mathews & Sear, 2013; Thomese&Liefbroer, 2013; Arpinoet al., 2014). In fertility research, great attention has been devoted to second or subsequent births transition but very little is known about the

influence of grandparents on entry into parenthood. Chapter 3 suggests that grandparents can play a role in this very important transition in individuals' life course. Yet, we know that the initial experience indirectly influences subsequent transitions, i.e.second and higher parity transitions (Margolis and Myrskyla 2011 Myrskyla and Margolis 2014, Morgan 2003). However, we still do not know what are the most important grandparental characteristics influencing parental decisions.

Current and future research on grandparenting is not an easy task. Due to lack of data it is very important to make the limitations explicit. In the following paragraph, I would like to discuss the main characteristics of currently available datasets and the main limitations they imply. First, very few longitudinal surveys collect data on more than one generation and, when they do, it is very difficult to obtain rich information about all the generations involved. Furthermore, longitudinal studies on grandparents suffer from attrition due to both the death of the individual or his dropout because of age-related health issues. SHARE focuses on the oldest generation and this implies that information on the younger generations is limited. Furthermore, for childcare studies, only one half of the family is observed (i.e. the main respondent). The strength of SHARE is certainly the possibility to carry out cross country, comparative research. On the other hand, due to its structure, it allows only intergenerational studies about either the role played by basic demographics of the youngest generations or studies focusing on grandparental outcomes. In contrast, the MCS focuses on the youngest generation, i.e. on children born between 2000 and 2001. It provides fairly rich information about the child and its parents. It is longitudinal, focused only on the UK, and since it is a cohort study of children, different parental cohorts are available. Here we have almost no information about health and living conditions of grandparents. We do know whether they are alive and whether they are providing childcare. Thus, intergenerational studies focusing more on the consequences of grandparents on grandchildren and parents are feasible. Nonetheless, our ability to better understand the relationship between intergenerational exchanges and grandparental characteristics is limited. The other datasets like the British Household Panel Study, identify only co-resident grandparents. Nowadays, individual trajectories are very heterogeneous and increasingly based on individual choices. Nonetheless, each life trajectory is connected with others' in a more complex way. Thus, for instance to study childcare arrangements we require information about grandparental work or health status because it is no longer so rare to have working

grandparents. Furthermore, when it comes to the relationship between childcare strategy and grandparental availability, there is the need to add a spatial dimension to these studies. Choosing whether sending a child to one day-care rather than another, or whether to leave the kids with grandparents is intimately connected with the time-space dimension. In the future, surveys should be able to connect different individual trajectories taking into account the changing meaning of family. Because, as notes Judith Seltzer in her presidential address at the PAA 2016 meetings, in order to understand who is in the family or what families do, we should understand individuals' attitudes and behavior and their change overtime. Nowadays individuals have more vertical ties (Uhlenberg, 1996), and surveys should start to take this into consideration.

From a more theoretical perspective, in the last three decades grandparental research has gained importance due to demographic changes like increasing life expectancy. Family ties have become more important and they make families more stable but also more complex (e.g. step grandparents). In this thesis I focus on the relationship between fertility outcomes and family ties. One of the most important findings is that it seems that grandparental childcare works better as a complement rather than a substitute for formal childcare (Chapter 3). A good mix between formal and informal childcare may be more encouraging for adult children's transition into parenthood (Chapter 3).When childcare is combined it is more sustainable for everyone and it can be more beneficial also in terms of child outcomes. On a more speculative note, this is somehow an encouraging result because it tells us that family is important in terms of exchange and transmission but, at the same time, that if individuals know that family is not the only channel, things works better. Indeed the fact that those countries with both formal and informal care show a greater propensity of first births means that not only fertility but most likely also female labour force participation would be higher. This is encouraging because it provides a clear direction for future policies. In case family is disadvantaged the possibility of having a reliable backup option would probably attenuate the differences in "diverging destinies", especially for very young children. Nonetheless, we also know that public policies are endogenous to family structure and that, at the same time, in some contexts, the extended family represents a safety net that, to some extent, may level out starting differences. Building on this, there are two important questions that in future research needs to be answered: "how desirable is grandparental

childcare in our society?" and “Is this desirability a function of the amount of grandparental care provided?”

In order to answer these questions, we should first of all define what we mean by desirability and how to measure it. Generally speaking, something is desirable when it improves substantially the quality of the outcomes of interest. One possibility is to measure to what extent grandparenting has positive effects for care providers, i.e. grandparents. As explained by Hank and Buber (2009), in some countries to be a grandparent is a full-time job. This can be too demanding in terms of energy for grandparents, especially in the early years of the newborn. US research has to some extent explored the consequences of grandparenthood on grandparental outcomes (Baker & Silverstein, 2008; Hughes, Waite, LaPierre, & Luo, 2007, Ruiz and Silverstein, 2007). Yet, in Europe little attention has been devoted to this topic. Some exceptions are the study by Arpino and Bordone (2014) that explores the effect of grandparenting on cognitive outcomes of grandparents or the one by Di Gessa and his collegues (2015) who explore health impact of grandparenting. A second possibility to handle desirability is to measure whether grandparental childcare is beneficial for those who receive care, i.e. parents and grandchildren. Important variables to be considered might be both cognitive and non-cognitive child outcomes. Although there is an extensive literature, especially in the US and the UK, focused on child outcomes (Waldfoegel, 2006; Del Boca, Piazzalunga and Pronzato, 2014), when it comes to the direct grandparental effect, empirical evidence is scant. The same holds for studies that look at the effect of grandparents on couples' outcomes like well-being or satisfaction. Whether grandparents have a role in such a relationship is still to be tested.

Starting from these two future lines for research, we should also explore how this desirability changes in a dynamic perspective. Thus, for instance, too many hours of grandparenting per week might become detrimental for both grandparental health and satisfaction. Nonetheless, this negative relationship might hold only for specific ages of the grandchild or of the grandparent. Yet, when households have to choose their childcare strategy, in general they choose a combination of childcare sources. Research focusing on the interplay of fertility and childcare arrangements, considering a childcare “portfolio” rather than a main childcare provider, is almost inexistent. Yet, the decision process about the proper childcare “portfolio” is the product of both some fixed

constraints, e.g. income, and some varying criteria, like childcare quality or the child's age.Apart from one study by Silverstein and Marenco (2001), there are no longitudinal studies examining how grandparenthood changes over the life course of both the grandparent and the grandchildren. As we saw in Chapter 4, when the child is very young it seems that parents perceive grandparental childcare as universally beneficial for the toddler, regardless of their educational level, their income or their degree of traditional values. One possible explanation is that when the child is still a toddler, a grandparent might appear as the most reliable figure to leave the toddler with (of course, excluding parents). However, such a perception may change when the grandchild grows older. What is the direction of such a change? From the grandparents' perspective, is having an adolescent grandchild more fulfilling/beneficial than a toddler? From the grandchildren's perspective, is there an age where grandparents are better in terms of cognitive, non-cognitive outcomes and well-being? Having a helping grandparent alleviates parental stress or parents' relationship quality? Are all these relationship are different across different type of families (e.g. step families, single parents)? All these issues and their consequences on "diverging destinies" discourse, remain open for future European research.

2.References

Aassve, A., Arpino, B., &Goisis, A. (2012). Grandparenting and mothers' labour force participation: A comparative analysis using the generations and gender survey. DemographicResearch, 27, 53.

Aassve, A., Meroni, E., &Pronzato, C. (2012).Grandparenting and childbearing in the extended family.European Journal of Population/Revue européenne de Démographie, 28(4), 499-518.

Arpino, B., &Bordone, V. (2014). Does grandparenting pay off? The effect of child care on grandparents' cognitive functioning. Journal of Marriage and Family, 76(2), 337-351.

Arpino, B., Pronzato, C. D., & Tavares, L. P. (2014).The Effect of Grandparental Support on Mothers' Labour Market Participation: An Instrumental Variable Approach. European Journal of Population, 30(4), 369–390. doi: 10.1007/s10680-014-9319-8

Baizán, P., Aassve, A., & Billari, F. C. (2003).Cohabitation, marriage, and first birth: The interrelationship of family formation events in Spain. European Journal of Population/Revue européenne de Démographie, 19(2), 147-169.

Del Boca, D., Piazzalunga, D., & Pronzato, C. (2014).Early child care and child outcomes: the role of grandparents.

Fergusson, E., Maughan, B., & Golding, J. (2008). Which children receive grandparental care and what effect does it have?. Journal of Child Psychology and Psychiatry, 49(2), 161-169.

Gauthier, A. (2002). The role of grandparents. Current Sociology, 50(2), 295-307.

Gray, A. (2005). The changing availability of grandparents as carers and its implications for childcare policy in the UK.Journal of Social Policy, 34(04), 557-577.

Hughes, M. E., Waite, L. J., LaPierre, T. A., & Luo, Y. (2007). All in the family: The impact of caring for grandchildren on grandparents' health. The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62(2), S108-S119.

Hank, K. & Buber, I. (2009). Grandparents caring for their grandchildren: Findings from the 2004 survey of health, ageing, and retirement in Europe. Journal of Family Issues, 30(1), 53–73. doi:10.1177/0192513X08322627

Jappens, M. & Van Bavel, J. (2012). Regional family norms and child care by grandparents in Europe. Demographic research, 27(4), 85–120.doi: 10.4054/DemRes.2012.27.4

Margolis, R., & Myrskylä, M. (2011).A global perspective on happiness and fertility. Population and Development Review, 37(1), 29-56.

Mathews, P., & Sear, R. (2013). Family and fertility: kin influence on the progression to a second birth in the British Household Panel Study. PloS one, 8(3), e56941.

Myrskylä, M., & Margolis, R. (2014). Happiness: Before and after the kids. Demography, 51(5), 1843-1866.

Morgan, S.P. (2003). Is low fertility a twenty-first-century demographic crisis?. Demography, 40(4), 589-603.

Ruiz, S. A., & Silverstein, M. (2007).Relationships with grandparents and the emotional well-being of late adolescent and young adult grandchildren. Journal of Social Issues, 63(4), 793-808.

Sigle-Rushton, W. (2008). England and Wales: Stable fertility and pronounced social status differences. Demographic Research, 19(15), 455-502.

Silverstein, M., & Marenco, A. (2001). How Americans enact the grandparent role across the family life course. Journal of Family Issues, 22(4), 493-522.

Thomese, F., &Liefbroer, A. C. (2013). Child care and child births: The role of grandparents in the Netherlands. Journal of Marriage and Family, 75(2), 403-421

Waldfogel, J. (2006). What do children need?. Juncture